STATE OF ALASKA

Department of Transportation and Public Facilities
Northern Region, Aviation Design

Engineer Design Report

For

Brevig Mission Airport Lighting and Resurfacing

Project No. NFAPT00500

AIP No. 3-02-0400-XX-202X

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ACRONYMS

AC.....FAA Advisory Circular
AIP.....Airport Improvement Program
ALP.....Airport Layout Plan
ARC.....Airport Reference Code
ASC.....Aggregate Surface Course
AVEC.....Alaska Village Electric Cooperative
AWOS.....Automated Weather Observation System
CFR.....Code of Federal Regulations
CMP.....Corrugated Metal Pipe
CSPP.....Construction Safety and Phasing Plan
DOT&PF.....State of Alaska, Department of Transportation and Public Facilities
EEB.....Electrical Equipment Building
FAA.....Federal Aviation Administration
FAR.....Federal Aviation Regulations
ICAP.....Indirect Cost Allocation Program
KTS.....Brevig Mission Airport
LED.....Light Emitting Diodes
M&O.....Maintenance and Operations
NAVAID.....Navigational Aids
NOAA.....National Oceanic & Atmospheric Administration
PAPI.....Precision Approach Path Indicator
REIL.....Runway End Identifier Light
RPZ.....Runway Protection Zone
ROFA.....Runway Object Free Area
RSA.....Runway Safety Area
RW.....Runway
Michael Baker.....Michael Baker International
SREB.....Snow Removal Equipment Building
TDG.....Taxiway Design Group
TOFA.....Taxiway Object Free Area
TSA.....Taxiway Safety Area
U.S.....United States

NOTICE TO USERS

This report reflects the thinking and design decisions at the time of publication, June 2021. Changes frequently occur during the evolution of the design process, so persons who may rely on information contained in this document should check with the Alaska Department of Transportation and Public Facilities for the most current design. Contact the Design Project Manager, Jonathan Hutchinson, at (907)451-5479 for this information.

I. Introduction

A. Purpose of Project

The community of Brevig Mission, Alaska is on the western coast of the Seward Peninsula, northeastern edge of Port Clarence Bay, and approximately 66 miles northwest of Nome. Brevig Mission Airport (KTS) is owned by the Alaska Department of Transportation and Public Facilities (DOT&PF), Northern Region, and provides year-round transportation for the community of Brevig Mission. The airfield consists of two gravel-surfaced, perpendicular runways, a taxiway, an apron, and an access road. The primary runway (RW), designated 04-22, is 75-feet wide and 2,110-feet long. The crosswind runway, RW 11-29, is 100-feet wide and 2,990-feet long. The Project Layout Plan is included in **Appendix A**.

Periodic regrading over the years has redistributed the runway, taxiway, apron, and access road surface course causing depressions and loss of surfacing material. Significant erosion and toe rotation are also present at the embankment shoulders reducing the safety area below the required dimensions (See **Figure 1**). This erosion has encroached on the threshold markers and lighting and is beginning to impact the runway lighting. The associated damage is primarily caused by thaw induced differential settlement of ice-rich subgrades underlying the airport embankments. The airfield lighting system has also outlived its useful life and requires rehabilitation and replacement.

Figure 1: RW 11-29 RSA degradation present during October 14, 2020 Site Visit (View southeast)

B. Project Description

To address the issues at the airport, this project will:

- Repair differential settlement to the existing embankments and flatten the side slopes of runways, taxiway, apron, and access road to reduce future erosion.
- Resurface the existing runways, taxiway, apron, and access road.
- Apply dust palliative to the resurfaced areas.
- Replace the airfield lighting system, rotating beacon, and electrical components.

II. Design Analysis

A. Airport Layout Considerations

1. Conformance with FAA Standards

a. Dimensions, Pavements, and Hazards

Existing dimensions, grades, pavements, and horizontal and vertical layout of the airport will remain. The primary scope for this project is to repair settlement induced damage to the embankment and resurface the gravel airfield. Reconstruction or changes to the airfield geometrics to conform with current standards are outside the scope of the project.

Existing dimensions for RW 04-22 and RW 11-29 were established as part of the airport improvements project completed in 1997[1]. As-built plans show RW 04-22 was widened to 75 feet and the Runway Safety Area (RSA) was widened to 120 feet, while RW 11-29 was constructed to 100 feet and the RSA to 150 feet. The Airport Reference Code for both runways is B-II, although RW 04-22 RSA width and length conform to A-I Small and RW 11-29 width conform to B-II standards. FAA has concurred to maintain the existing runway widths and lighting locations, see **Appendix B**. A summary of the runways' dimensions and FAA standards are shown in **Table 1**.

Table 1 – Summary of Runway Dimensions

Dimension	RW 04-22			RW 11-29			AC 5300-13A ARC B-II Standard
	As-Built	*Survey*	*Proposed*	*As-Built*	*Survey*	*Proposed*	
Runway Width	75'	75'	75'	100'	100'	100'	75'
Runway Shoulder Width	10'	10'	10'	10'	10'	10'	10'
RSA Width	120'	120'	120'	150′	150'	150'	150'
RSA Length Beyond RW Threshold	240'	240'/240'	240'/240'	300′	285'/290'	300'/300'	300'
ROFA Width	250'	--	500'	250'	--	500'	500'
Runway Length	2,110'	2,110'	2,110'	3,000'	2,990'	3,000'	--

Note: RSA – Runway Safety Area
ROFA – Runway Object Free Area

Existing taxiway geometry was also established as part of the 1997 Airport Improvements project. The existing taxiway was relocated along with the apron as part of the referenced project. The taxiway was designed to conform Taxiway Design Group (TDG) 2. A summary of the taxiway dimensions and FAA standards are shown in **Table 2** below. Based on the survey, the taxiway safety area (TSA) was established as 53 feet. During the June 2021 site

[1] Brevig Mission Airport Improvements AIP No. 3-02-0294-02/65007 Asbuilts

visit differential settlement was noted from the toe to inside of the taxiway lights. This project proposes to reestablish the taxiway to meet design standards.

Table 2 – Summary of Taxiway Dimensions

Dimension	As-Built	Survey	Proposed	AC 5300-13A TDG 2 Standard
Taxiway Width	35’	35’	35’	35’
Taxiway Shoulder Width	10′	10’	10’	10’
TSA Width	79’	53’	79’	79’
TOFA Width	131’	--	131’	131’

Note: TSA – Taxiway Safety Area
TOFA – Taxiway Object Free Area

The existing apron is 200 feet long by 300 feet wide. The June 2021 site visit noted minimal ponding around the apron.

Brevig Mission Airport has known hazards within the runway protection zone (RPZ). These hazards include Clarence Road (RW 04) and the old Haul Road (RW 22). Clarence Road elevations sits 15 feet below the runway elevation. Changes to Clarence Road are outside the scope of this project. The old Haul Road ties into the runway, this project proposes to remove the gravel embankment within the RPZ.

b. Conformance with the Airport Layout Plan (ALP)

This project conforms to the Brevig Mission Airport ALP approved by the FAA in August 2003. The 2003 ALP includes non-standard conditions for runway, taxiway, and safety area geometry for the current critical aircraft. Reconstructing the runway and taxiway to meet the new design standards is beyond the scope of this project. FAA concurred with maintaining the proposed design dimensions in an email dated June 8, 2021, see **Appendix B**.

c. Analysis of Alternatives and Preferred Alternative

Two embankment slope treatment alternatives were considered to repair existing erosion, mitigate future thaw induced differential settlement, and displace ponding against the airport embankment away from the operational surface. A third alternative considered the placement of insulation into the reconstructed 6:1 side slopes to further reduce heat transfer into the subgrade. See **Appendix C** for additional comparison. The following selection criteria were evaluated:

- Constructability/Construction Sequencing
- Cost
- Maintenance Burden

Assumptions:

- Reported air temperatures for 2020 remain constant for the next five years
- The near surface soils beneath the embankment are thawed to a depth of 4 feet
- Thaw ponds will be filled
- Surface aggregate will be locally sourced

Alternative 1: This alternative consists of flattening the existing embankment slopes from an average slope of 1.5:1 (H:V) to 6:1 (H:V), see **Figure 2**. The proposed embankment will fill existing thaw ponds and construct shallower slopes to help reduce snow accumulation along the embankment. The reduced snow accumulation will increase heat loss during the winter.

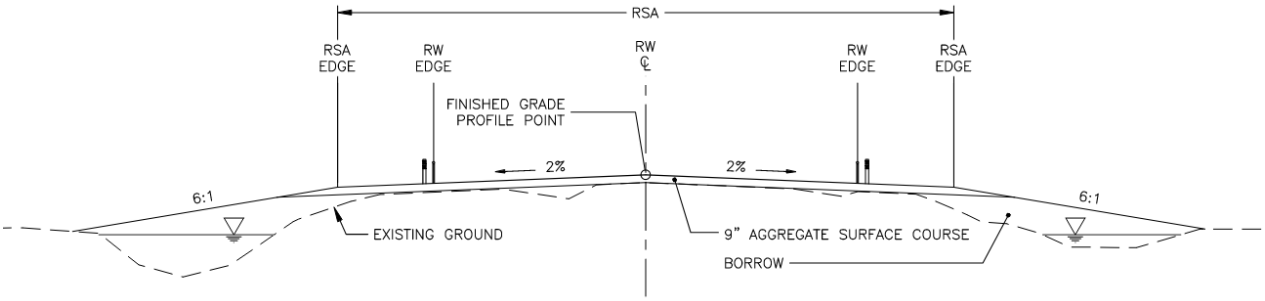


Figure 2: 6:1 Side Slopes

Alternative 2: This alternative consists of constructing "barn roof" style side slopes. This will take the average slope of 1.5:1 (H:V) to 10:1(H;V) for 25 feet from RSA hinging to a 3:1 to daylight, see **Figure 3**. This embankment treatment will provide approximately a two feet thick embankment over the tundra near the toe, providing additional material to maintain adequate slopes, and fill the existing thaw ponds.

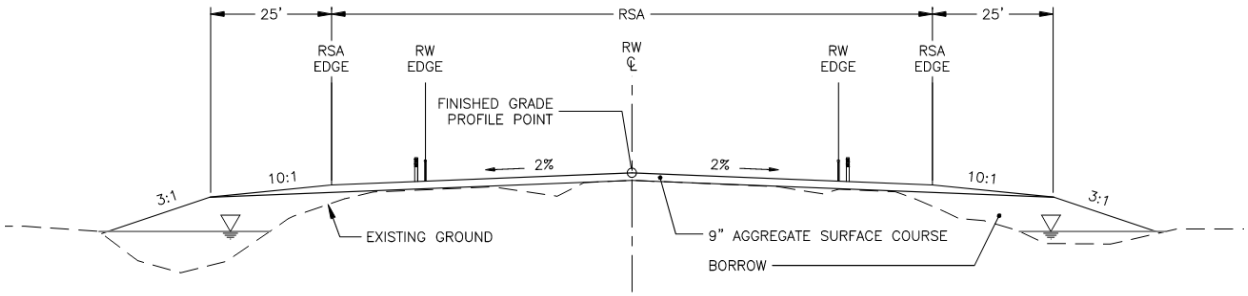


Figure 3: Barn Roof Side Slopes

Alternative 3: This alternative extends existing insulation placed within the RSA and flattens the embankments slopes from an average of 1.5:1 (H:V) to 6:1 (H:V), see **Figure 4**. This alternative would require approximately 20ft of new insulation to be added to the existing insulation for the length of embankment repair. Construction would require the existing embankment be excavated to expose the edge of the existing insulation and reconstruction of the RSA and embankment slopes. This alternative would also require displacing the ponded water against the existing embankment to accommodate placement of new embankment material. Once the thaw ponds are filled, and the ground is cool, then the insulation installation occurs in the late winter. After the insulation is installed, then the resurfacing and lighting replacement will be constructed.

For the insulation to be most effective it is recommended to install the insulation when the ground is frozen complicating installation and phasing. This combination increases construction complexity, cost, and time. **Figure 5** shows the existing embankment

degradation and exposed insulation. Insulation fragments were also observed in the ponds and sloughed sections of the embankment during site visits.

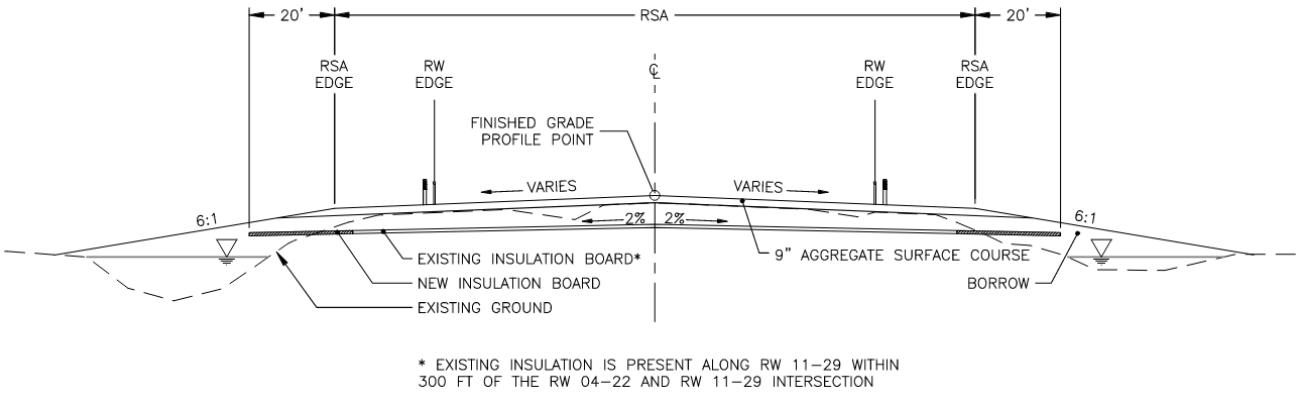


Figure 4: Embankments with Insulation

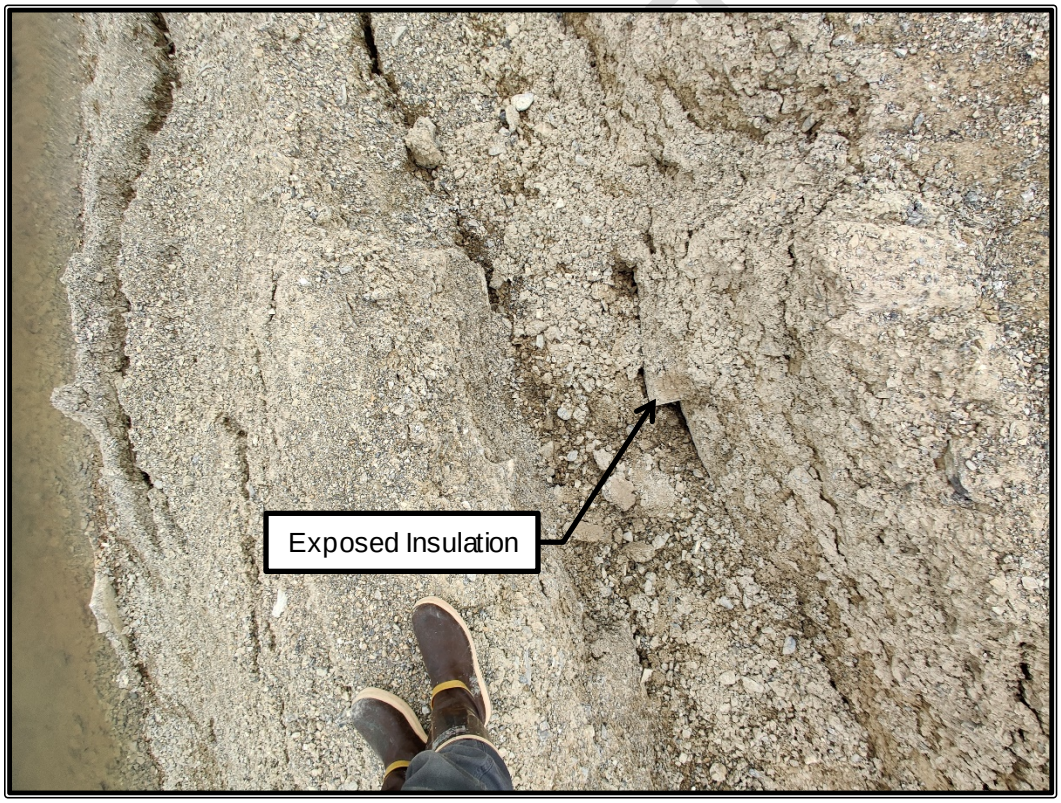


Figure 5: Exposed Existing Insulation June 9, 2021

Alternative Comparison: The alternatives were compared rough order of magnitude (ROM) costs to construct, the constructability and sequencing, and the forecasted maintenance burden. Each alternative is ranked 1 to 3 for each category, with 1 being the most favorable solution for the category. The comparison is summarized in **Table 3.**

Cost – The cost of construction is a function of the alternative comparison. The main cost differentials between the alternatives include borrow and insulation.

- **Alternative 1:** Requires approximately 150,000 cubic yards (CY) of borrow and no insulation, resulting in a ROM cost of $13,160,000
- **Alternative 2:** Requires approximately 162,000 CY of borrow and no insulation, resulting in a ROM cost of $13,447,000
- **Alternative 3:** Requires approximately 150,000 CY of borrow and 30,000 square feet (SF) of insulation, resulting in a ROM cost of $20,369,000

Constructability and Sequencing

- **Alternative 1:** The construction sequencing will require displacing the water from the thaw ponds prior to filling to a minimum one foot above existing grade. The next phase will continue to build up the safety areas. Once the safety areas are reconstructed, then resurfacing and lighting replacement will be completed along the runways, taxiway, apron, and access road. The final phase of the project will apply a dust palliative to preserve dust control.
- **Alternative 2:** The construction sequencing will require displacing the water from the thaw ponds prior to filling to a minimum one foot above existing grade. The next phase will continue to construct the safety areas. Once the safety areas are reconstructed, then replacement of the lighting and resurfacing of the runways, taxiway, apron, and access road will occur. The final phase of the project will apply a dust palliative to preserve dust control.
- **Alternative 3:** The construction sequencing will require displacing the water from the thaw ponds prior to filling to a minimum one foot above existing ground elevation. The second phase will install the insulation by exposing the existing edge of insulation. This phase will be constructed during the early spring and require the embankment to be graded to provide an RSA slope of 5%, prior to the runway being operational. The third phase will compact the safety areas after spring breakup and raise to final grades, prior to resurfacing and new lighting. The final phase of the project will apply a dust palliative to preserve dust control. This alternative also requires additional storage area for the insulation.

Maintenance

- **Alternative 1:** This alternative provides flatten slopes, which will assistance with minimizing snow drifting at the toe of the embankment. The reduced snow accumulation aide in heat loss of the surrounding tundra and limit the thaw

penetration. The 6:1 slope treatment provides additional snow storage on the on the embankment shoulders compared to Alternative 2.

- **Alternative 2:** This alternative provides a 25 ft of 10:1 slopes before steepening to 3:1 to daylight. Snow accumulation is likely to occur along the 3:1 slope, which will decrease the heat loss of the surrounding soil. This is likely to produce similar results as the airport is currently experiencing. The maintenance required to maintain the slopes is increased due to the hinge within the embankment.
- **Alternative 3:** This alternative provides flatten slopes similar to Alternative 1, which will assistance with minimizing snow accumulation at the toe of the embankment. The addition of insulation will provide additional thermal benefit. However, if the insulation shifts, the maintenance requirements to rectify insulation failures is increased. The June 2021 site visit observed minimal differences, between the current insulation sections and the non-insulated sections, along the runway surface or embankment slopes. Thaw ponds were observed around the majority of the runway with depths in excess of 4 ft of water, increasing in depth near the runway intersection, where the insulation is present in the embankment. It is probably that much of the thaw settlement has taken place within the reconstructed embankment limits; thus, it is determined that insulation would be of little added value to the embankment.

Table 3 – Alternatives Comparison

	Cost	Constructability/Sequencing	Maintenance
Alternative 1	1	1	1
Alternative 2	2	2	3
Alternative 3	3	3	2

Note: Alternative were ranked with 1 being better and 3 being worse

Preferred Alternative: Alternative 1 is preferred alternative. This alternative will flatten the slopes reducing the amount of trapped snow along the crosswind runway and allow more heat to escape during the winter months. In return this alternative reduces the amount of thaw penetration of the tundra during the summer months and provides the toe of the embankment the farthest from the RSA.

d. Federal Aviation Regulation (FAR) Part 77 Clearances

There are terrain obstructions to the conical and horizontal (CFR14, §77.19b, 2020) surfaces. Clearing terrain obstructions is beyond the scope of this project and they will remain.

2. Design Aircraft

The design aircraft is the Cessna 208B Grand Caravan (ARC A-II Small) as determined by AC 150/5000-17 *Critical Aircraft and Regular Use Determination*. The Grand Caravan is the most demanding aircraft to fulfill the "regular use" requirement of 500 annual operations, as defined in the AC. The number of operations for each aircraft was retrieved from the Bureau of Transportation

Statistics website for the year 2019 (BTS 2020). The Cessna Grand Caravan is a propeller-driven aircraft with a gross weight less than 12,500 pounds. This defines the runways as "utility" (CFR14, §77.3, 2020).

3. Runway Alignments

The basis of bearing for the runway alignments is based on as-built monumentation defined by connecting the end monuments as surveyed from September 30 – October 4, 2020. A table showing the various as-built stationing, and distances along the runways is attached as **Appendix D**. The basis for stationing on RW 04-22 is the RW 04 end monument at 4+00.00. The basis for stationing on RW 11-29 is the RW 11 end monument at 95+00. See the appendix for additional information.

4. Access Road Standards

The access road was constructed during the 1997 Airport Improvements Project. The access road will only be modified for this project as needed to meet the following design standards where relevant:

- State of Alaska, DOT&PF Highway Preconstruction Manual, 2020
- AASHTO's Geometric Design of Highways and Streets, 2011, (The Green Book, or GB)
- AASHTO's Guidelines for Geometric Design of Vey Low-Volume Roads, 2019, (GDVLVLR)

The road design designation and design criteria forms are attached as **Appendix E**.

B. Soils and Grading

1. Soils

The Brevig Mission Airport is located in the Norton Sound Highlands Geographic district. Materials around the airport consist of a up to a 2-foot-thick vegetative mat, overlaying 3 to 5-feet of silt with occasional pebbles, which overlies sandy gravel. Brevig Mission soils are perennially frozen and contain abundant ice and ice lenses[2]. Thermal degradation of underlying ice-rich subgrade soils has cause differential settlement of the airport embankments.

Alluvial fan deposits are present along Shelman Creek. A borrow site north of the runway contains material suitable for the embankment reconstruction.

The locally available source, which does not meet the specifications for quality, was used to surface Runway 04-22 in 1997. Grab samples within the Shelman Creek borrow source were recovered during October 2020 and June 2021 site visits. Use of the local material source for the surface course would require modifying the quality specification for gradation and quality requirements. Alternatively, aggregate surface course that meets current quality specifications will need to be brought into Brevig Mission via barge.

[2]1996-04-02 Geologic Information Memorandum, Alaska DOT&PF

2. Internal Drainage and Frost

There are no internal drainage systems in place at Brevig Mission Airport. Climactic conditions and permafrost would require costly modifications and excessive maintenance to subsurface drainage systems due to differential settlement of the subgrade. Drainage occurs via surface runoff and is adequate for these unpaved surfaces.

3. Lab Tests

During DOT&PF's site visit in October of 2020, one grab sample was obtained. Lab tests from this grab sample from Brevig Mission's material site, located within one mile of the airport, are included in **Appendix F**. The material site is an alluvial fan deposit that contains silty, sandy gravel composed of angular to subangular fragments.

The project team obtained additional samples, from the material site, during a June 9, 2021 site visit. Draft lab results are also included in **Appendix F**.

4. Special Compaction Requirements

Special compaction effort is not anticipated.

5. Expansive Soil Problems

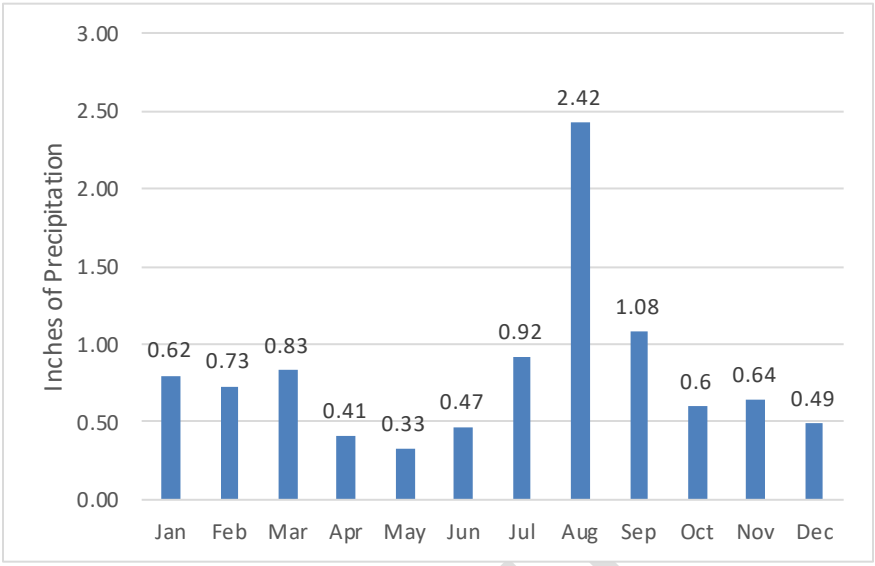
Expansive soils are not anticipated on this project.

C. Drainage

1. Rainfall and Runoff Data

The nearest WRCC (Western Regional Climate Center) US COOP Station to Brevig Mission is located approximately 6 miles away in Teller. The average annual precipitation for Teller is 9.73 inches. **Chart 1** shows the average monthly precipitation.

Chart 1 - Average Monthly Precipitation for Teller, Alaska



Source: WRCC, Period of Record: 1925-1997, https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak9102

2. Capacity and Structure Design

a. Existing Structures.

There is a single existing culvert located on the airport access road at approximate station 1124+00, adjacent to the SREB building pad see **Figure 6**. This culvert was installed in 1997 to convey drainage from the infield area across the access road. The culvert inlet and outlet were both underwater during the June 9, 2021 site visit (see **Figure 7** and **Figure 8)**. This project will fill the infield area, crush the culvert ends, and abandon the structure in place.

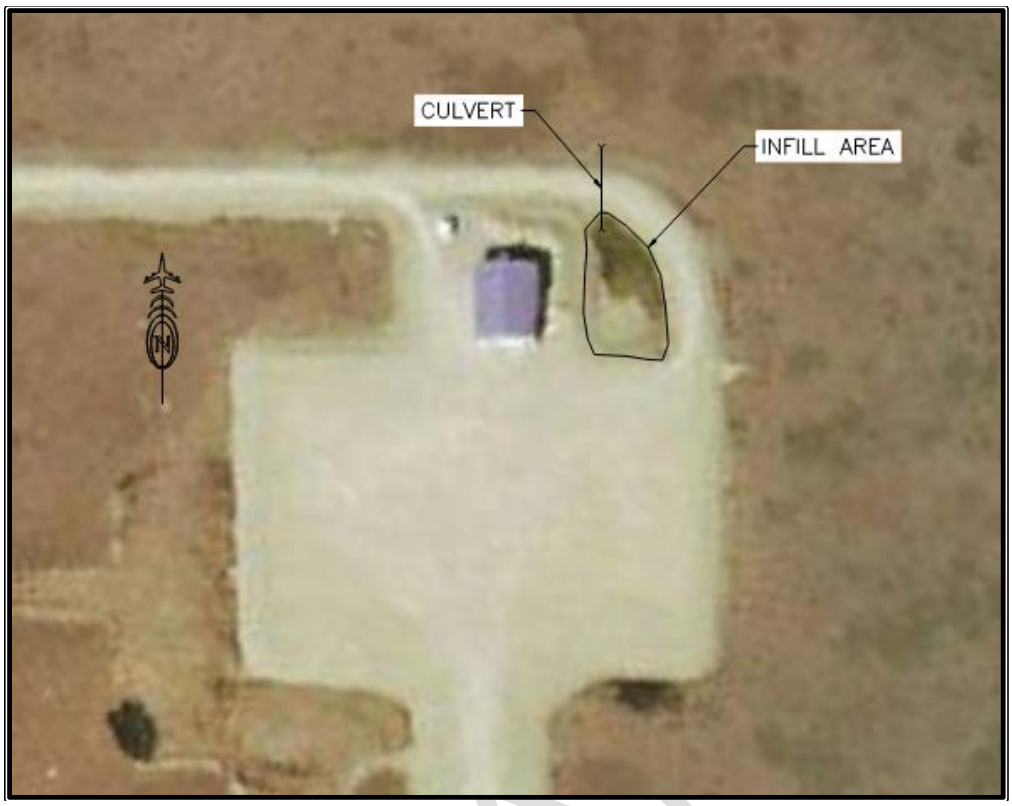


Figure 6: Infield Area Plan View

Figure 7: Infield Access Road Area – Culvert Inlet

Figure 8: Infield Access Road - Culvert Outlet

b. Existing Drainage Conditions and Structure Capacity

Airport drainage occurs via surface runoff. Water sheet flows away from the crowned centerline of the runways, taxiway, apron, and access road and sheds off the side slopes. The terrain near the airport predominantly drains from north to south and is partly impeded by RW 11-29 as it drains into Port Clarence. Secondary drainages include Shelman Creek on the west end of the runway.

Haul Route Drainage Structures:

Potential impacts to existing drainage structures along haul route were examined. The proposed haul route is approximately 1.5-miles as shown in **Figure 9**. Existing structures along the haul route include five culverts along Clarence Road and two culverts on New Haul Road. The Clarence Road culverts consist of three 24" corrugated metal pipes (CMP) cross culverts. Two culverts convey flow across Shelman Creek (60" CMP and 36" CMP). This crossing includes a gabion headwall to support the embankment, see **Figure 10**. At the time of the site visit, the 36" CMP was completely blocked. Improvements to the Haul Route Drainage structures are outside of the scope of this project. However, it is recommended the contractor provides rig mats to support additional truck loading across the culverts during construction.

Figure 9: Haul Route

Figure 10: Shelman Creek Crossing – Clarence Road

c. Proposed Conditions

The project will maintain overall drainage patterns on the airport with exception to the proposed infield fill between the airport access road and the apron.

3. Ponding, Erosion Control, and Extraordinary Features

Snow accumulates along the runway embankment slopes due to snow removal operations, flat terrain, and prevailing winds. This combination leads to warming ground temperatures and thermal degradation of the permafrost has resulted in excessive erosion. The terrain is gently sloping and there are not erosion issues, outside of the embankment, or extraordinary drainage features.

D. Pavements

The gravel surface and airport embankments have experienced significant thermal degradation since construction. Regular maintenance has kept the airport operational. However, the thermal erosion is impacting the RSA, TSA, threshold markers and lighting, runway and taxiway lighting and the gravel surfacing. Current conditions have deteriorated beyond the scope of maintenance and require a rehabilitation project to remedy the eroding embankments. The existing embankment and surface will be regraded and compacted, then a 9-inch layer of ASC will be placed over the runways, RSA, taxiway, TSA, apron, and access road. The crowns of the runways, taxiway, and apron will be re-established to improve drainage.

As-built plans of the 1997 project show the RW 04-22 embankments were lengthened, raised, and widened to current conditions. RW 11-29 and the access road were constructed. The taxiway and apron were relocated and expanded. The runways, taxiway, apron, and access road were capped with a uniform, 6-inch layer of ASC. The 6-inch layer of ASC was extended to the runway and taxiway edges and tapered down to meet the embankment at the edge of the runway and taxiway shoulders. The ASC layer was widened to the full RSA width at the ends of both runways to allow for aircraft turnarounds.

E. Lighting and Navigational Aids (NAVAIDs)

Lighting and NAVAIDs are designed according to FAA AC 150/5340-30J, *Design and Installation Details for Airport Visual Aids*, and the lighting device series AC 150/5345 standards, as applicable.

1. Existing Equipment

Brevig Mission Airport consists of two intersecting runways, RW 04-22 orientated SW to NE and RW 11-29 orientated NW to SE. These runways cross perpendicular to each other at the approximate midpoint of RW 04-22 and the northwestern third of RW 11-29. The existing runway and taxiway lighting consist of elevated lights. The light bases are steel, and lighting includes medium-intensity threshold/runway end, edge, and taxiway lighting. The airfield lighting is pilot-controlled via a radio receiver.

All the existing threshold/runway end, edge, and taxiway lights will be replaced, including the associated conduit, cables, and light bases. Removed lights and transformers will be offered to airfield maintenance for salvage. Disposal of the remaining materials and non-salvaged lights and transformers will be the responsibility of the Contractor.

The existing segmented circle with a lighted wind cone is located South of the runway apron just opposite the electrical equipment building (EEB) and snow removal equipment building (SREB) on the North side. The existing rotating beacon is mounted on a platform on top of the existing SREB. Both the lighted wind cone and rotating beacon will be removed and replaced.

An existing automated weather observation system (AWOS) is located south of the apron near the segmented circle and lighted wind cone. This system will not be affected by the project.

2. Power Supply

Power service to Brevig Mission Airport is provided from Alaska Village Electric Cooperative (AVEC) via an overhead distribution system from Brevig Mission proper. Power service is routed parallel to the airport access road. Improvements to the road will impact the power pole guy wires but is not expected to impact the poles. Modifications to the overhead electrical system related to access road improvements are outside of the project's scope.

AVEC medium voltage overhead wiring switches to below ground west of the airport, routed in conduit to a junction cabinet on the south end of the runway, where it transitions to above ground to feed the AWOS building. At the dead-end pole on the west side of the airport, there is an overhead tap running parallel to the airport access road north to the apron. A single-phase pole mounted

transformer is located at the end of this tap and serves the existing SREB and EEB via overhead secondary feeders. Both the transformer and the feeder to SREB will remain in place.

The existing runway and taxiway lighting systems are powered from a single lighting regulator located in the EEB north of the apron. The EEB with its corresponding regulator and lighting controls are approaching 20 years old, have reached their service life expectancy, and will be replaced. Electrical service entrance equipment for the EEB is mounted on the exterior of the EEB. The service is fed from the nearby pole-mounted transformer and will be replaced.

3. New Equipment

New lighting will consist of a medium intensity lighting system. Lighting layouts, circuit loading, and fixture selections will follow current design standards. All equipment will be installed per current specifications. Runway and taxiway lighting fixtures will use incandescent lamps. Per discussions with M&O personnel, light fixtures are subject to vandalism, and light-emitting diode (LED) lamps alternatives were discarded due to cost of replacement. A cone marker with reflective material will be placed around each fixture, with reflective material matching the lens color of the fixture.

The new lighting regulator and controls will be installed in the new EEB. The new EEB will include new lighting regulator, controller, panelboard, heater, and electrical service entrance equipment served from the existing utility transformer. The new service equipment will include a single meter base to serve the EEB.

A segmented circle was installed in 2019 around the existing wind cone at RW 04. The wind cone will be an L-807, Size 1, internally lighted wind cone on a tilt-down pole and will use LEDs for illumination. The wind cone will be connected to the new lighting controls with cables and conduit leading back to the EEB.

4. Rotating Beacon

The existing rotating beacon is attached to the SREB building just off the runway apron. This existing beacon will be removed, and a new LED rotating beacon installed on top of the existing SREB. The SREB is currently equipped with an exterior ladder that leads to a work platform off the building's north roofline. An existing equipment mounting platform is mounted to the work platform railing. The new beacon will be mounted on this platform. The beacon will be tied into the new lighting control system with new cables and conduit routed back to the EEB.

5. NAVAIDs

There are currently no PAPI or REIL systems installed at the airport and provisions for a new PAPI/REIL system will not be provided as part of this project.

III. Modifications of Agency Airport Design and Construction Standards

FAA AC 150/5300-13A states there should be no direct taxiway access between the runway and the apron. Correcting this condition would require a partial parallel taxiway and relocation of the apron. This work is outside the scope of this project. The current layout will not change.

The primary RSA does not meet geometric design standards for the critical aircraft. In addition, the taxiway at Brevig Mission Airport does not conform to horizontal standards as stated in FAA AC 150/5300-13A. Updating the primary RSA, as well as the taxiway geometry is outside the scope of the embankment rehabilitation and resurfacing project. The current primary RSA width, length, and taxiway geometry will not change.

No other modification to design standards have been identified. The DOT&PF *Standard Specifications for Airport Construction* (DOT&PF 2020) will be used in the development of this project. Special provisions to those specifications will be submitted to FAA for approval, as required, under separate cover.

IV. Cost Estimates

A. Engineer's Estimate

An Engineer's Estimate for the preferred alternative is attached as **Appendix G**.

Table 4 contains the estimate summary for the preferred alternative.

Table 4 – General Cost Estimate

Basic Bid Estimate		$10,808,000
Construction Engineering (15%)		$1,621,000
	Subtotal	$12,429,000
ICAP at 5.88%		$731,000
Project Total		**$13,160,000**

Note:
ICAP – Indirect Cost Allocation Program

B. Additive Alternatives

No additive alternatives have been identified.

V. Project Schedule

A. Time Constraints

The seasonal weather patterns at Brevig Mission offer considerable challenges to construction. The average temperature is above freezing from May to September, which gives approximately 150 days for construction activities per year or construction season. Some earthwork activities such as borrow pit development and material processing, can occur in less favorable conditions.

B. Recommended Schedule

The following schedule is proposed based on funds being obligated in early Federal Fiscal Year 2022 for 2022 construction start.

Task / Phase	**End Dates**
Preliminary Design	October 2021
Final Design	January 2022
Advertisement	February 2022
Award	April 2022
Mobilize	Fall 2022
Construction Completion	October 2024

VI. References

BTS (Bureau of Transportation Statistics), U.S. Department of Transportation. “Air carrier statistics for Brevig Mission Airport” accessed June 2021 at https://www.transtats.bts.gov/.

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FAA (Federal Aviation Administration). 2012. *Airport Design*. (Advisory Circular [AC] 150/5300-13A, Change 1). February 26, 2014. Available at https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.current/documentNumber/150_5300-13

FAA. 2017. *Critical Aircraft and Regular Use Determination*. (AC 150/5000-17), June 20, 2017. Available at https://www.faa.gov/airports/resources/advisory_circulars/index.cfm/go/document.information/documentID/1031186

WRCC (Western Region Climate Center), "Summary of Monthly Precipitation 1925 to 1997 for Teller, AK" accessed May 2021 at https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak9102

NOAA (National Oceanic & Atmospheric Administration), "Summary of Monthly Normals 1981-2010 for Nome Airport, AK" accessed June 2021 at https://www.ncdc.noaa.gov/cdo-web/datatools/normals.

Shannon & Wilson, Inc. (S&W). 2020. *DRAFT Geotechnical Recommendations Report Deering Airport Improvements*.

Appendix A Project Plans – 35%

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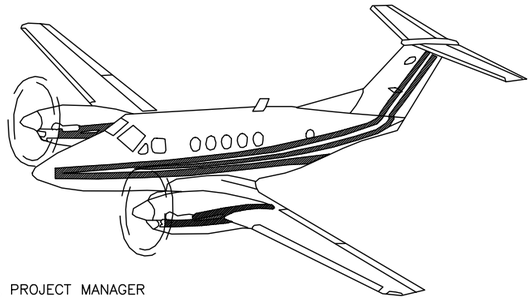
PROPOSED AIRPORT PROJECT

BREVIG MISSION AIRPORT

BREVIG MISSION AIRPORT LIGHTING AND RESURFACING

AIP NO. 3-02-0400-XX-202X

PROJECT NO. NFAPT00500

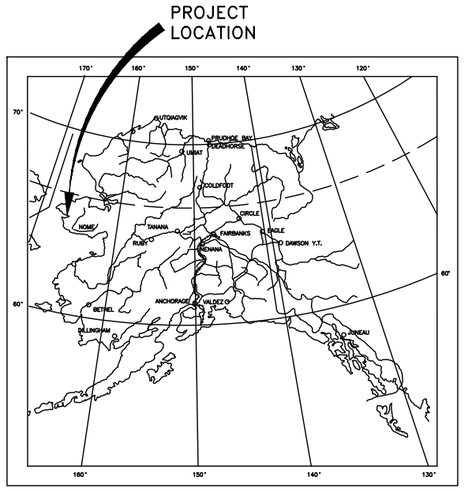


JONATHAN J. HUTCHINSON, P.E., PROJECT MANAGER

SPONSORED BY THE STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION

APPROVED BY: _____ DATE _____
SARAH E. SCHACHER, P.E., PRECONSTRUCTION ENGINEER, NORTHERN REGION

ACCEPTED FOR CONSTRUCTION: _____ DATE _____
RYAN F. ANDERSON, P.E., REGIONAL DIRECTOR, NORTHERN REGION



LOCATION MAP

VICINITY MAP

SEC 9, T2S, R38W, KM
USGS-TELLER B-3
1"=2000'

INDEX OF SHEETS

SHEET NO.	DESCRIPTION
1	COVER
2	LEGEND
3	ESTIMATE OF QUANTITIES
4	PROJECT LAYOUT PLAN
5	CONSTRUCTION AND CLEARING LIMITS PLAN*
6	EROSION AND SEDIMENT CONTROL PLAN OVERIVIEW*
7	CSPP GENERAL
8	SAFETY PLAN DETAILS
9	CSPP – PHASE I A
10	CSPP – PHASE I B
11	CSPP – PHASE I C
12	CSPP – PHASE I D
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17	CSPP – PHASE IV
18	TYPICAL SECTIONS 1 OF 2
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20	RW 04-22 PLAN AND PROFILE
21	RW 11-29 PLAN AND PROFILE 1 OF 2
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23	TW PLAN AND PROFILE
24	ROAD PLAN AND PROFILE
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29	STATIONING
30	LIGHTING DETAILS
31	LIGHTING DETAILS 2 OF 2
32	ELECTRICAL EQUIPMENT BUILDING

*NOT INCLUDED IN THIS REVISION

SCOPE OF WORK

1. THE SCOPE OF WORK FOR THIS PROJECT IS TO RESURFACE THE RUNWAY, TAXIWAY, APRON, AND ACCESS ROAD SURFACES; REPLACE THE RUNWAY AND TAXIWAY LIGHTING; AND ROTATING BEACON. THE SCOPE ALSO INCLUDES CLEARING AND VEGETATING OF THE RE-GRADED EMBANKMENT SLOPES AND APPLYING A DUST PALLIATIVE TO THE GRAVEL SURFACES.

2. THE SCOPE OF WORK TOGETHER WITH REFERENCED CODES, STANDARDS, SPECIFICATIONS, PROJECT DRAWINGS, STANDARD DRAWINGS, AND OTHER SUPPLEMENTAL INSTRUCTIONS COVERS THE PROJECT REQUIREMENTS.

SURVEY CONTROL NOTES

1. SURVEY WAS ACQUIRED BY DOT&PF FROM SEPT. 30 TO OCT. 4, 2020, AT A STANDARD PARALLEL SCALE OF 0.9999.

2. THE BASIS OF COORDINATES IS THE NAD83(2011)(EPOCH:2010.0000) OPUS AVERAGED POSITION OF POINT #1 N: 414328.78 FT E: 1567906.09 FT.

3. THE BASIS OF BEARING IS AK STATE PLANE ZONE 8 US FT.

4. THE BASIS OF ELEVATIONS IS THE OPUS AVERAGED GEOID12A (NAVD88) ELEVATION OF 33.49 FT. AT POINT #1.

GENERAL NOTES

1. KNOWN UTILITIES AND STRUCTURES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. PRIOR TO WORK THE CONTRACTOR SHALL VERIFY SIZE, DEPTH, AND LOCATIONS OF ALL UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES. THE CONTRACTOR SHALL PROTECT UTILITIES AND STRUCTURES FROM DAMAGE AND SHALL NOT DISTURB UNDERGROUND UTILITIES/STRUCTURES THAT ARE TO REMAIN.

ABBREVIATIONS

A.I.P.	AIRPORT IMPROVEMENT PROJECT
ADOT&PF	ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
AWOS	AUTOMATED WEATHER OBSERVING SYSTEM
BMPs	BEST MANAGEMENT PRACTICES
BP	BEGIN PROJECT
℄	CENTERLINE
E	EASTING
EG	EXISTING GRADE
FG	FUTURE GRADE
FT	FEET
LT	LEFT
MIN	MINIMUM
N	NORTHING
NO.	NUMBER
OFA	OBJECT FREE AREA
RW	RUNWAY
R	RADIUS
ROW	RIGHT OF WAY
RPZ	RUNWAY PROTECTION ZONE
RSA	RUNWAY SAFETY AREA
RT	RIGHT
SPEC	SPECIFICATION
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
T/H	THRESHOLD
TW	TAXIWAY
TYP	TYPICAL

LEGEND

EXISTING	PROPOSED	
		CENTER LINE
		AIRPORT PROPERTY BOUNDARY
		EDGE OF GRAVEL ROADWAY
1040		CONTOUR
		RIVER EDGE
		LIMITS OF VEGETATION
		CLEARING LIMITS
		APPROXIMATE MEAN WATER LEVEL
		PERIMETER CONTROL
		WIND CONE
		SEGMENTED CIRCLE
		EDGE OF RUNWAY, TAXIWAY, APRON
		CONSTRUCTION LIMITS
		HAUL ROUTE
		ALYESKA ABOVEGROUND PIPELINE
		SECURITY FENCING
		EROSION MARKER PINS
		CONSTRUCTOR STAGING AREA

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BY	DATE	REVISIONS

BREVIG MISSION AIRPORT
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AIP 3-02-0400-XX-202X/NFAPT00500
LEGEND

SHEET 2 OF 32

ESTIMATE OF QUANTITIES

ITEM NO.	PAY ITEM	UNIT	QUANTITIY
G100.010.0000	MOBILIZATION & DEMOBILIZATION	LUMP SUM	ALL REQUIRED
G115.010.0000	WORKER MEALS & LODGING, OR PER DIEM	LUMP SUM	ALL REQUIRED
G130.010.0000	FIELD OFFICE	LUMP SUM	ALL REQUIRED
G130.020.0000	FIELD LABORATORY	LUMP SUM	ALL REQUIRED
G130.040.0000	MEAL	EACH	1278
G130.050.0000	LODGING	EACH	426
G130.060.0000	NUCLEAR TESTING EQUIPMENT STORAGE SHED	EACH	1
G130.110.0000	FIELD COMMUNICATIONS	LUMP SUM	ALL REQUIRED
G131.050.0000	ENGINEERING TRANSPORTATION	LUMP SUM	ALL REQUIRED
G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	LUMP SUM	ALL REQUIRED
G135.020.0000	EXTRA THREE PERSON SURVEY PARTY	HOUR	120
G210.010.0000	CONTRACTOR SAFETY PLAN COMPLIANCE DOCUMENT	LUMP SUM	ALL REQUIRED
G700.010.0000	AIRPORT FLAGGER	CONTINGENT SUM	ALL REQUIRED
G700.030.0000	AIRPORT TRAFFIC MAINTENANCE	LUMP SUM	ALL REQUIRED
G705.010.0000	WATERING FOR DUST CONTROL	MGAL	1150
G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	LUMP SUM	ALL REQUIRED
L101.020.0000	ROTATING BEACON, MEDIUM INTENSITY, L-801A	EACH	1
L107.010.0008	LIGHTED WIND CONE, L-807	EACH	1
L108.010.2008	UNDERGROUD CABLE #8 AWG, COPPER, 5kV FAA TYPE C, L-824	LF	12000
L108.030.0006	#6 BARE COPPER GROUND CONDUCTOR	LF	12000
L108.070.0000	GROUND ROD	EACH	16
L108.080.0012	UNDERGROUND CABLE #12 AWG, 2-CONDUCTOR, COPPER, 600V, TYPE "SOOW-A/SOOW"	LF	500
L109.030.0000	ELECTRICAL ENCLOSURE AND FOUNDATION IN PLACE	EACH	1
L109.050.0000	INSTALLATION OF ELECTRICAL EQUIPMENT IN NEW OR EXISTING STRUCTURE	LUMP SUM	ALL REQUIRED
L110.030.1002	RIGID STEEL CONDUIT, 2-INCH	LF	850
L110.080.1002	HDPE CONDUIT, 2-INCH	LF	11650
L125.020.0000	REGULATOR, L-828	EACH	1
L125.030.0000	MEDIUM INTENSITY RUNWAY EDGE AND THRESHOLD LIGHT, L-861 AND L-861E	EACH	77
L125.040.0000	TAXIWAY EDGE LIGHT, L-861T	EACH	18
L125.070.0000	REMOVE RUNWAY AND TAXIWAY LIGHT	EACH	95
L125.170.0000	SPARE PARTS	CONTINGENT SUM	ALL REQUIRED
L125.180.0000	TEMPORARY RUNWAY LIGHTING SYSTEM	LUMP SUM	ALL REQUIRED
P151.040.0000	CLEARING & GRUBBING	LUMP SUM	ALL REQUIRED
P152.010.0000	UNCLASSIFIED EXCAVATION	CUBIC YARD	10000
P152.200.0000	BORROW	TON	265500
P165.010.0000	REMOVAL OF STRUCTURES	LUMP SUM	ALL REQUIRED
P167.010.0000	DUST PALLIATIVE	SQUARE YARD	103300
P299.020.0000	CRUSHED AGGREGATE SURFACE COURSE	TON	60300
P641.010.0000	EROSION, SEDIMENT, AND POLLUTION CONTROL ADMINISTRATION	LUMP SUM	ALL REQUIRED
P641.030.0000	TEMPORARY EROSION, SEDIMENT, AND POLLUTION CONTROL	LUMP SUM	ALL REQUIRED
P641.040.0000	TEMPORARY EROSION, SEDIMENT, AND POLLUTION CONTROL ADDITITIVES	CONTINGENT SUM	ALL REQUIRED
P641.060.0000	WITHHOLDINGS	CONTINGENT SUM	ALL REQUIRED
P641.070.0000	SWPPP MANAGER	LUMP SUM	ALL REQUIRED
P670.010.0000	HAZARD MARKER BARRIER, PLASTIC	EACH	62
P671.010.0000	RUNWAY CLOSURE MARKER, VINYL MESH	EACH	12
P671.020.0000	RUNWAY CLOSURE MARKER, ILLUMINATED	EACH	4
P671.040.0000	TAXIWAY CLOSURE MARKER, VINYL	EACH	1
T901.020.0000	SEEDING	POUND	1250
T908.040.0000	MULCH - HYDRUALIC EROSION CONTROL PRODUCTS	SQUARE YARD	92500

ESTIMATE OF LUMP SUM QUANTITIES

ITEM NO.	DESCRIPTION	PAY UNIT	QUANTITY

ESTIMATING FACTORS

ITEM NO.	DESCRIPTION	VALUE
P152.190.0000	BORROW	2 TON/CY
P201.010.0000	CURSHED AGGREGATE SURFACE COARSE	2 TON/CY
T901.020.0000	SEEDING	1.5 LB/1000 SF

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BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
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ESTIMATE OF QUANTITIES

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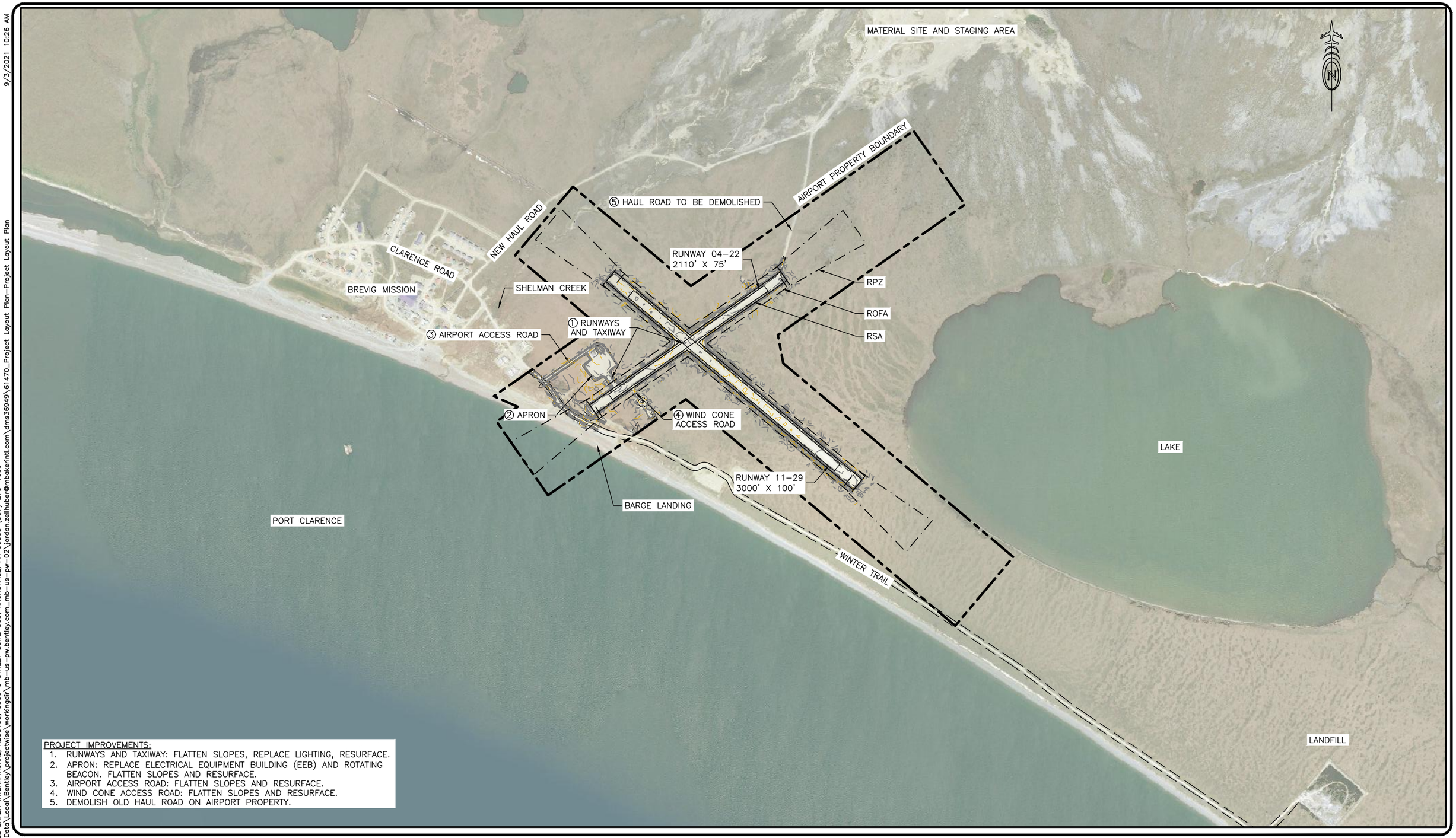

PROJECT IMPROVEMENTS:
1. RUNWAYS AND TAXIWAY: FLATTEN SLOPES, REPLACE LIGHTING, RESURFACE.
2. APRON: REPLACE ELECTRICAL EQUIPMENT BUILDING (EEB) AND ROTATING BEACON. FLATTEN SLOPES AND RESURFACE.
3. AIRPORT ACCESS ROAD: FLATTEN SLOPES AND RESURFACE.
4. WIND CONE ACCESS ROAD: FLATTEN SLOPES AND RESURFACE.
5. DEMOLISH OLD HAUL ROAD ON AIRPORT PROPERTY.

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PROJECT LAYOUT PLAN

SHEET 4 OF 32

NOTES:

1. PHASED WORK DEPICTED IN THE PLAN SET AND APPENDIX D: CONSTRUCTION SAFETY AND PHASING PLAN (CSPP), SHOWS A CONSTRUCTION SEQUENCE OF WORK UNDER THIS CONTRACT. THE WORK SHOWN ALLOWS CONCURRENT PROGRESS WITH OTHER TASKS IF APPROVED BY THE ENGINEER. THE CSPP PROVIDES ADDITIONAL GUIDANCE ON OPERATION LIMITATIONS, PHASE CONSTRUCTION ACTIVITIES TO OMPLY WITH ALL CONDITION OF THE SAFETY PLAN, PROJECT PERMIT STIPULATIONS, SUBSECTION 08-04 LIMITATION OF OPERATIONS, AND SUBSECTION 80-07 FAILURE TO COMPLETE ON TIME.
2. DEVELOP A SAFETY PLAN COMPLIANCE DOCUMENT (SPCD) BASED ON THE REQUIREMENTS OF THE CONTRACT CSPP, SECTION G-210 SAFETY PLAN COMPLIANCE DOCUMENT, SUBSECTION 80-04, SUBSECTION 80-07, AND AC 150/5370-2G OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTIONS. CONSTRUCTION ACTIVITIES CANNOT START UNTIL AN SPCD HAS BEEN APPROVED BY THE ENGINEER.
3. PHASE IIB WORK AND TEMPORARY MARKINGS AND LIGHTING WILL REQUIRE NIGHT CLOSURES OF THE BREVIG MISSION AIRPORT. NIGHT IS CONSIDERED FROM 5PM TO 9AM THE FOLLOWING DAY
4. WORK IN THE OFA THAT CANNOT BE FINISHED WITHIN 30 MINUTES FOR EMERGENCY LANDINGS MUST BE COMPLETED DURING NIGHT CLOSURES. NO HOLES, TRENCHING, STOCKPILES, OR EQUIPMENT AREA ALLOWED IN THE OFA WHILE THE RUNWAY IS ACTIVE.
5. THE CONTRACTOR SHALL BE PREPARED AT ALL TIMES TO REMOVE TEMPORARY CLOSURE MARKINGS AND RUNWAY BARRICADES ON SHORT NOTICE FOR EMERGENCY LANDINGS.
6. PARKING AND MATERIAL STORAGE WILL ONLY BE ALLOWED IN THE STAGING AREAS PER THE APPROVED SPCD. ANY FILL THE CONTRACTOR ELECTS TO USE FOR STAGING AREA IN EXCESS OF THAT SHOWN OIN THE PLANS, REGARDLESS OF TYPE OR QUANTITY, IS SUBSIDIARY TO THE OTHER ITEMS OR WORK BUT NEED TO BE REMOVED UPON COMPLETION. IF THE CONTRACTOR CHOOSES TO USE A LOCATION OTHER THAN WHAT IS SHOWN IN THE CSPP; THE CONTRACTOR MUST PROVIDE WRITTEN APPROVAL FROM THE PROPERTY OWNER / LEASE HOLDER.
7. PARTICULAR RESTRICTIONS ARE NOTED IN THE PLAN VIEW OF THE PHASING AND SAFETY FOR EACH PHASE. ALL STATIONS AND OFFSET ARE REFERENCED TO THE ALIGNMENTS AS DEFINED.
8. TEMPORARY LIGHTING AND MARKINGS ARE REQUIRED TO MEET AC 150/5340-30J, DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS, AND AC 150/5370-2G, OPERATIONAL SAFETY ON AIRPORTS DURING CONSTRUCTION.
9. REPAIR OR REPLACE TEMPORARY LIGHTING, MARKINGS, AND BARRIERS DAMAGED DURING CONSTRUCTION UPON DISCOVERY OR NOTIFICATION.
10. PROVIDE HIGHWAY FLAGGER FOR WORK OFF PROPERTY AS APPROVED AND INCLUDED IN THE APPROVED TRAFFIC CONTROL PLAN.

PLANS DEVELOPED BY: MICHAEL BAKER INTERNATIONAL, AECC103, 3900 C STREET SUITE 900, ANCHORAGE, AK 99503 (907) 273-1600
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CSPP GENERAL

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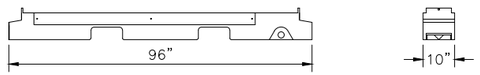
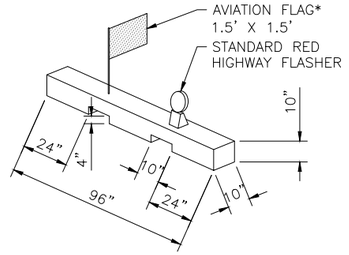


ELEVATION VIEW

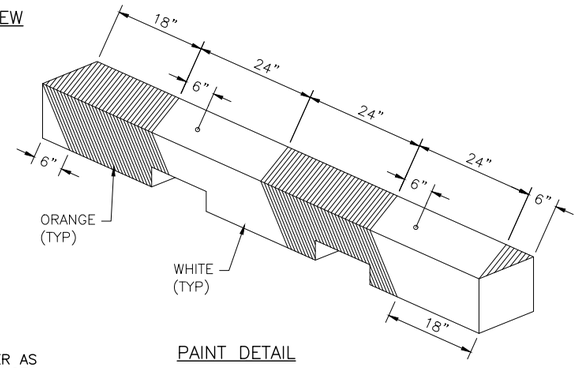
SIDE VIEW

HAZARD MARKER BARRIER NOTES:

1. PLACE BARRIERS TO LIMIT ACCESS TO THE CLOSED RUNWAY. USE LOW STYLE BARRIERS (LESS THAN 12 INCHES HIGH) WHEN ADJACENT TO AN ACTIVE MOVEMENT AREA.
2. DISABLE AND PREVENT THE OPERATION OF RUNWAY EDGE LIGHTS AND RUNWAY THRESHOLD LIGHTS DURING CLOSURE OF THE RUNWAY.
3. HAZARD MARKER BARRIERS ARE NOT TO BE PLACED WITHIN THE OFZ OF THE ACTIVE RUNWAY. CONSIDER JET BLAST WHEN PLACING BARRIERS.
4. SEE CSPP SECTION 16 FOR SPACING REQUIREMENTS.



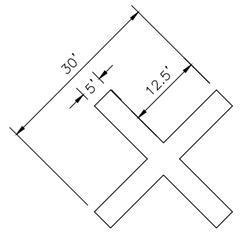
PREPARATION OF
FLAG & FLASHER MOUNT DETAIL



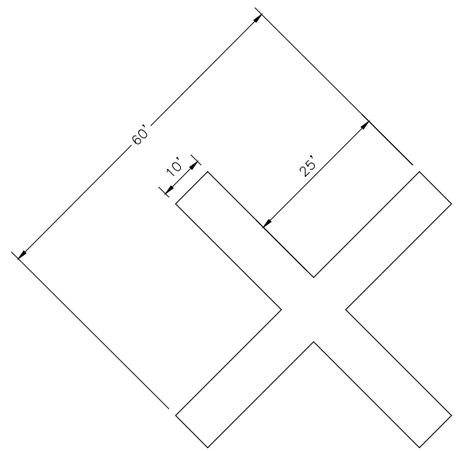
PAINT DETAIL

* FLAGS SHALL ALTERNATE COLOR (ORANGE/WHITE) ON EACH BARRIER AS THEY ARE PLACED IN THE AIRPORT OPERATIONS AREA, IN SEQUENCE.

HAZARD MARKER BARRIER DETAIL



CLOSED TAXIWAY
OR
1/2 WIDTH
RUNWAY



CLOSED RUNWAY MARKERS

NOTES:

1. THE MARKERS SHALL BE PAINTED YELLOW.
2. MARKERS SHALL BE CONSTRUCTED OF PLYWOOD OR HEAVY FABRIC FASTENED TO GROUND.
3. MARKERS SHALL NOT MOVE OR DEFORM IN WIND OR PROPELLER BLAST.

PLANS DEVELOPED BY: MICHAEL BAKER INTERNATIONAL, AECC103, 3900 C STREET SUITE 900, ANCHORAGE, AK 99503 (907) 273-1600
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SAFETY PLAN DETAILS

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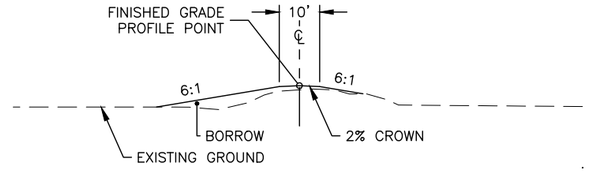
SCALE IN FEET

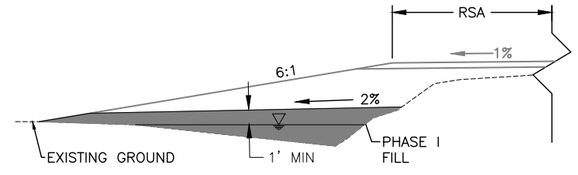
N

CSPP PHASE I A

- DEMOLISH OLD HAUL ROAD
- INSTALL BORROW IN PONDED AREAS TO 1–FT ABOVE WATER LEVEL AROUND RW 04–22 AND WIND CONE ACCESS
- MAINTAIN 35' TAXIWAY
- HAUL ROUTE
- PROPOSED SHOULDER



WIND CONE ACCESS



NOTES:

1. THIS PHASE WILL INCLUDE:
   A. CLEARING AND GRUBBING OF RW 04–22 RUNWAY SAFETY AREA WHERE SHOWN AND WIND CONE ACCESS
   B. FILLING OF PONDS TO 1' ABOVE EXISTING WATER LEVEL AT A 6:1 SLOPE AROUND RW 04–22 WHERE SHOWN AND THE WIND CONE ACCESS
   C. DEMOLITION OF OLD HAUL ROUTE FROM NORTH END OF RW 04–22
2. MAINTAIN A 35' TAXIWAY FROM RW 11–29 TO THE APRON
3. RW 11–29 IS TO REMAIN OPERABLE DURING THIS PHASE

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BREVIG MISSION AIRPORT

AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

CSPP – PHASE I A

SHEET 9 OF 32

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SCALE IN FEET

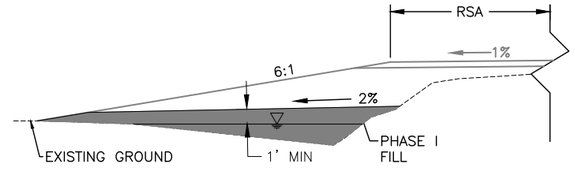
CSPP PHASE I B

INSTALL BORROW IN PONDED AREAS TO 1–FT ABOVE WATER LEVEL AROUND RW 04–22, APRON, AND TAXIWAY DURING NIGHT TIME CLOSURES

MAINTAIN 35' TAXIWAY.

HAUL ROUTE

PROPOSED SHOULDER



NOTES:
1. THIS PHASE WILL INCLUDE:
   A. CLEARING AND GRUBBING OF RW 04–22 RUNWAY SAFETY AREA WHERE SHOWN AND THE APRON
   B. FILLING OF PONDS TO 1' ABOVE EXISTING WATER LEVEL AT A 6:1 SLOPE AROUND RW 04–22 WHERE SHOWN AND THE APRON
2. MAINTAIN A 35' TAXIWAY FROM RW 11–29 TO THE APRON
3. MAINTAIN HALF OF APRON
4. RW 11–29 IS TO REMAIN OPERABLE DURING THIS PHASE

DESIGN REH

DRAWN JCZ

CHECKED REH

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BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
CSPP – PHASE I B

SHEET 10 OF 32

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SCALE IN FEET

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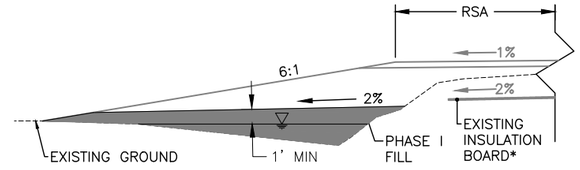
CSPP PHASE I C

INSTALL BORROW IN PONDED AREAS TO 1–FT ABOVE WATER LEVEL AROUND RW 11–29

HAUL ROUTE

PROPOSED SHOULDER



* INSULATION IS PRESENT WITHIN 300 FT OF THE RW 04–22 AND RW 11–29 INTERSECTION

NOTES:
1. THIS PHASE WILL INCLUDE:
   A. CLEARING AND GRUBBING OF RW 11–29 RUNWAY SAFETY AREA
   B. FILLING OF PONDS TO 1' ABOVE EXISTING WATER LEVEL AT A 6:1 SLOPE AROUND RW 11–29
2. RW 04–22 IS TO REMAIN OPERABLE DURING THIS PHASE

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CSPP – PHASE I C

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SCALE IN FEET

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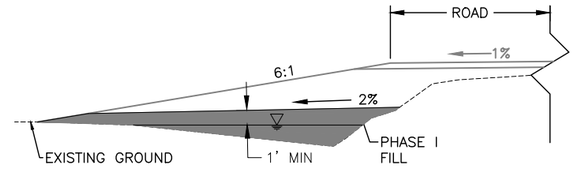
CSPP PHASE I D

INSTALL BORROW IN PONDED AREAS TO 1–FT ABOVE WATER LEVEL AROUND ACCESS ROAD. MAY BE COMPLETED DURING ANY PHASE

HAUL ROUTE

PROPOSED SHOULDER



NOTES:
1. THIS PHASE WILL INCLUDE:
   A. CLEARING AND GRUBBING OF THE ACCESS ROAD
   B. FILLING OF PONDS TO 1' ABOVE EXISTING WATER LEVEL AT A 6:1 SLOPE AROUND THE ACCESS ROAD
2. BOTH RUNWAYS ARE TO REMAIN OPERABLE DURING THIS PHASE

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AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

CSPP – PHASE I D

SHEET 12 OF 32

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SCALE IN FEET

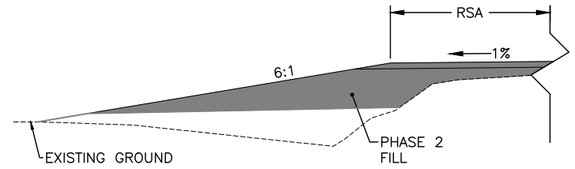
CSPP PHASE II A

REHABILITATE RW 04–22 AND WIND CONE ACCESS

MAINTAIN 35' TAXIWAY

HAUL ROUTE

PROPOSED SHOULDER



NOTES:

1. THIS PHASE WILL INCLUDE:
   A. RAISING RW 04–22 WHERE SHOWN AND WIND CONE ACCESS SLOPES TO FINAL GRADE
   B. RESURFACING OF RW 04–22 WHERE SHOWN
2. MAINTAIN A 35' TAXIWAY FROM RW 11–29 TO THE APRON
3. RW 11–29 IS TO REMAIN OPERABLE DURING THIS PHASE

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AIP 3-02-0400-XX-202X/NFAPT00500

CSPP – PHASE II A

SHEET 13 OF 32

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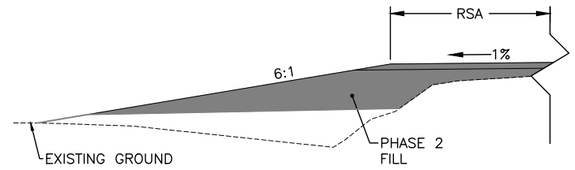
CSPP PHASE II B

REHABILITATE RUNWAY INTERSECTION, TAXIWAY, AND APRON DURING NIGHT TIME CLOSURES

HAUL ROUTE

PROPOSED SHOULDER



NOTES:

1. THIS PHASE WILL INCLUDE:
   A. RAISING RW 04–22 WHERE SHOWN, INTERSECTION, AND APRON SLOPES TO FINAL GRADE
   B. RESURFACING OF RW 04–22 WHERE SHOWN, INTERSECTION, AND APRON
2. THIS PHASE IS TO BE COMPLETED DURING SCHEDULED NIGHT TIME CLOSURES

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AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

CSPP – PHASE II B

SHEET 14 OF 32

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SCALE IN FEET

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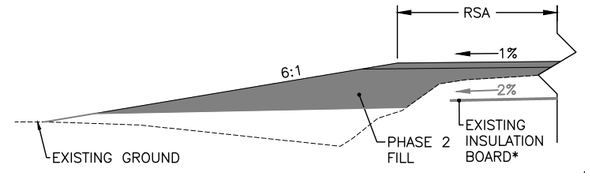
CSPP PHASE II C

REHABILITATE RW 11–29

HAUL ROUTE

PROPOSED SHOULDER



* INSULATION IS PRESENT WITHIN 300 FT OF THE RW 04–22 AND RW 11–29 INTERSECTION

NOTES:
1. THIS PHASE WILL INCLUDE:
   A. RAISING RW 11–29 SLOPES TO FINAL GRADE
   B. RESURFACING OF RW 11–29
2. RW 04–22 IS TO REMAIN OPERABLE DURING THIS PHASE

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CSPP – PHASE II C

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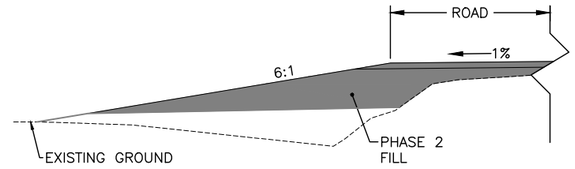
CSPP PHASE III

REHABILITATE ACCESS ROAD AND BUILDING PAD. PLACE ROAD INFILL. MAY BE COMPLETED UNDER ANY PHASE

HAUL ROUTE

PROPOSED SHOULDER



NOTES:
1. THIS PHASE WILL INCLUDE:
   A. RAISING ACCESS ROAD SLOPES TO FINAL GRADE
   B. RESURFACING OF ACCESS ROAD
2. THIS WORK CAN BE COMPLETED DURING ANY PHASE
3. BOTH RUNWAYS ARE TO REMAIN OPERABLE DURING THIS PHASE
4. MAINTAIN AIRPORT ACCESS ON ACCESS ROAD DURING CONSTRUCTION

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AIP 3-02-0400-XX-202X/NFAPT00500

CSPP - PHASE III

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CSPP PHASE IV

- APPLY DUST PALLIATIVE TO RW 04-22, RW 11-29, TW, APRON, AND ACCESS ROAD SURFACES DURING NIGHT TIME CLOSURES
- HAUL ROUTE
- PROPOSED SHOULDER

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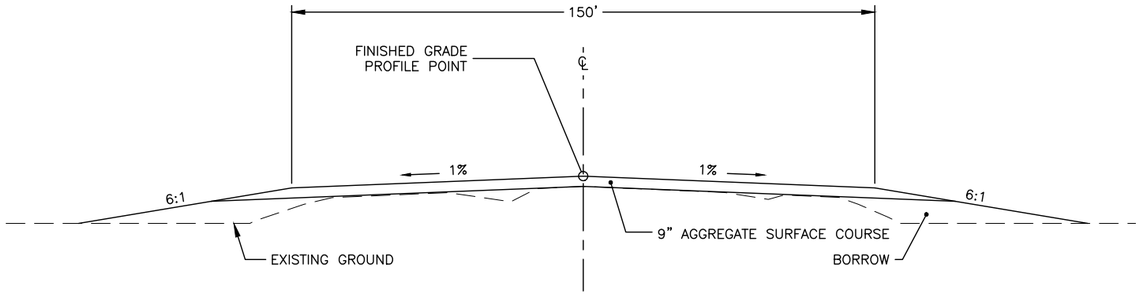
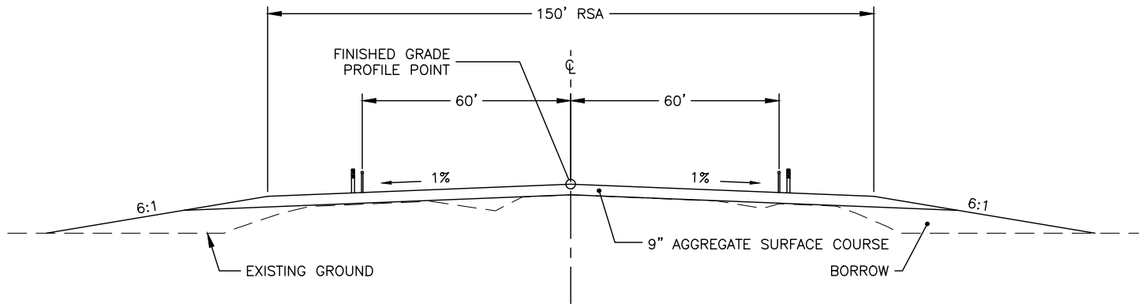
CSPP - PHASE IV



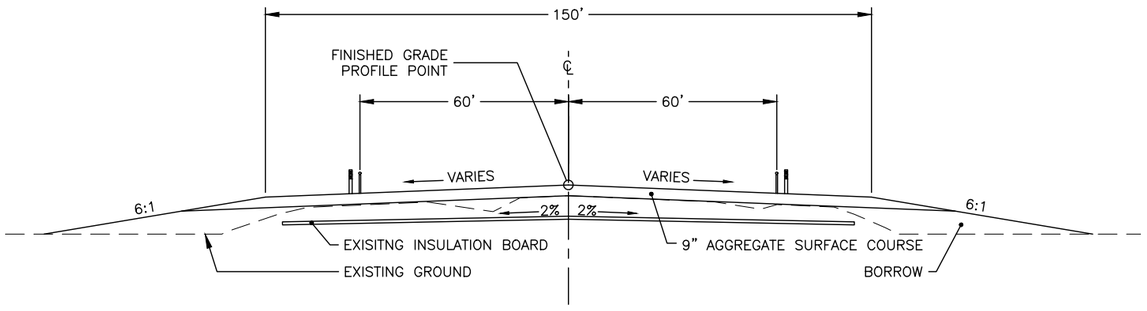
CROSSWIND RUNWAY SAFETY AREA TYPICAL SECTION

"RW 11–29" STA: 97+60 TO 100+60
"RW 11–29" STA: 130+60 TO 133+60



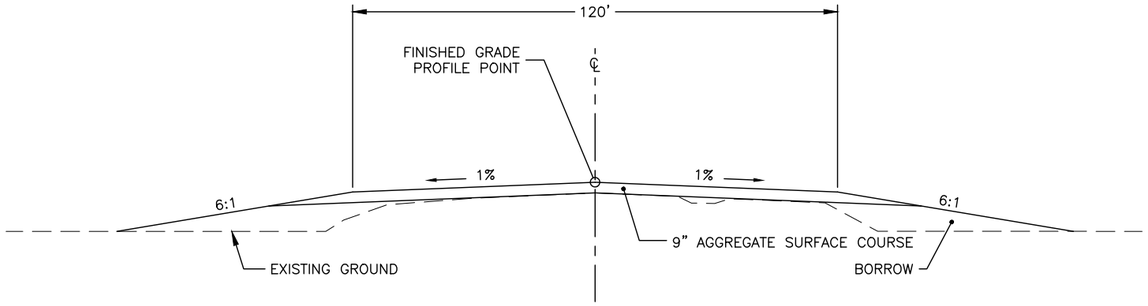
CROSSWIND RUNWAY TYPICAL SECTION

"RW 11–29" STA: 100+60 TO 105+55
"RW 11–29" STA: 108+55 TO 109+50
"RW 11–29" STA: 112+50 TO 130+60



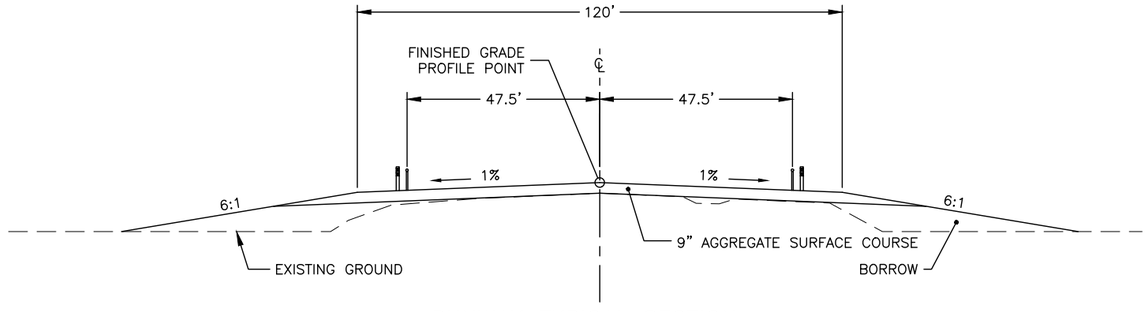
CROSSWIND RUNWAY TYPICAL SECTION

"RW 11–29" STA: 105+55 TO 108+55
"RW 11–29" STA: 109+50 TO 112+50



RUNWAY SAFETY AREA TYPICAL SECTION

"RW 04–22" STA: 5+00 TO 7+40
"RW 04–22" STA: 28+50 TO 30+90



RUNWAY TYPICAL SECTION

"RW 04–22" STA: 7+40 TO 28+50

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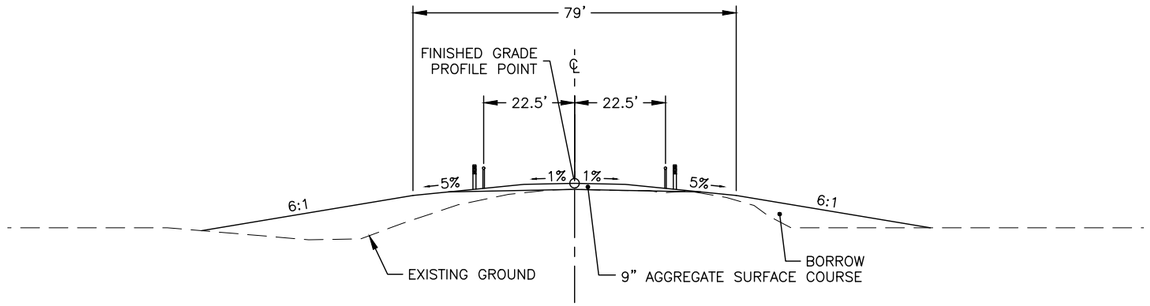
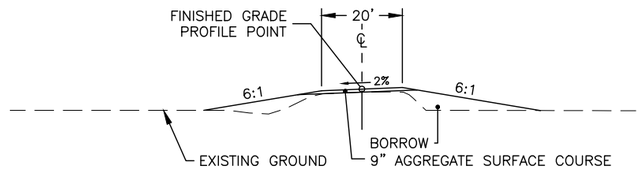
BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
TYPICAL SECTIONS 1 OF 2

SHEET 18 OF 32



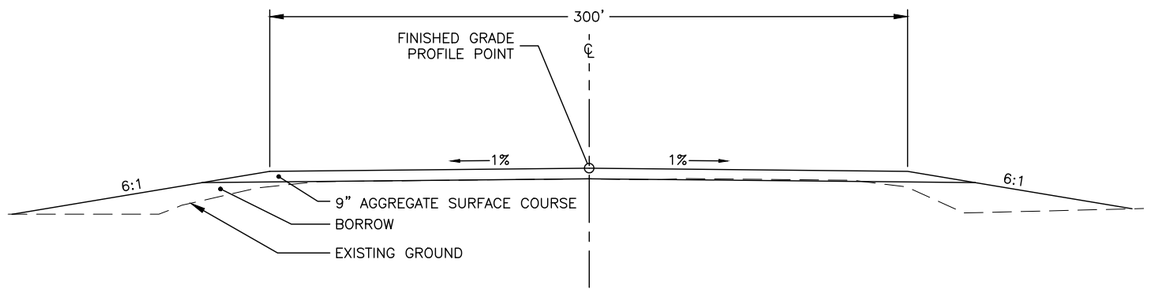
TAXIWAY TYPICAL SECTION

"TW" STA: 50+60 TO 52+50



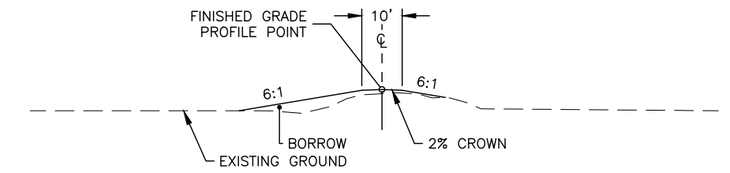
ACCESS ROAD TYPICAL SECTION

"AR" STA: 1116+88 TO 1125+49



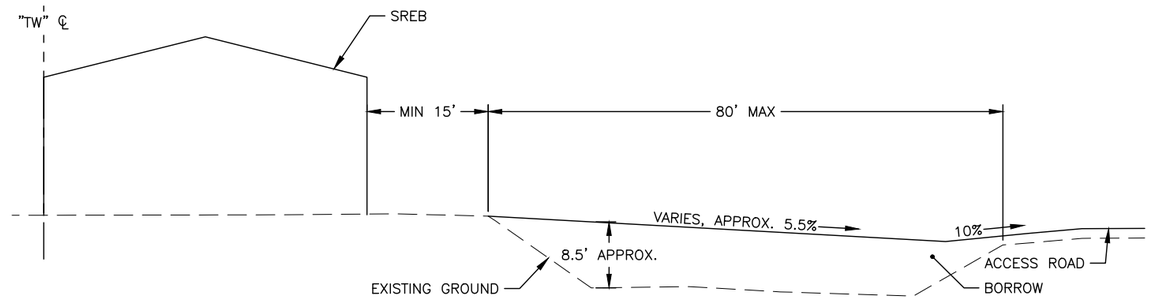
TAXI APRON TYPICAL SECTION

"TW" STA: 52+50 TO 54+50

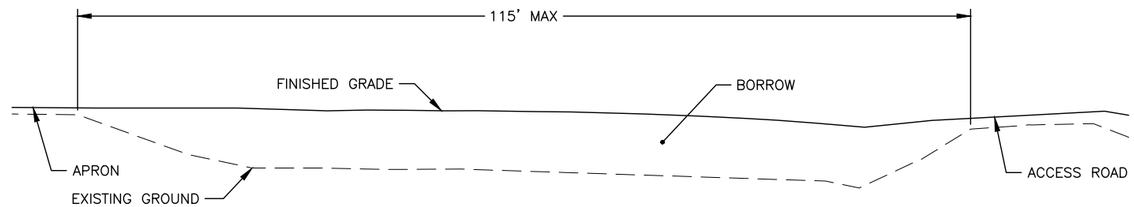


WIND CONE ROAD TYPICAL SECTION

"WC" STA: 60+60 TO 61+90



ROAD INFILL TYPICAL SECTION WEST TO EAST



ROAD INFILL TYPICAL SECTION NORTH TO SOUTH

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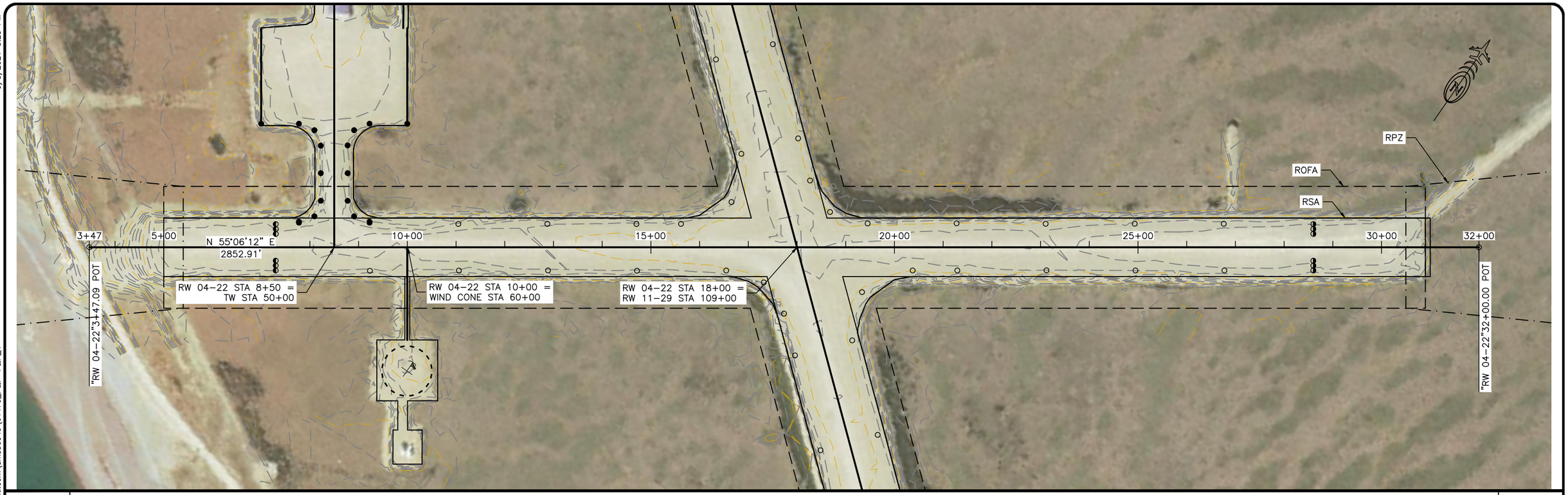
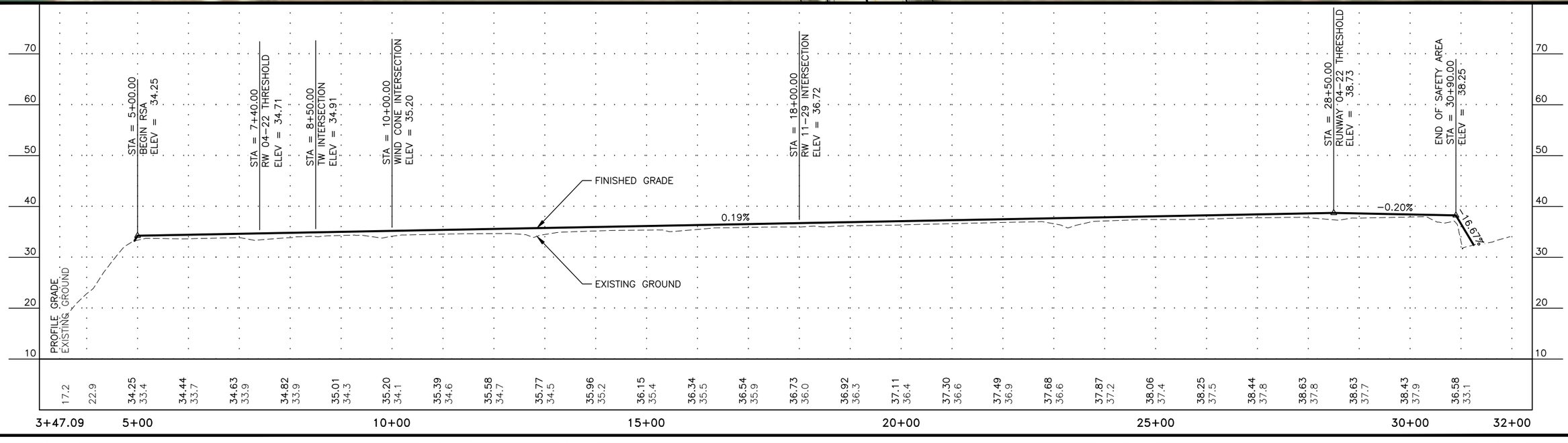
BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
TYPICAL SECTIONS 2 OF 2

SHEET 19 OF 32





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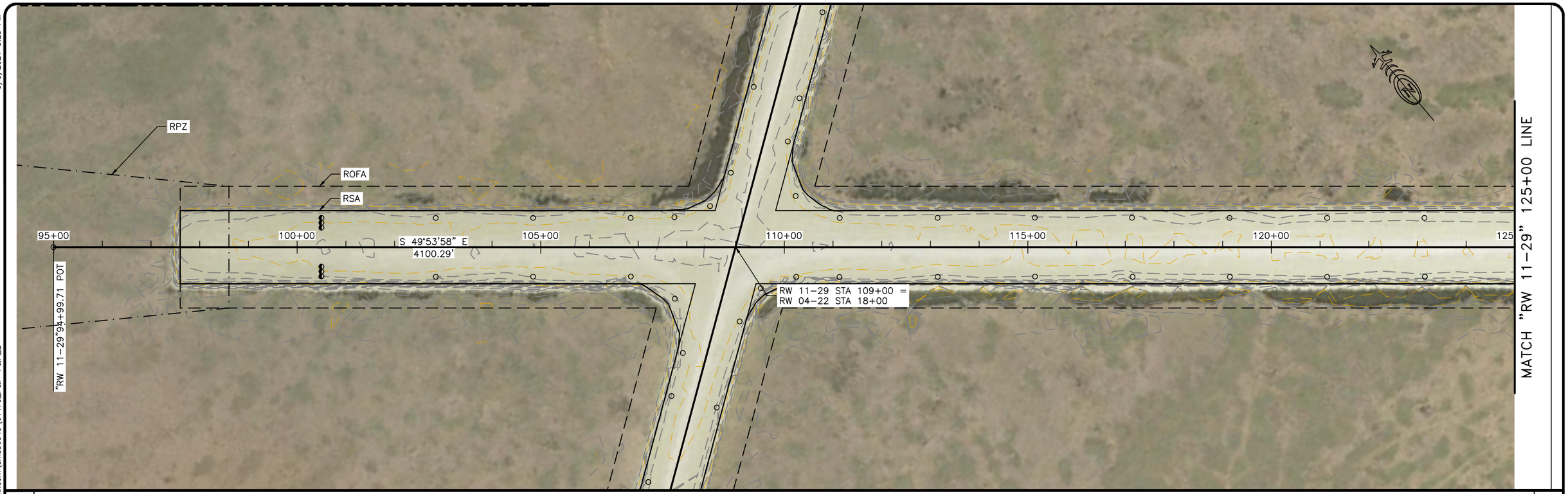
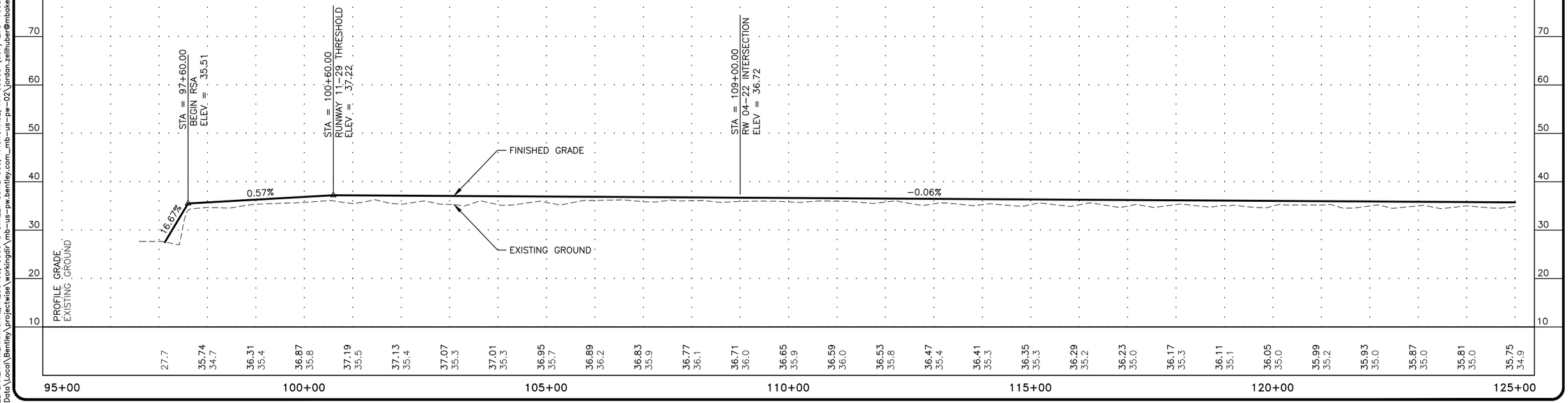
BREVIG MISSION AIRPORT

AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

RW 04-22 PLAN AND PROFILE

SHEET 20 OF 32





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AIRPORT LIGHTING AND RESURFACING
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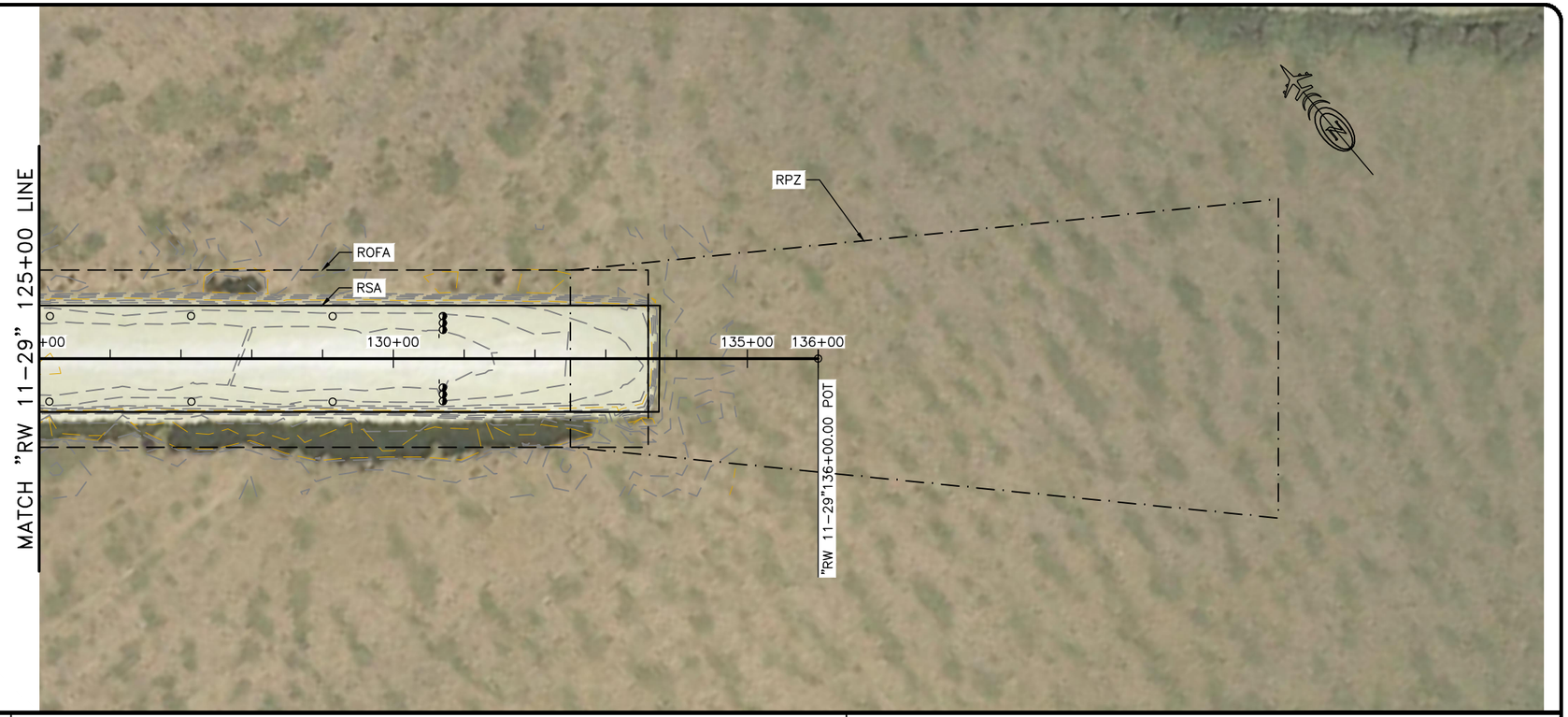
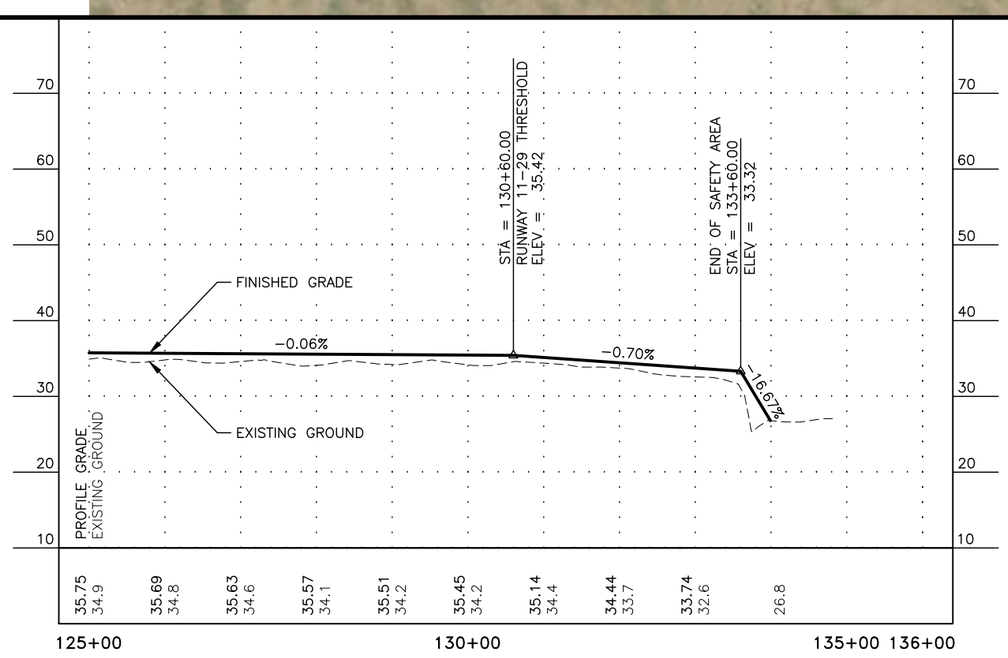
RW 11-29 PLAN AND PROFILE 1 OF 2

SHEET 21 OF 32





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DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION-DESIGN AND CONSTRUCTION-AVIATION

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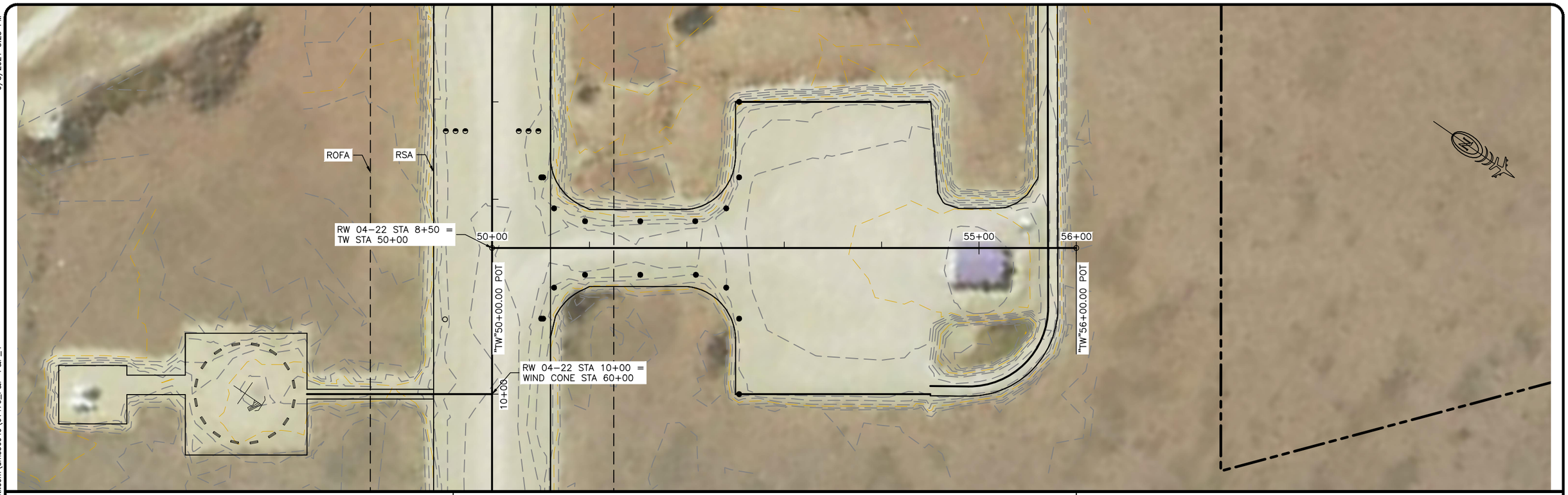
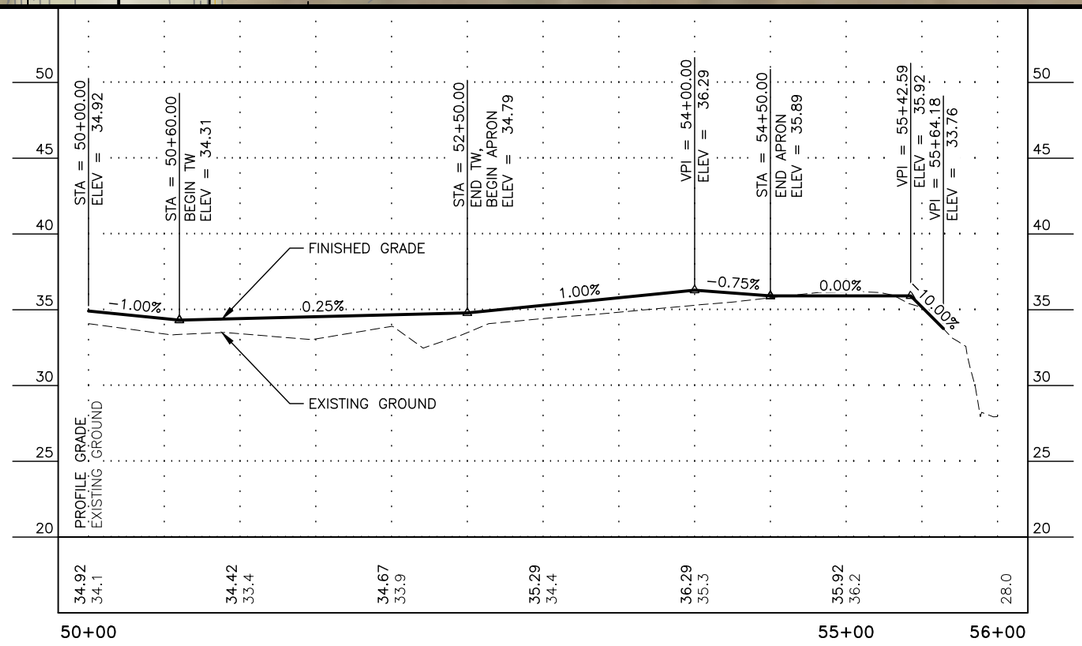
BY	DATE	REVISIONS

BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
RW 11-29 PLAN AND PROFILE 2 OF 2

SHEET 22 OF 32





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NORTHERN REGION-DESIGN AND CONSTRUCTION-AVIATION

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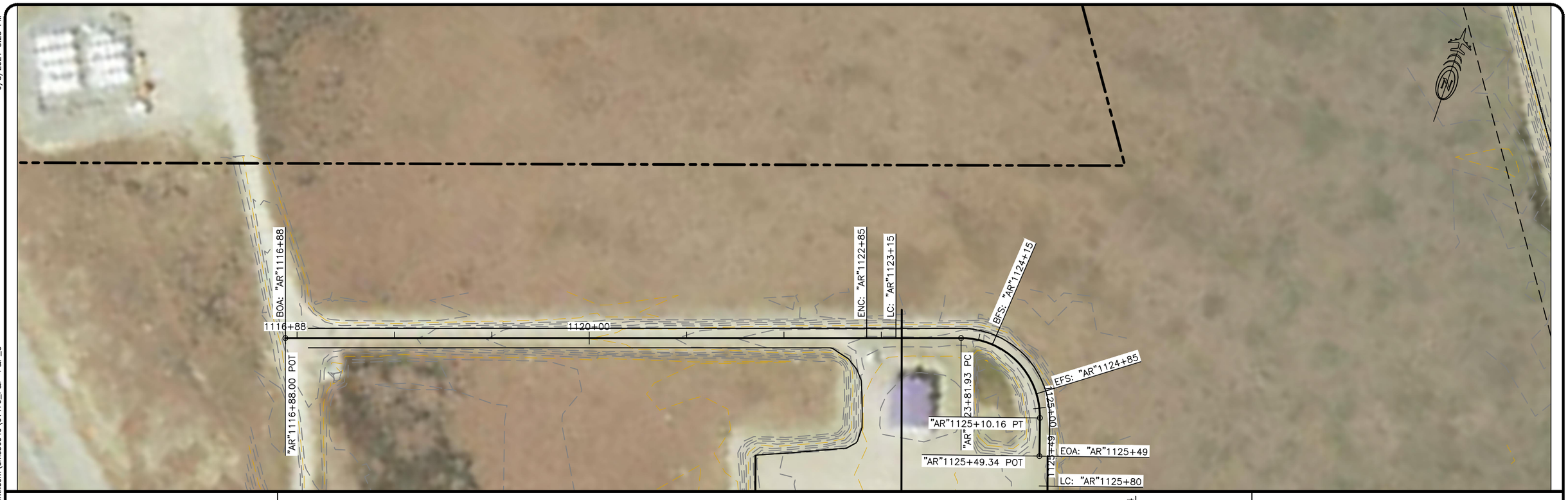
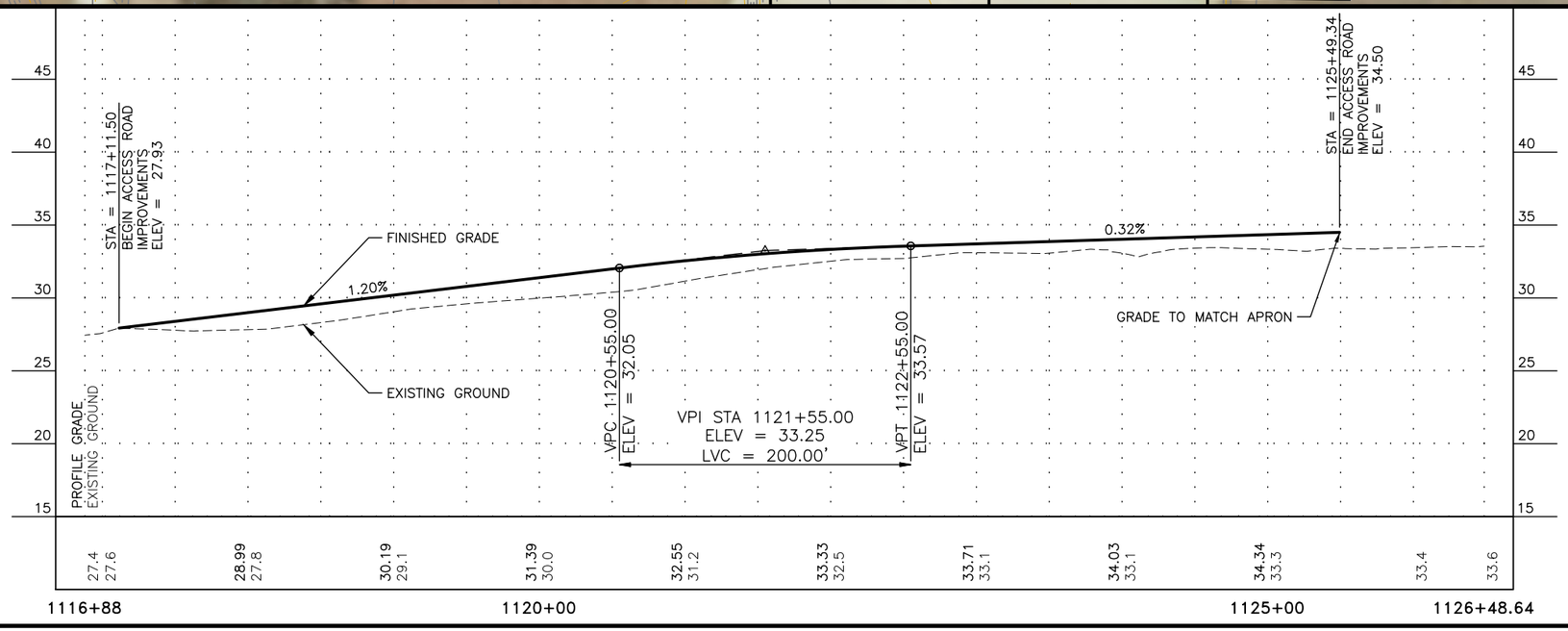
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

TW PLAN AND PROFILE

SHEET 23 OF 32





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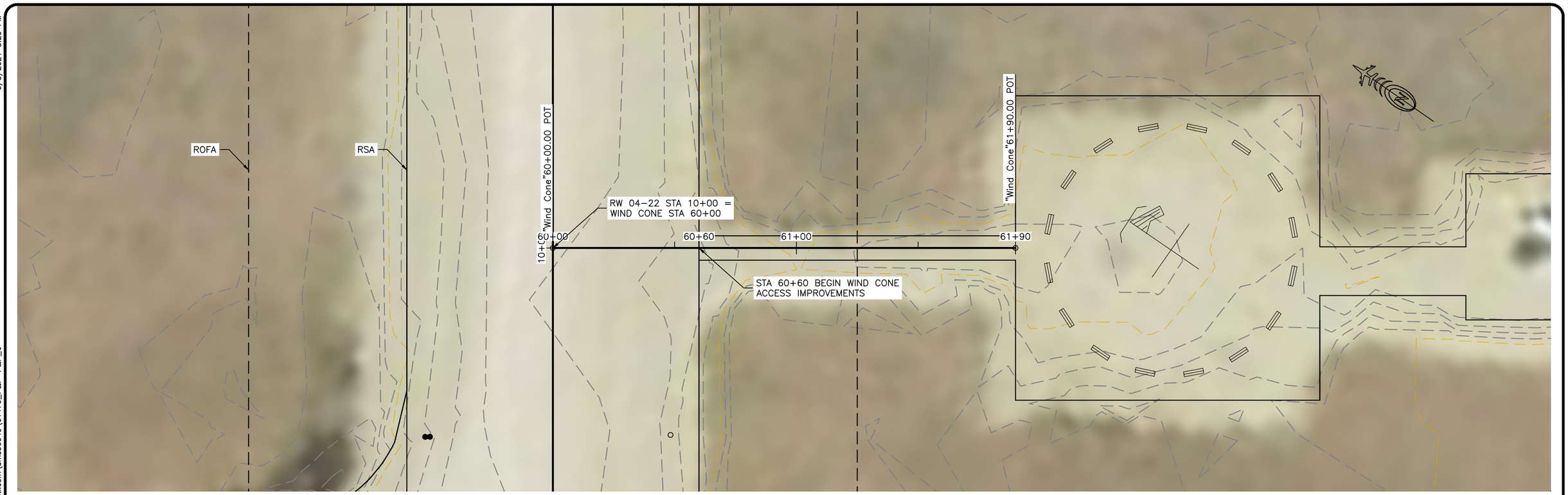
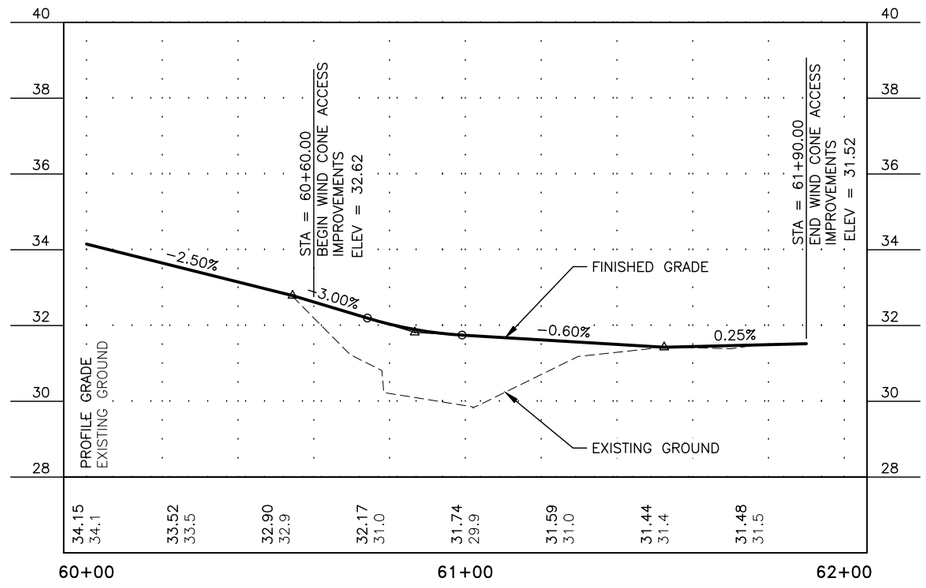
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

ROAD PLAN AND PROFILE

SHEET 24 OF 32





PLANS DEVELOPED BY: CONSULTING FIRM NAME, LLC, CERT. OF AUTHORIZATION NO.: A111111, 1000 C STREET, SOMEWHERE, AK 99700, (907)000-0000
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BREVIG MISSION AIRPORT

AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

WIND CONE ACCESS PLAN AND PROFILE

SHEET 25 OF 32

OVERALL SITE PLAN

200 0 200 400

SCALE IN FEET

LEGEND AND ABBREVIATIONS

	L-806 WIND CONE, LIGHTED
	MEDIUM INTENSITY L-861 R/W EDGE LIGHT, WHITE
	MEDIUM INTENSITY L-861SE THRESHOLD LIGHT, 180° GREEN, 180° RED
	MEDIUM INTENSITY L-861T T/W LIGHT, BLUE
	HANDHOLE
	GROUND ROD, 3/4"X10'
1-CONDUCTOR / 2-CONDUCTORS	CONDUIT OR DUCT BELOW GRADE. HDPE, MIN 2" UON (NUMBER OF CONDUCTORS SHOWN BY HASH MARKS)
	2" RIGID STEEL CONDUIT
DIA.	DIAMETER
(E)	EXISTING TO REMAIN
EEB	ELECTRICAL EQUIPMENT BUILDING
(D)	DEMOLISHED
R/W	RUNWAY
SREB	SNOW REMOVAL EQUIPMENT BUILDING
TYP.	TYPICAL
T/W	TAXIWAY
UON	UNLESS OTHERWISE NOTED

GENERAL NOTES

1. CONTRACTOR SHALL OFFER ALL DEMOLISHED EQUIPMENT TO DOT FOR SALVAGE. ITEMS NOT SALVAGED BY DOT ARE THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OF. EQUIPMENT INCLUDES BUT IS NOT LIMITED TO: LIGHTS AND STEMS, CONTROLLERS, LIGHTING REGULATOR, ROTATING BEACON, AND WIND CONE.

PLANS DEVELOPED BY: DESIGN ALASKA, INC., AECC511, 601 COLLEGE ROAD, FAIRBANKS, AK 99701 (907) 452-1241
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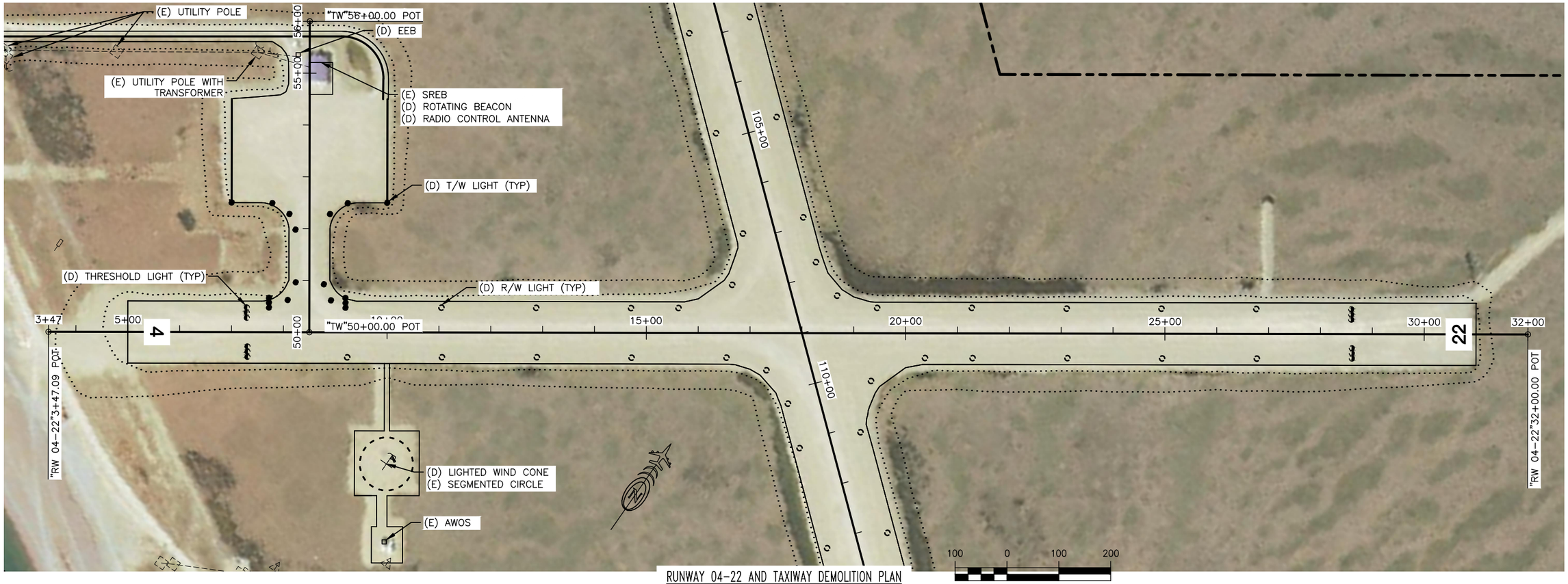
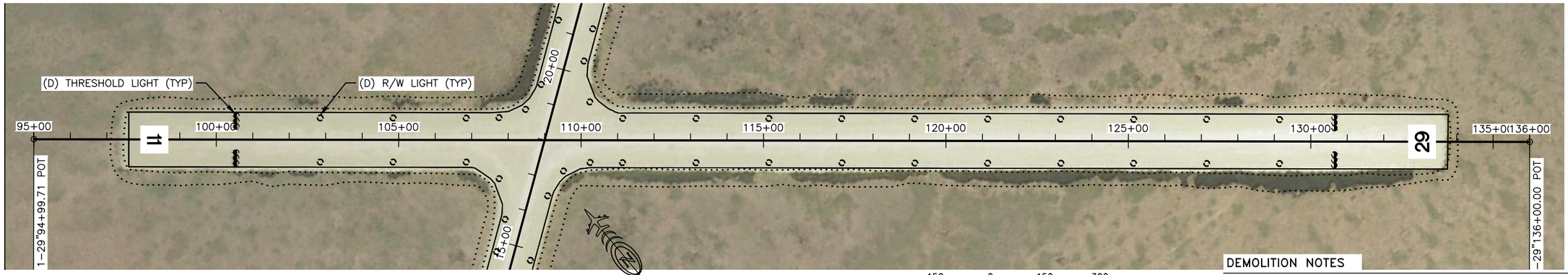
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
ELECTRICAL SITE PLAN AND LEGEND

SHEET 26 OF 32



RUNWAY 04-22 AND TAXIWAY DEMOLITION PLAN



RUNWAY 11-29 DEMOLITION PLAN

DEMOLITION NOTES

1. GENERIC NOTE

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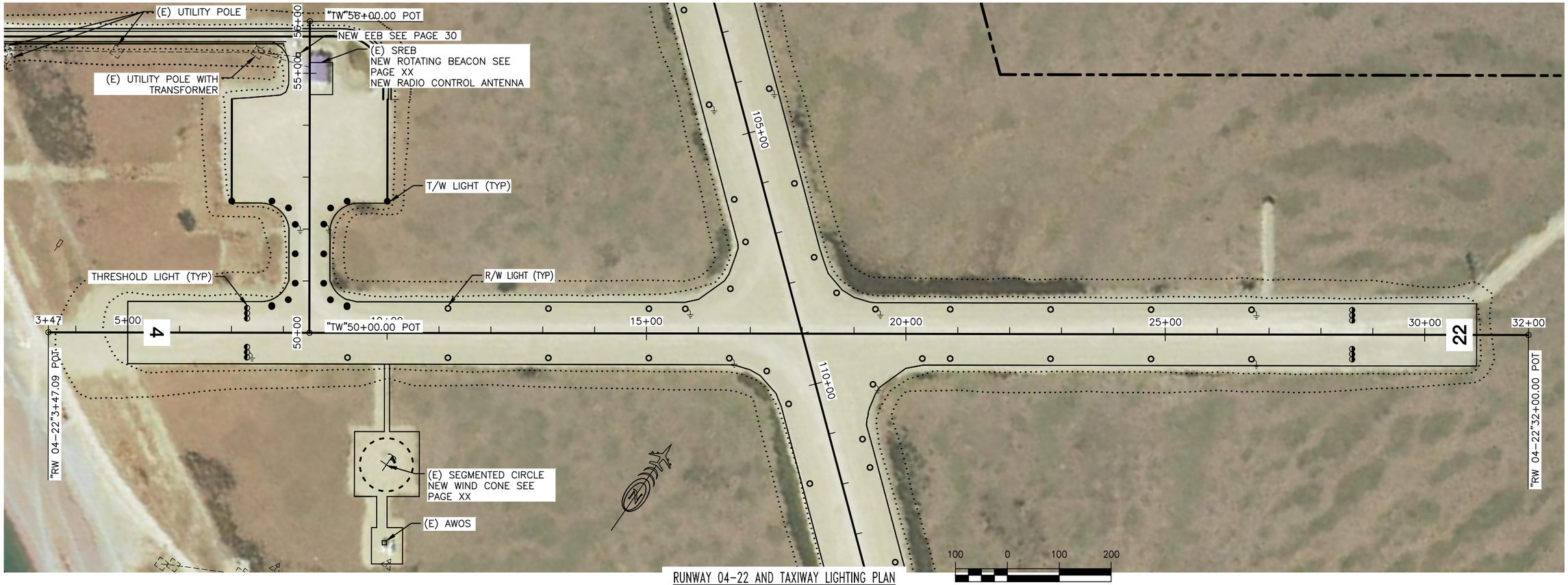
BREVIG MISSION AIRPORT

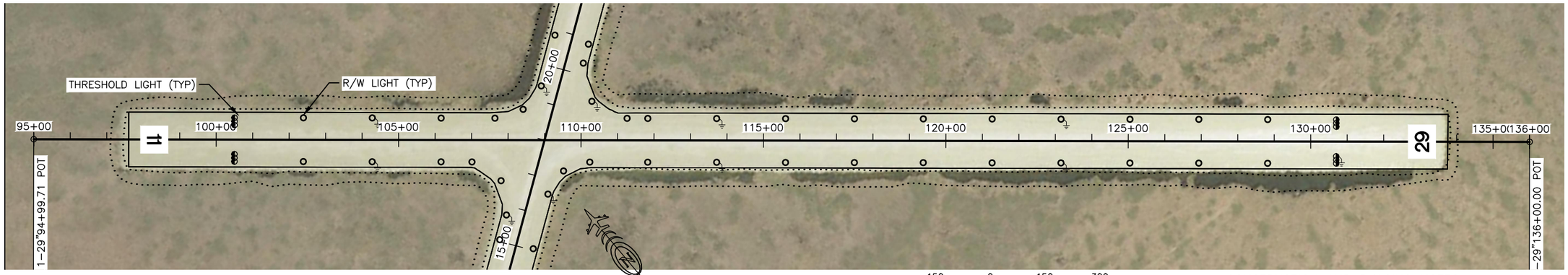
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500

ELECTRICAL DEMOLITION PLANS

SHEET 27 OF 32



RUNWAY 04-22 AND TAXIWAY LIGHTING PLAN



RUNWAY 11-29 LIGHTING PLAN

CONSTRUCTION AND PHASING NOTES

1. GENERAL NOTE

PLANS DEVELOPED BY: DESIGN ALASKA, INC., AECC511, 601 COLLEGE ROAD, FAIRBANKS, AK 99701 (907) 452-1241
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BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
LIGHTING PLANS

SHEET 28 OF 32

TAXIWAY LIGHT STATIONING

LIGHT	STATION	OFFSET
EDGE LIGHT	50+50.5	72.5L; 72.5R
EDGE LIGHT	50+52.5	72.5L; 72.5R
EDGE LIGHT	50+63.7	40.7L; 40.7R
EDGE LIGHT	50+95.5	27.5L; 27.5R
EDGE LIGHT	51+52.2	27.5L; 27.5R
EDGE LIGHT	52+9.3	27.5L; 27.5R
EDGE LIGHT	52+40.5	40.7L; 40.7R
EDGE LIGHT	52+53.7	150L, 72.5L; 72.5R, 150R

RUNWAY 04–22 LIGHT STATIONING

LIGHT	STATION	OFFSET
11 THRESHOLD	07+30.0	47.5L, 37.5L, 27.5L; 47.5R, 37.5R, 27.5R
EDGE LIGHT	09+23.6	47.5R
EDGE LIGHT	11+17.2	47.5L; 47.5R
EDGE LIGHT	13+10.8	47.5L; 47.5R
EDGE LIGHT	15+4.4	47.5L; 47.5R
EDGE LIGHT	15+74.6	47.5L
EDGE LIGHT	16+59.6	47.5R
INTERSECTION EDGE LIGHT	16+61.4	86.22L
INTERSECTION EDGE LIGHT	17+31.8	72.1R
INTERSECTION EDGE LIGHT	18+66.2	78.7L
INTERSECTION EDGE LIGHT	19+36.5	97.4R
EDGE LIGHT	19+41.1	47.5L
EDGE LIGHT	20+31.6	47.5R
EDGE LIGHT	20+85.2	47.5L; 47.5R
EDGE LIGHT	22+78.8	47.5L; 47.5R
EDGE LIGHT	24+72.4	47.5L; 47.5R
EDGE LIGHT	26+66.0	47.5L; 47.5R
22 THRESHOLD	28+60.0	47.5L, 37.5L, 27.5L; 47.5R, 37.5R, 27.5R

RUNWAY 11–29 LIGHT STATIONING

LIGHT	STATION	OFFSET
11 THRESHOLD	100+50	60L, 50L, 40L; 60R, 50R, 40R
EDGE LIGHT	102+38.8	60L; 60R
EDGE LIGHT	104+27.6	60L; 60R
EDGE LIGHT	106+16.4	60L; 60R
EDGE LIGHT	107+1.0	60R
EDGE LIGHT	107+63.7	60L
EDGE LIGHT	110+24.1	60R
EDGE LIGHT	111+26.1	60L
EDGE LIGHT	111+82.8	60L; 60R
EDGE LIGHT	113+71.6	60L; 60R
EDGE LIGHT	115+60.4	60L; 60R
EDGE LIGHT	117+49.2	60L; 60R
EDGE LIGHT	119+38.0	60L; 60R
EDGE LIGHT	121+26.8	60L; 60R
EDGE LIGHT	123+15.6	60L; 60R
EDGE LIGHT	125+4.4	60L; 60R
EDGE LIGHT	126+93.2	60L; 60R
EDGE LIGHT	128+82.0	60L; 60R
29 THRESHOLD	130+70.0	60L, 50L, 40L; 60R, 50R, 40R

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BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
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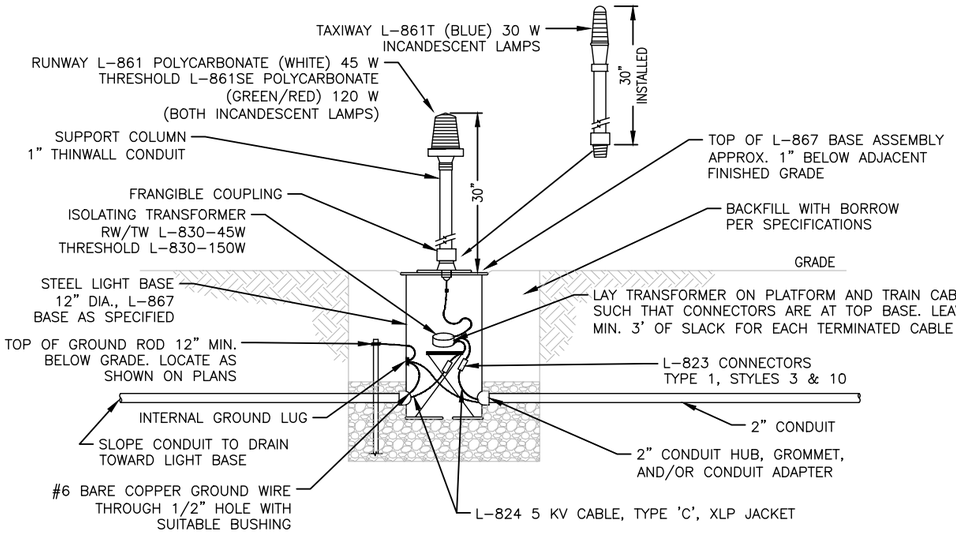
STATIONING

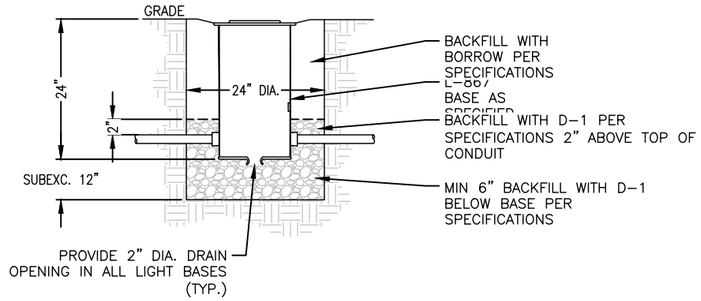
SHEET 29 OF 32



RUNWAY EDGE, THRESHOLD & TAXIWAY LIGHT DETAIL

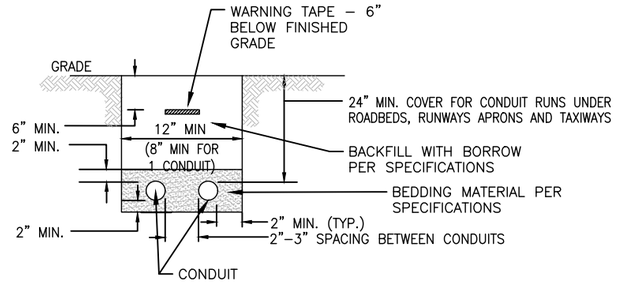
NO SCALE

NOTE: L-867 LIGHT ASSEMBLY WORK IS SUBSIDIARY TO ITEMS L-100d AND L-100e PER L-100 SPECIFICATIONS.



HAND HOLE BURIAL DETAIL

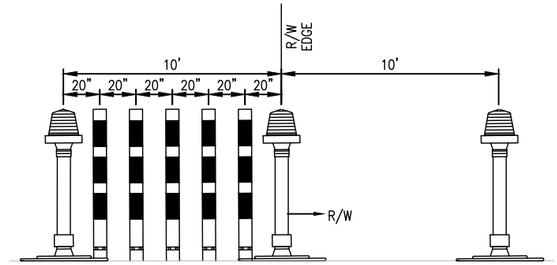
NO SCALE



TRENCHING DETAIL R/W LIGHTS

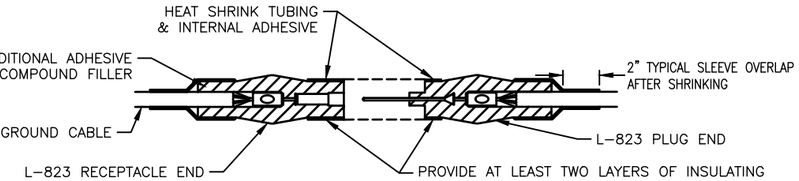
NO SCALE

NOTE: AT TAXIWAY AND TAXILANE CROSSINGS, CONSTRUCT 4" OF CRUSHED AGGREGATE BASE COURSE D-1 PER P-209 AND 2" OF ASPHALT PAVEMENT PER P-401 SPECS. SEE CIVIL PLANS.

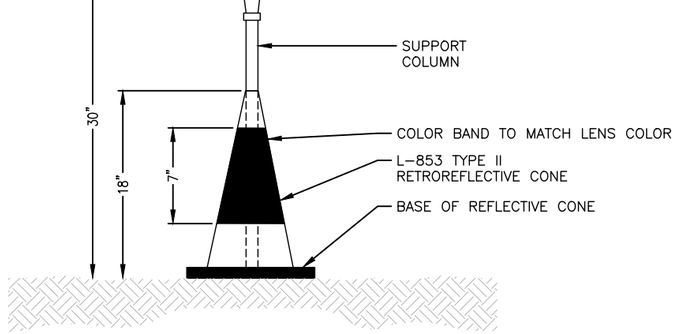


THRESHOLD LIGHTING AND TYPE II MARKER DETAIL

NO SCALE - (NOTE: REFLECTIVE CONES TO BE INSTALLED, BUT NOT SHOWN ON FRANGIBLE POSTS FOR CLARITY)

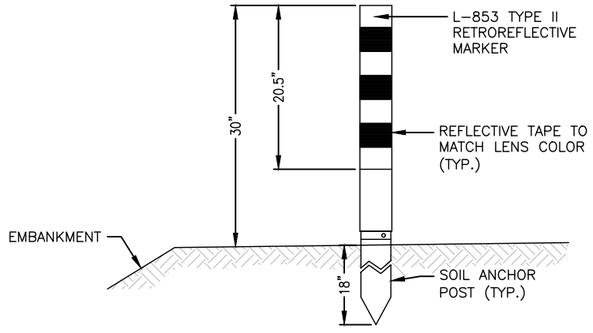


TYPE B
CABLE TERMINATIONS AT JUNCTION OF
HOMERUN WITH LOOP CIRCUIT



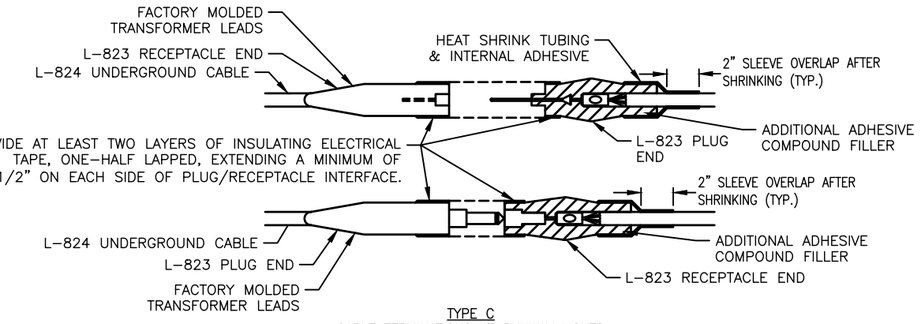
TYPE II RETOREFLECTIVE MARKER CONE

NO SCALE



TYPE II RETROREFLECTIVE MARKER DETAIL

NO SCALE



TYPE C
CABLE TERMINATIONS AT RUNWAY LIGHTS

PRIMARY CABLE TERMINATION DETAILS

R/W & T/W REFLECTIVE MARKER COLOR SCHEDULE

COMPONENT		LOCATION	COLOR	QTY
REFLECTIVE MARKER	TYPE II	THRESHOLD	WHITE	40
REFLECTIVE TAPE			GREEN/RED	40
REFLECTIVE CONE	TYPE II	THESHOLD	WHITE	24
REFLECTIVE TAPE			GREEN/RED	24
REFLECTIVE CONE	TYPE II	RUNWAY	WHITE	53
REFLECTIVE TAPE			WHITE	53
REFLECTIVE CONE	TYPE II	TAXIWAY	WHITE	16
REFLECTIVE TAPE			BLUE	16

NOTES

1. RUNWAY BOUNDARY MARKERS SHALL HAVE A WHITE REFLECTIVE COLOR BAND AS STATED IN THE SPECIFICATIONS.
2. RUNWAY END MARKERS SHALL HAVE A GREEN REFLECTIVE COLOR BAND.
3. T/W MARKERS SHALL HAVE A BLUE REFLECTIVE COLOR BAND.
4. THRESHOLD LIGHTS SHALL HAVE THE RED HALF OF THE LENS FACING THE OPPOSITE THRESHOLD.

NOTES

1. PROVIDE L-823 PLUG AND RECEPTACLE TERMINALS AT ALL LIGHT BASES AND HAND HOLES AS REQUIRED.
2. INSIDE DIAMETER OF CONNECTOR SHALL PROPERLY MATCH THE OUTSIDE DIAMETER OF CABLE.
3. PROPERLY SEAT BOTH PLUG AND RECEPTACLE ENDS ONTO CABLE AND CHECK FOR PROPER CONNECTOR PIN POSITIONING PRIOR TO HEATING SHRINKABLE TUBING.
4. CONNECTION OF CONDUCTORS MUST BE MADE BY USING CRIMP CONNECTORS AND A CRIMPING TOOL APPROVED BY THE CONNECTOR/LUG MANUFACTURER. THE TOOL MUST PRODUCE A COMPLETE CRIMP BEFORE IT CAN BE REMOVED. THE CRIMPING TOOL USED MUST BE LISTED BY THE L-823 KIT MANUFACTURER. MAKE THE NUMBER AND TYPE OF CRIMPS PER THE KIT MANUFACTURER'S INSTRUCTIONS.

PRIMARY CABLE TERMINATION DETAILS

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mbakerintl.com\dms36948\502101 - Electrical-DETAILS1

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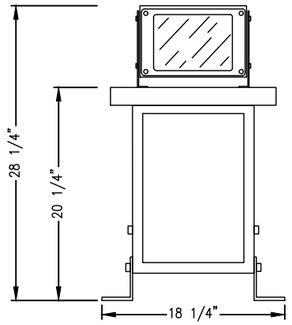
BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
LIGHTING DETAILS

SHEET 30 OF 32

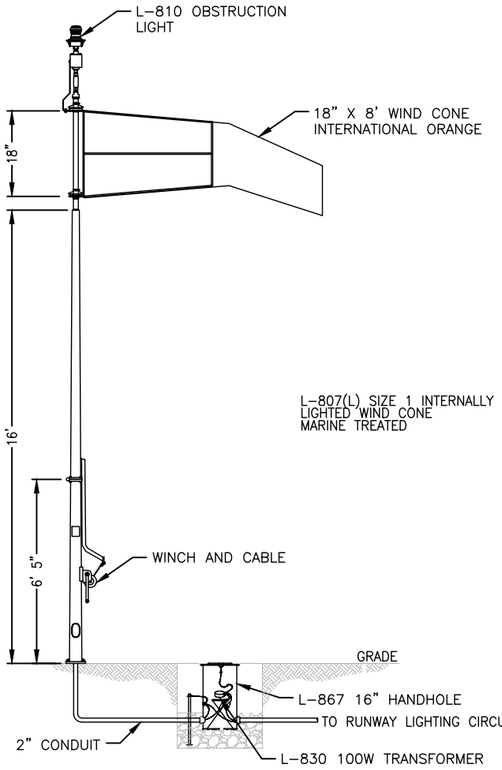


L-801A(L) CLASS II MEDIUM INTENSITY AIRPORT BEACON
ROTATION SPEED - 12 RPM
BEAM POWER MIN. 50,000 EFFECTIVE CANDELA FROM +3° TO +7° VERTICAL

MOUNT ON (E) STANDOFF PLATFORM ON SREB

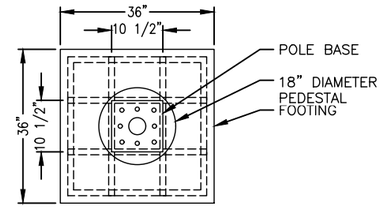
BEACON DETAIL

NO SCALE

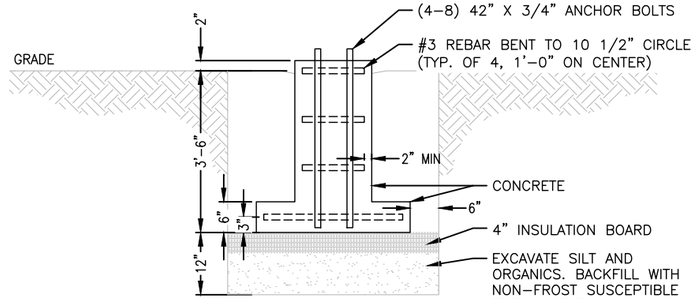


WIND CONE ASSEMBLY

NO SCALE



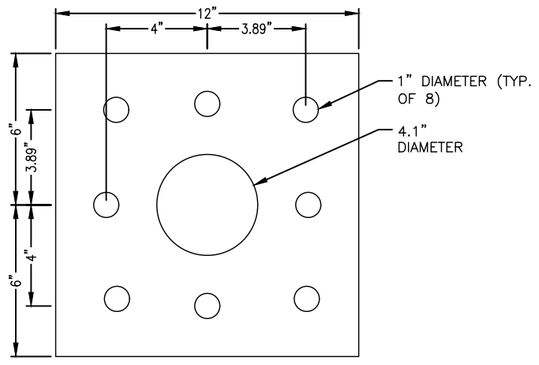
PLAN VIEW



SECTION VIEW

WIND CONE FOUNDATION DETAIL

NO SCALE



PROVIDE MINIMUM 4 ANCHOR BOLTS

WIND CONE BASE PLATE DETAIL

NO SCALE

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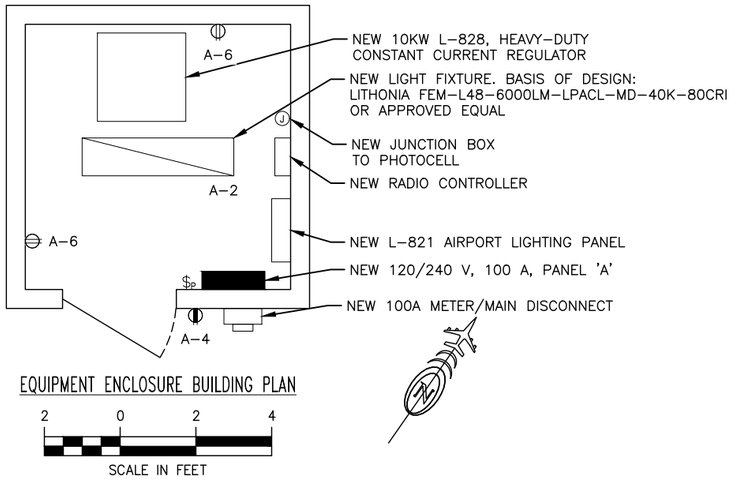
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
LIGHTING DETAILS

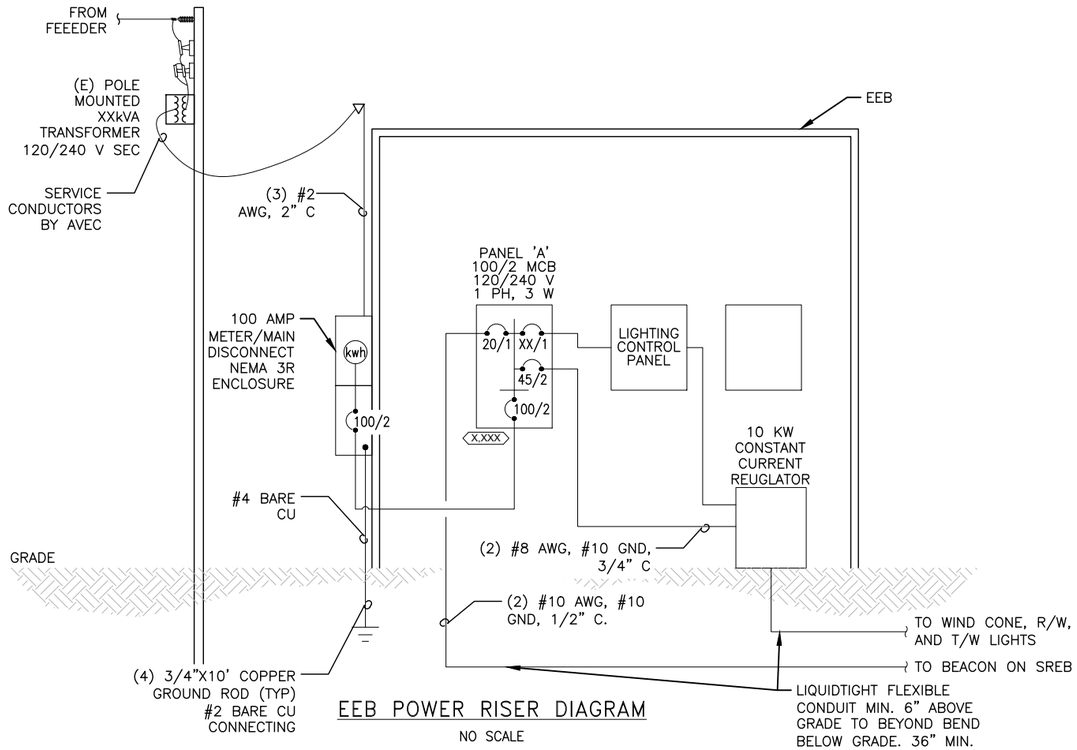
SHEET 31 OF 32



EQUIPMENT ENCLOSURE BUILDING PLAN

2 0 2 4

SCALE IN FEET



EEB POWER RISER DIAGRAM

NO SCALE

PANEL 'A'

LOCATION: EEB | VOLTS: 120/240 V | A.I.C. RATING: 10,000 A

SUPPLY: METER/MAIN COMBO | PHASES: 1 | MAINS TYPE: MLO

MOUNTING: SURFACE | WIRES: 3 | MAINS RATING: 100 A

ENCLOSURE: NEMA TYPE 1 | POLE SPACES: 20 | PANELBOARD FEEDER C/B RATING: 100 A

NOTES:

CKT NO	P	TRIP	LOAD SERVED	LOAD TYPE	LOAD (VA)	BUS	LOAD (VA)	LOAD TYPE	LOAD SERVED	TRIP	P	CKT NO
1	1	20	LIGHTING CONTROL PANEL	E	0	A	38	L	ENLCOSURE LIGHTING	20	1	2
3	1	20	SPARE	S	0	B	180	R	REC - EXTERIOR	20	1	4
5	1	20	ROTATING BEACON AND MOTOR	M	536	A	360	R	REC - INTERIOR	20	1	6
7	1	20	SPARE	S	0	B	1,500	E	EEB HEATER (1.5 KW)	20	1	8
9	2	45	10 KW REGULATOR	E	4,100	A	0	S	SPARE	20	1	10
11			" "	E	4,100	B	0	S	SPARE	20	1	12
13	1	20	SPARE	S	0	A	0	-	PREPARED SPACE	--	--	14
15	--	--	PREPARED SPACE	-	0	B	0	-	" "	--	--	16
17	--	--	" "	-	0	A	0	-	" "	--	--	18
19	--	--	" "	-	0	B	0	-	" "	--	--	20

CONNECTED LOAD CALCULATIONS:	LOAD	BALANCE	CURRENT	LOAD PERCENTAGE
PHASE A	5,034 VA	47%	21.0 A	21%
PHASE B	5,780 VA	53%	24.1 A	24%
PHASE C	--	--	--	--
TOTAL CONNECTED LOAD:	10,814 VA		45.1 A	45%

NEC DEMAND LOAD CALCULATIONS:	LOAD	FACTOR	TOTAL	CURRENT	LOAD PERCENTAGE
L=LIGHTING X125%	38 VA	125%	47 VA	0.2 A	0%
R=RECEPTACLES (NEC 220.44)	540 VA	100%	540 VA	2.3 A	2%
C=EQUIPMENT (CONT.) X125%	--	--	--	--	--
E=EQUIPMENT (NON-CONT.) X100%	9,700 VA	100%	9,700 VA	40.4 A	40%
M=MOTORS (+25% OF LARGEST)	536 VA	125%	670 VA	2.8 A	3%
A=APPLIANCES (NEC 220.56)	--	--	--	--	--
TOTAL DEMAND LOAD:	10,814 VA	101%	10,957 VA	45.7 A	46%

PLANS DEVELOPED BY: DESIGN ALASKA, INC., AECC511, 601 COLLEGE ROAD, FAIRBANKS, AK 99701 (907) 452-1241
C:\Users\jordan.zellhuber\AppData\Local\Bentley\projectwise\workingdir\mb-us-pw.bentley.com_mb-us-pw-02\jordan.zellhuber@mbakerintl.com\dms36948\502101 - Electrical-EEB

DESIGN RSG

DRAWN JCC

CHECKED RSG

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NORTHERN REGION-DESIGN AND CONSTRUCTION-AVIATION

35% PS&E

BY	DATE	REVISIONS

BREVIG MISSION AIRPORT
AIRPORT LIGHTING AND RESURFACING
AIP 3-02-0400-XX-202X/NFAPT00500
ELECTRICAL EQUIPMENT BUILDING

SHEET 32 OF 32

Appendix B FAA Project Concurrence

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Hebnes, RaeAnne

From: Thatcher, Garrett
Sent: Thursday, July 15, 2021 9:54 AM
To: Hebnes, RaeAnne
Subject: FW: EXTERNAL: FW: Brevig Mission Airport Lighting and Resurfacing

---

From: Hutchinson, Jonathan J (DOT) <jonathan.hutchinson@alaska.gov>
Sent: Thursday, July 15, 2021 9:44 AM
To: Thatcher, Garrett <Garrett.Thatcher@mbakerintl.com>
Subject: EXTERNAL: FW: Brevig Mission Airport Lighting and Resurfacing

Here is the correspondence.

From: Edic, Heather M (FAA) <Heather.M.Edic@faa.gov>
Sent: Tuesday, June 8, 2021 9:02 AM
To: Hutchinson, Jonathan J (DOT) <jonathan.hutchinson@alaska.gov>
Subject: FW: Brevig Mission Airport Lighting and Resurfacing

Hi Jonathan,

After speaking with the other FAA Planners, we are fine moving forward with the scope of rehabilitating the existing Runways at their current widths and replacing the lights at their current locations. However, can you reword this part of the SOW: below it says “resurface of the entirety of the RSA” for a rehabilitation runway project we would expect the RSA to only need some grading. Could you revise your CIP Datasheet to reflect this SOW discussion?

Thank you,

Heather Edic
Community Planner, FAA
Alaskan Region Airports Division
heather.m.edic@faa.gov
Tel: (907) 460-1684

From: Hutchinson, Jonathan J (DOT)
Sent: Monday, February 1, 2021 9:55 AM
To: Edic, Heather M (FAA) <Heather.M.Edic@faa.gov>
Subject: Brevig Mission Airport Lighting and Resurfacing

Hey Heather,

Re: Brevig Mission Airport Lighting and Resurfacing. NFAPT00500

This project is in the funding plan for FFY22.

The **scope** is a rehab job - to resurface the operational surfaces (runway, taxiway, apron), replace the lighting, rehabilitate embankment shoulders, and apply dust palliative. I wanted to highlight some existing conditions and agree on conceptual scope:

1. The ALP is a little dated (8/18/03), though it reflects current conditions. We don't propose any geometry changes, but propose to bring the ALP up to latest standards concurrently with the As-Built ALP Update.

2. The Crosswind runway (11/29) is 3000'x100' with a 3600'x150' RSA. This meets current standards with the exception of the Runway width which exceeds the minimum runway width requirement of 75'. Because the RSA is to standard, we propose to resurface the entire RSA width at its existing geometry without changing the runway width. This would not add any (trivial) cost to the project, because it would involve replacing the lights in their current location instead of reconstructing them at a narrower width of 75'.

3. The main runway (4/22) is 2110' x 75', with a 2590x120' RSA. This meets current AC standards for an A-I small, with the exception of the runway width, which exceeds the minimum required runway width of 60'. Like above, we propose to resurface the entirety of the RSA, and keep the runway width at the non-standard 75' by replacing the lights @ their current location.

Cheers,

Jonathan J. Hutchinson, P.E.
Project Manager, DOT&PF Rural Transportation Team
907-451-5479 | jonathan.hutchinson@alaska.gov

Appendix C Geotechnical Recommendations

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BREVIG MISSION AIRPORT LIGHTING AND RESURFACING

MEMORANDUM

Subject: GEOTECHNICAL RECOMMENDATIONS – BREVIG MISSION AIRPORT

From: William Brooks, P.E.
Michael Baker International
Geotechnical Engineer

To: Jonathan Hutchinson, P.E.
Alaska DOT&PF
Design Manager

Date: 7/23/2021

1. INTRODUCTION

This memo reports the results of our desktop analysis assessing the general subsurface conditions in the project area as well slope treatment alternatives to repair damage to airfield embankment slopes caused by thaw induced differential settlement of the subgrade. No additional geotechnical investigation was completed at the Brevig Mission Airport for the 2021 Resurfacing and Lighting Project.

The airfield consists of two gravel-surfaced, perpendicular runways, a taxiway, an apron, and an access road. The primary runway (RW), designated 04-22, is 75-feet wide and 2,110-feet long. The crosswind runway, RW 11-29, is 100-feet wide and 2990-feet long. Brevig Mission airport is shown in Figure 1-1.

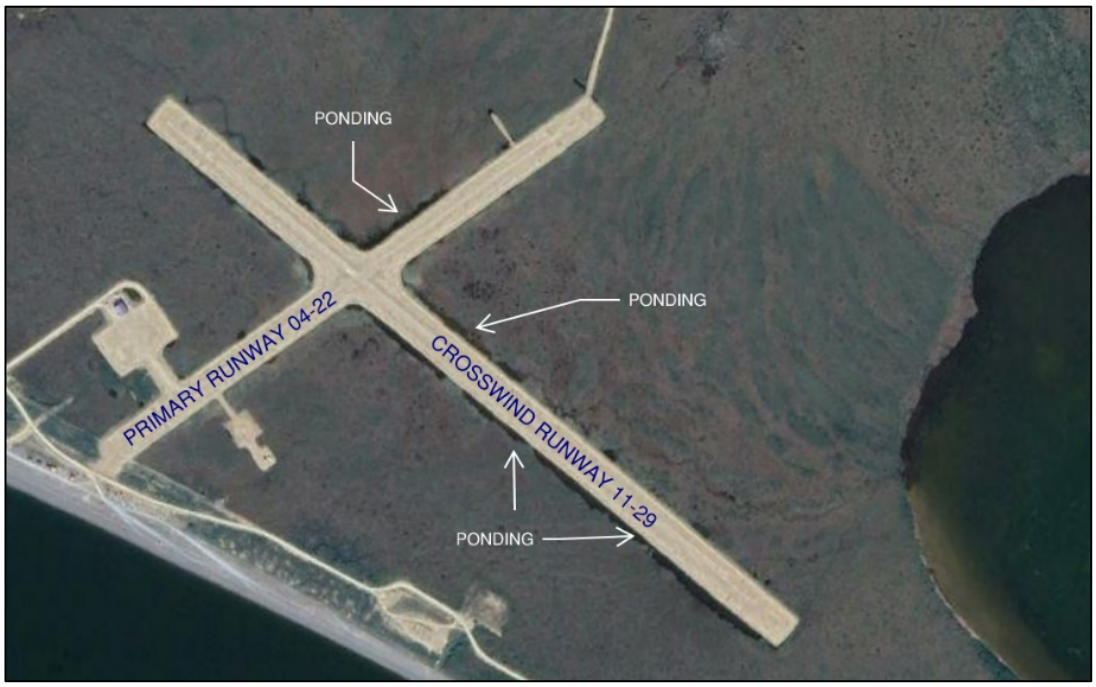


Figure 1-1: Brevig Mission Airport

Ongoing embankment failure occurring at Brevig Mission is evidenced by longitudinal cracking, rotation, and sloughing. The cause of the failure is attributed to thermal degradation initiated by construction of the gravel runways which changed the surface characteristics. This change increased heat transfer to the subgrade and resulted in increased thaw depths adjacent to the runway and was followed by thaw consolidation of ice-rich, thaw-unstable permafrost in the subgrade.

The airport's main runway 04-22 was improved in the 1980s to extend the runway approximately 300ft and increase the embankment of the runway over the permafrost. A crosswind runway, new access road, and revised taxiway and apron were constructed in 1997. This construction also increased the safety area of runway 04-22. Geotechnical investigations were documented in 1980, 1994, and 1995. The purpose of each investigation is listed below.

- 1980 – The geotechnical investigation supported airport upgrades, including overlaying the gravel runway with an additional 2-3 feet of borrow, construction of an aircraft parking apron, taxiway, access road, and equipment storage building pad.
- 1994 – The geotechnical investigation supported the environmental assessment (EA) for the Brevig Mission Airport Master Plan. Two alternatives were evaluated: expansion of the existing runway or construction of a new airport at the alternate site.
- 1995 – The engineering geology evaluation supported the lengthening and widening of the existing runway and construction of the crosswind runway which was completed in 1997.

These investigations encountered a frozen, ice-rich subgrade underlying the airport property. Though investigations were shallow, with the greatest depth explored approximately 15', permafrost appears to extend to the depth explored and is likely present to great depths.

Thaw consolidation of the ice-rich subgrade appears to be an ongoing issue. The embankment thickness has been increased in the past to limit the depth of thaw into the subgrade, and insulation present has prevented deep thaw beneath the center of the runways. At the edges, including the shoulders, the thinner section does little to prevent thawing of the subgrade soils. Thawing at the edges then results in thaw consolidation extents similar to the depth of thaw due to the high moisture content of the subgrade and similarly high potential for thaw consolidation.

2. CLIMATE

Brevig Mission is located on the west coast of the Seward Peninsula. The nearest Western Region Climate Center (WRCC) US COOP Station to Brevig Mission is located in Teller, AK approximately 6 miles south. The highest monthly average temperature is 57.5 degrees, which occurs in July and an average low temperature of -8 degrees in February.

TABLE 2.1: TELLER/BREVIG MISSION CLIMATE AVERAGES

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg Max Temp (ºF)	10.2	5.7	10.3	24.0	40.9	52.1	57.7	56.0	47.3	33.0	21.2	6.9
Avg Min Temp (ºF)	-4.4	-8.0	-6.9	5.2	26.2	37.9	45.1	44.9	36.9	24.6	12.6	-5.2
Avg Total Precip (in)	0.80	0.73	0.83	0.41	0.33	0.47	0.92	2.42	1.08	0.60	0.64	0.49
Avg Total Snowfall (in)	6.9	7.1	11.1	4.6	1.8	0.1	0.0	0.0	0.3	1.5	6.6	6.1
Avg Snow Depth (in)	7	6	11	7	3	0	0	0	0	0	2	4

3. SUBSURFACE CONDITIONS

The subsurface investigations conducted in 1980, 1994, and 1995 generally encountered a soil profile consisting of one foot of vegetative tundra mat underlain by one to six and one half feet of organic silt overlying silt to silt with gravel. Moisture content values of soil samples collected during the 1994 geotechnical investigation reflect the presence of massive ice, and indicate thaw consolidation potential is considerable. The typical subsurface is presented in Figure 3-1.

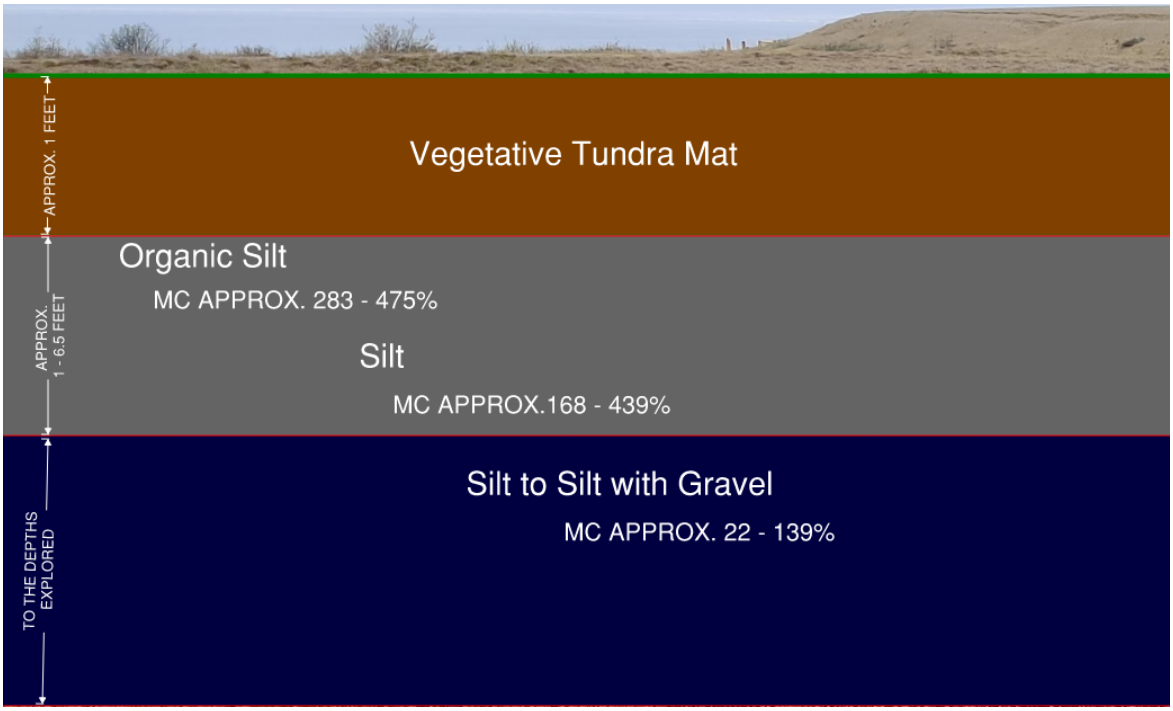


FIGURE 3-1: TYPICAL SUBSURFACE PROFILE

Subsurface conditions have been investigated three times in the last 40 years. A summary of Brevig Mission subsurface investigations includes:

- 1980 – 28 test holes to an average depth of 4.7 feet using a Haynes drill with 3-inch continuous flight auger. Maximum depth reached was 6.5 feet. Testholes were placed in the vicinity of the existing runway.
- 1994 – 31 test borings were drilled using a Marlow 18 HP Prospectorpac flow through sampler, a hydraulic percussion hammer, to 10 to 15 feet below ground. Ten test holes were placed along the existing runway, 16 test holes were placed at the alternate site, and 5 were drilled at the existing borrow pit.
- 1995 – An engineering evaluation was conducted for the proposed borrow area and crosswind runway location using a six-foot steel probe, hand shovel, and geology hammer.

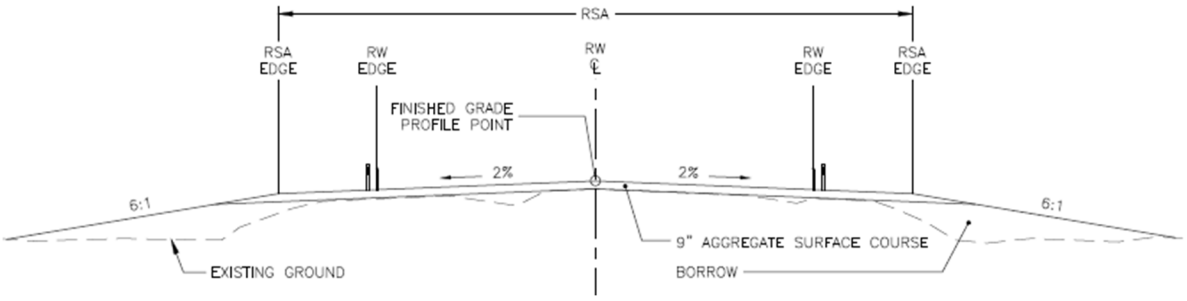
Throughout the investigations, ice-rich permafrost was found to be present throughout the area. In late July 1995, the active layer was estimated at 8-12 inches below areas with a surface organic layer; where intense seasonal frost action occurs in circular to trench like openings, the vegetation is absent, and thaw depths of 3 to 4 feet were noted during the summer.

Since the construction of the crosswind runway in 1997, thaw consolidation has occurred following the change in thermal conditions, causing ponds to develop adjacent to the embankment, which have initiated sloughing and oversteepening at the runway edges. These ponds have been observed to be at least five feet deep, reflecting considerable thaw consolidation and thermal influence beyond the typical active layer depth of the surrounding tundra.

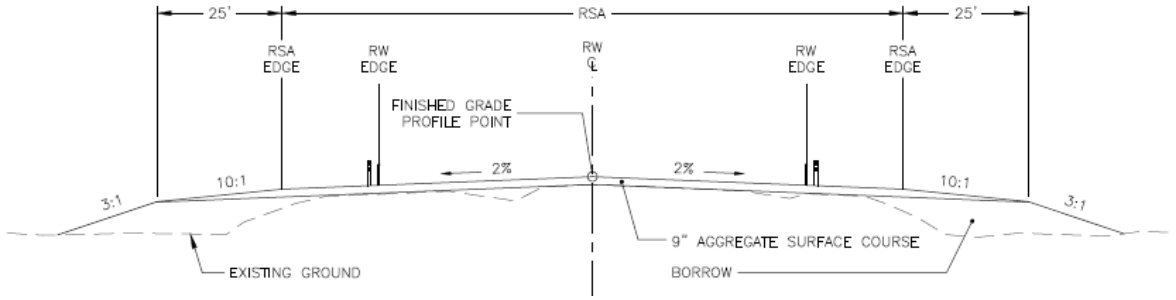
4. ALTERNATIVES

Three alternatives were considered to reconstruct the failure of the embankment slopes. These alternatives aim to limit thaw consolidation within the safety areas of the airport and minimize differential settlement of the runways. Alternatives 1 and 2 consider the reconstruction without insulation, whereas Alternative 3 places additional insulation along the crosswind runway.

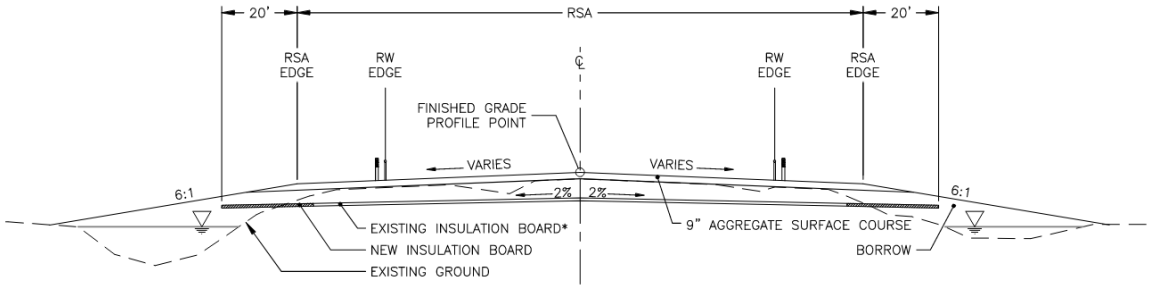
- Alternative 1 – 6H:1V slopes



- Alternative 2 – Barn roof – 10H:1V transitioning to 3H:1V



- Alternative 3 – 6H:1V with additional insulation at existing locations



* EXISTING INSULATION IS PRESENT ALONG RW 11–29 WITHIN 300 FT OF THE RW 04–22 AND RW 11–29 INTERSECTION

Alternatives 1 and 2 will place the toe of the new slope on undisturbed tundra, reduce snow accumulation, and allow for grading to correct settlement and maintain safe slopes adjacent to the runway as thaw consolidation continues. Alternative 2 has a 3:1 slope at the edge which will likely steepen as thaw consolidation occurs following construction. Alternative 1, and its 6:1 side slope, will mitigate snow drifting to some degree, reducing the effects of drifted snow, which insulates and limits heat transfer out of the subgrade during winter months.

The footprint of all alternatives infills the existing thaw ponds to buttress the existing embankment and move future thermal degradation issues away from the runway and towards the edge of the embankment. Pond depths observed in June 2021 were fairly deep, such that if backfilled, summer thaw penetration likely would remain in the gravel fill reducing the need for insulation to limit thaw depths.

Alternative 3 includes insulation, which would impose seasonal restrictions on the construction schedule requiring a spring construction season in order to install the insulation when the ground is frozen. If installed correctly, insulation will limit thaw penetration into the subgrade. However, as it doesn't extend to the toe, it will do little to prevent future ponding.

The options presented address the failed embankment side slopes. The maintenance of the shoulders following additional thaw consolidation should be weighed against the cost and effectiveness of installing insulation and the associated impacts to the construction schedule and project objectives.

5. GEOTHERMAL ASSESSMENT

A geotechnical investigation was not conducted as part of this project, but the Alaska Department of Transportation and Public Facilities (AKDOT&PF) provided a geothermal report developed by Shannon & Wilson titled "Draft Geotechnical Recommendation Report for Deering Airport" dated June 3, 2020, which presents qualitative geothermal modeling of various embankment geometries and insulation placement to evaluate different construction options for the airport at Deering. The Deering Airport is experiencing similar embankment failure due to thermal degradation as Brevig Mission.

The common failures at both airports include retrogressive thaw settlement and thaw consolidation of the underlying frozen soils resulting in embankment shoulder rotation and cracking along the edges of the embankment. Though Deering is located on the northeast portion of the Seward Peninsula, approximately 120 miles from Brevig Mission, the general recommendations may be applicable, due to the similar subsurface and climate conditions. A comparison of average monthly temperatures suggest Brevig Mission is a comparable location to Deering (Figure 5-1).

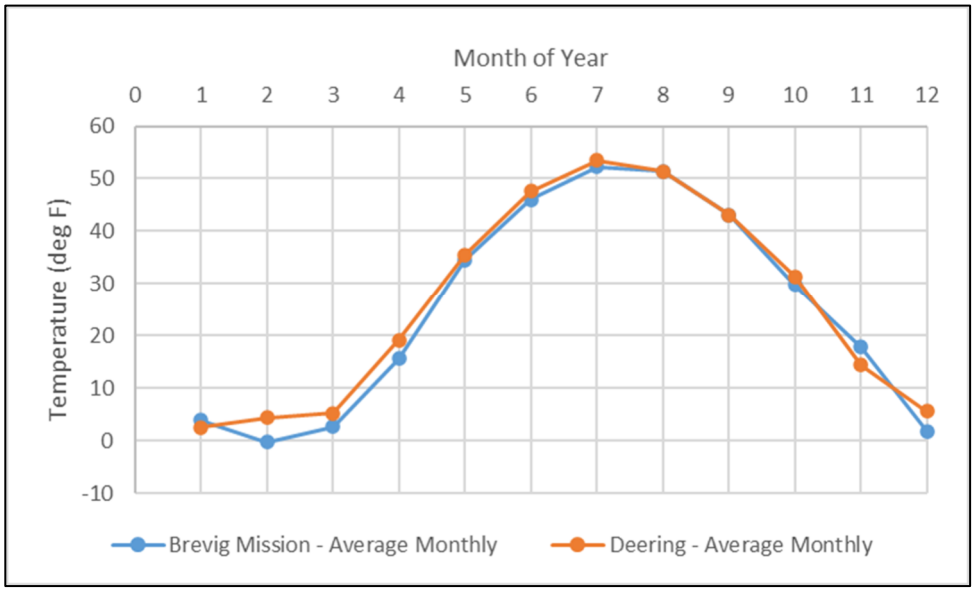


FIGURE 5-1: AVERAGE MONTHLY TEMPERATURES AT BREVIG MISSION AND DEERING

The qualitative modelling results provide a generalization of the thermal regime surrounding an embankment in the region, with a 2-foot active layer and warm permafrost hovering between 31 and 32 degrees Fahrenheit extending over 20 feet below the ground surface.

Field observations and geothermal modelling from Deering concluded:

- Snow accumulation adjacent to the slopes was correlated to the presence of tension cracks, and inversely, areas with little snow accumulation showed little in the way of tension cracks.
- Flatter slopes on the embankment are preferred to reduce snow accumulating during wind events, reducing heat loss during winter
- Insulation reduces the depth of thaw at the toe

Shannon and Wilson's report recommended constructing the Deering Airport with 6H:1V embankment slopes combined with altering snow removal practices to potentially reduce future snow accumulation from the embankment and lessen shoulder rotation.

At Brevig Mission, it follows that a reduction in snow accumulation will lower subgrade temperatures during winter, in turn reducing thaw depths during the summer; and that insulation installed away from the toe will have little effect on the preventing thaw consolidation and ponding at the toe.

6. RECOMMENDATIONS

Alternative 1 is recommended. This alternate constructs the flattest overall side slope without the addition of insulation. The flatter side slope reduces snow accumulation potential at the toe, thus reducing the potential for the side slope to steepen. 6H:1V side slopes are easier to maintain, increase the potential maintenance will be able to minimize differential settlement due to thaw consolidation throughout the airport.

Fill in the ponded areas at the embankment toes with a selected material consisting of sand and gravel with at least 30% fines. Remove and save the organic layer from within the extents of the new shoulder embankment and place the saved organic material over the toe of the new embankment.

If insulation is considered, insulation should be placed while the ground is as cold as possible in the spring, prior to the beginning of the thaw season. Insulation should not be used if this condition cannot be met by the project schedule.

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Appendix D Basis of Runway Alignments

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STATE OF ALASKA -- DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES -- NORTHERN REGION
PROJECT NAME: BREVIG MISSION AIRPORT RESURFACING
DOT&PF NO: 60657
APPENDIX D - BASIS OF RUNWAY ALIGNMENTS

CONTROL NOTES

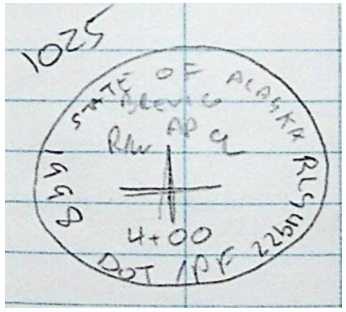
THIS PROJECT IS LOCATED ENTIRELY WITHIN STATE PLANE ZONE 8.
THE BASIS OF COORDINATES IS NAD83(2011)(EPOCH:2010.0000) OPUS AVERAGED POSITION OF POINT #1 N: 4141328.78 FT E: 1567906.09 FT
BASIS OF BEARING IS STATE PLANE ZONE 8.
THE BASIS OF ELEVATIONS IS THE OPUS AVERAGED GEOID12A (NAVD88) ELEVATION OF 33.49 FT. AT POINT #1

SURVEY PERFORMED BY DOT&PF SEPTEMBER 30 TO OCTOBER 4, 2020

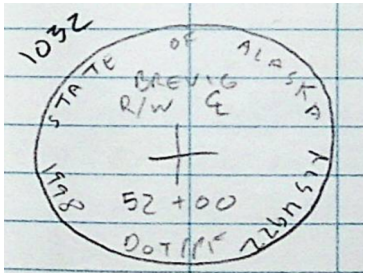
PT ID	NORTHING	EASTING	LATITUDE	LONGITUDE	Elevation	DESCRIPTION
1025	4140903.8500'	1567794.0190'	N65° 19' 47.2369"	W166° 28' 30.4690"	22.86'	2" alum rebar cap marked with RW CL 4+00
1032	4143649.6830'	1571730.6230'	N65° 20' 14.5454"	W166° 26' 58.2155"	51.96'	2" alum rebar cap marked with RW CL 52+00
1021	4142606.7560'	1567871.1800'	N65° 20' 04.0026"	W166° 28' 28.9537"	24.52'	PRIM MON FND marked with RW CL 95+00
1022	4139386.2650'	1571695.5590'	N65° 19' 32.5824"	W166° 26' 58.3254"	33.91'	PRIM MON FND marked with RW CL 145+00

RUNWAY 4-22 BASIS

PT ID 1025 Identified as 2" Aluminum Rebar Cap; flush with ground, stable, and in good condition

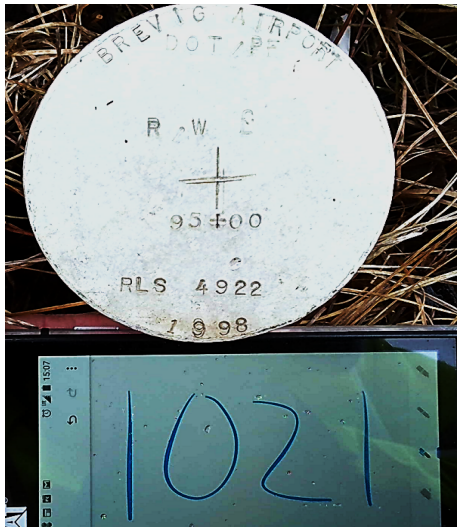


PT ID 1032 Identified as 2" Aluminum Rebar Cap; flush with ground, stable and in good condition



RUNWAY 11-29 BASIS

PT ID 1021 Identified as Primary Monument RWCL 95+00 RLS4922 1998, UNSTABLE



PT ID 1022 Identified as Primary Monument RWCL 145+00 RLS4922 1998

Appendix E Design Designation and Design Criteria Forms

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Project Name: Brevig Mission Airport				
☐ New Construction/Reconstruction ☑ Reconstruction (3R) ☐ Other:				
Project Number:	AIP 3-02-0400-XX-202X/NFAPT00500		☐ NHS	☑ Non NHS
Functional Classification:	Local Road			
Design Year:	2040	**Present ADT*:**		11
Design Year ADT:	17	**Mid Design Period ADT:**		14
DHV:	15%	**Directional Split:**		50/50
Percent Trucks:	0%	**Equivalent Axle Loading:**		0
Pavement Design Year:	N/A	**Design Vehicle:**		P
Terrain:	Flat	**Number of Roadways:**		1
Design Speed:	20-mph			
Width of Traveled Way:	16-ft			
Width of Shoulders:	**Outside:**	2-ft	**Inside:**	0
Cross Slope:	2%			
Superelevation Rate:	e_{max}=6%			
Minimum Radius of Curvature:	81			
Minimum K-Value for Vertical Curve:	**Sag:**	17	**Crest:**	4
Maximum Allowable Grade:	8%			
Minimum Allowable Grade:	0%			
Stopping Sight Distance:	90-ft			
Lateral Offset to Obstruction:	1.5-ft			
Vertical Clearance:	16-ft			
Bridge Width:	**N/A**			
Bridge Structural Capacity:	**N/A**			
Passing Sight Distance:	400-ft			
Surface Treatment:	**T/W:**	Aggregate Surface Coarse	**Shoulders:**	Aggregate Surface Coarse
Side Slope Ratios:	**Foreslopes:**	6H:1V	**Backslopes:**	6H:1V
Degree of Access Control:	Entrance regulations			
Median Treatment:	N/A			
Illumination:	N/A			
Curb Usage and Type:	N/A			
Bicycle Provisions:	Shoulders			
Pedestrian Provisions:	Shoulders			
Misc. Criteria:	N/A			

Proposed - Designer/Consultant: _____ **Date:** 9/3/2021

Accepted - Engineering Manager: _____ **Date:** _____

Approved - Preconstruction Engineer: _____ **Date:** _____

Shaded criteria are the *FWHA 13 controlling criteria*. For NHS routes only, these criteria must meet the minimums established in the Green Book (*AASHTO A Policy on Geometric Design of Highways and Streets*). For all other routes, these criteria must meet the minimums established in the *Alaska Highway Preconstruction Manual*. Otherwise a Design Exception must be approved.

Design Criterion marked with a " # " do not meet minimums and have a Design Exception(s) and/or Design Waiver(s) approved. See Appendix __ for Design Exception/Design Waiver approval(s) and approved design criteria values.

***No traffic Data Available**
Assuming 2 flights a day with 3 veh per flight, 2 trips by M&O, 3 trips a day for charters/freight
Total ADT of 11
Assumed design year of 2040, Design year ADT is current x 1.2
Vertical clearance limited by overhead powerlines. Should be at least 16ft high

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Appendix F Lab Tests

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State of Alaska
Department of Transportation & Public Facilities
Central Materials Lab

5750 East Tudor Road
Anchorage, AK 99507
Phone (907) 269-6200 FAX (907) 269-6201

Laboratory Report

Quality

Laboratory No.: 2020A-2461

Name: Brevig Mission Lighting and Resurfacing | Project No.: 00500
Sample: Pit Run | Item/Spec No.: 203 | Field No.: PIT-Q-1
Sampled From: Pit | Submitted By: S. Morrow | Date Sampled: 10/14/2020
Source: Salmon Creek Pit | Sampled By: C. Crockett | Date Received: 10/22/2020
Location: Brevig Mission Rehabilitation Project | Quantity Represented: Source | Date Completed: 11/09/2020
Examined For: LA Abrasion, Degradation, Sulfate Soundness, Atterberg | Date Reported:

Sample Preparation by: AASHTO R58 & T248

	Lab	Field	Specs
Sieve Analysis		AASHTO T27 & T11	
4"			
3"	**100**		
2"	**92**		
1 1/2"	**84**		
1"	**77**		
3/4"	**68**		
1/2"	**53**		
3/8"	**44**		
1/4"	**33**		
#4	**28**		
#8	**22**		
#10	**21**		
#16	**18**		
#30	**15**		
#40	**15**		
#50	**14**		
#80			
#100	**13**		
#200	**11.7**		
.02 mm			
.002 mm			
Fineness Modulus			

	Lab	Specs
% Organic		
% Natural Moisture		
pH of Soil		
% Sticks & Roots		
Dry Unit Weight, pcf		
% Lightweight Particles		
Uncompacted Voids of FA		
Specific Gravity of Soil		
Sand Equivalent		
Expansion Breakdown		

		Coarse		Fine	
		Lab	Specs	Lab	Specs
	Friable Particles				
AASHTO T104	Sulfate Soundness, % Loss	**2**		**1**	
	Agg. Specific Gravity, Bulk				
	Agg. Specific Gravity, SSD				
	Agg. Specific Gravity, App.				
	% Absorption				
AASHTO T96	LA Abrasion, Total % Loss	**29**			
	@ 100 revs % Loss				
ATM 313	Degradation	**18**			
	Nordic Abrasion				
	California Bearing Ratio				
	Organic Impurities				

Mortar Making Properties of Sand - Compressive Strength

Unwashed	Washed	Ratio	Spec
			95 min

% Fracture

Single Face			
Double Face			

Atterberg Limits	Dry Prep	AASHTO T89 & T90	
Liquid Limit	**25**		
Plastic Limit	**19**		
Plastic Index	**6**		

Flat / Elongated

1:3			
1:5			

Soil Classification

% +3"	FSV
	AASHTO
% Gravel	Unified
% Sand	
% Silt/Clay	
% Clay	

Remarks:

Signature: **DRAFT**

Mike Yerkes, P.E.
Regional Materials Engineer

X The Material as Submitted Conforms to Specifications
Yes [ ] No [ ] NA [ ]

THE TEST RESULTS ARE ONLY REPRESENTATIVE OF THE MATERIAL AS SUBMITTED

Laboratory No.: 2020A-2461

4"	
3"	100
2"	92
1 1/2"	84
1"	77
3/4"	68
1/2"	53
3/8"	44
1/4"	33
#4	28
#8	22
#10	21
#16	18
#30	15
#40	15
#50	14
#80	
#100	13
#200	11.7

Project Name: Brevig Mission Lighting and Resurfacing

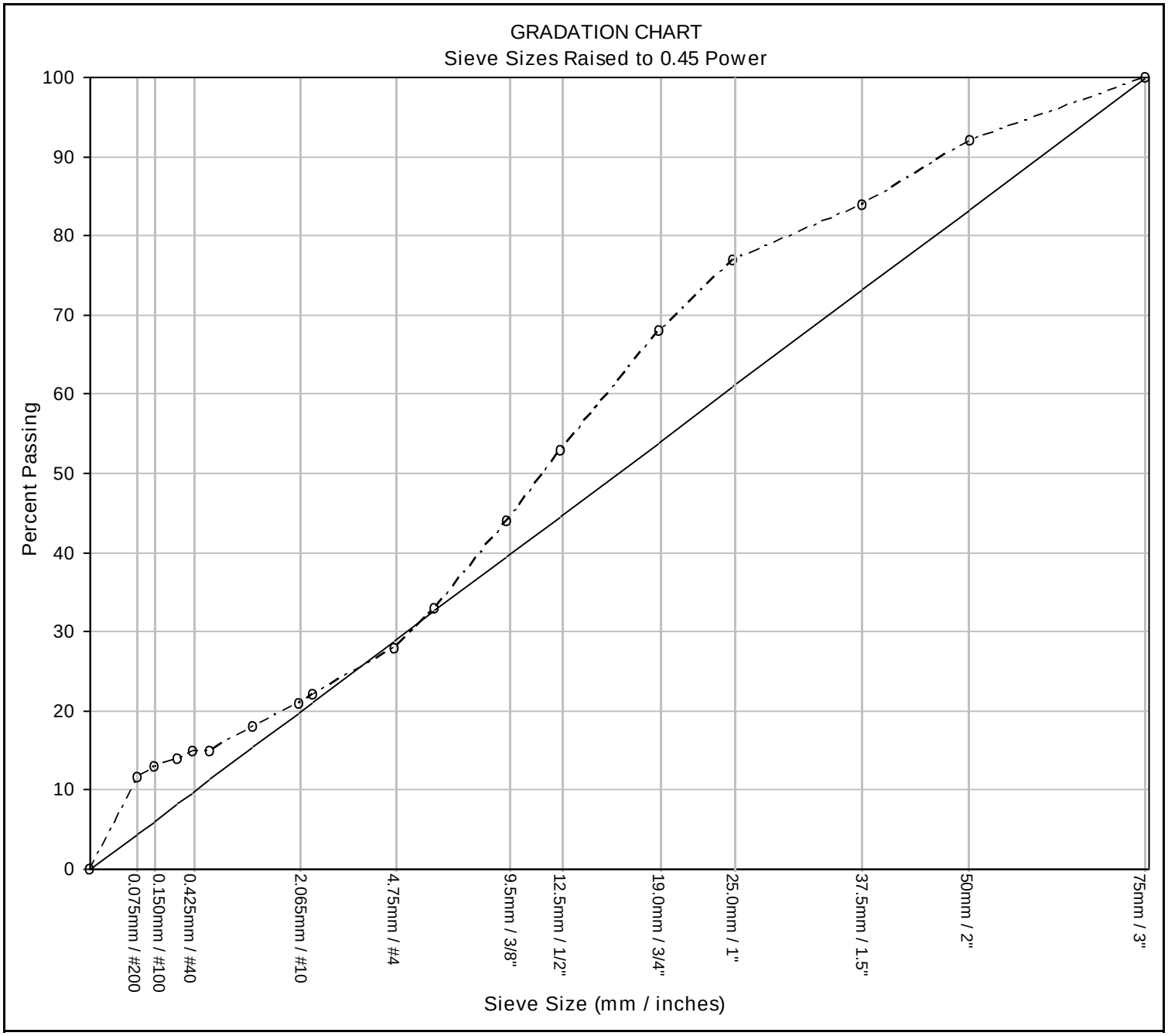
State Number: 00500 IRIS: NFAPT00500

FieldNum: PIT-Q-1

SampledFrom: Pit

Source: Salmon Creek Pit

Depth:



State of Alaska
Department of Transportation & Public Facilities
Central Materials Lab
5750 East Tudor Road
Anchorage, AK 99507
Phone (907) 269-6200 FAX (907) 269-6201

Laboratory Report

Quality

Laboratory No.: **2021A-1533**

Name: **Brevig Mission Lighting and Resurfacing** Project No.: **00500**
Sample: **Surface Course E1** Item/Spec No.: **301.004.00E1** Field No.: **BMAP-SC-Q-1**
Sampled From: **Runway** Submitted By: **M. Culley** Date Sampled: **06/11/2021**
Source: **Existing** Sampled By: Date Received: **07/09/2021**
Location: **Brevig Mission Rehabilitation Project** Quantity Represented: **Source** Date Completed: **07/15/2021**
Examined For: **LA Abrasion, Degradation, Gradation, Fracture, Atterberg** Date Reported: **07/15/2021**

Sample Preparation by: AASHTO R58 & T248

Sieve Analysis	Lab	Field	Specs
		AASHTO T27 & T11	
4"			
3"			
2"	100		
1 1/2"	99		
1"	93		100
3/4"	87		70-100
1/2"	74		
3/8"	65		50-85
1/4"	51		
#4	45		35-65
#8	34		20-50
#10	33		
#16	28		
#30	24		
#40	22		
#50	21		15-30
#80			
#100	19		
#200	17.2		8-15
.02 mm			
.002 mm			
Fineness Modulus			

% Fracture		AASHTO T335	
Single Face	96		70 min
Double Face			

Atterberg Limits	Dry Prep	AASHTO T89 & T90	
Liquid Limit	26		35 max
Plastic Limit	20		
Plastic Index	6		10 max

Flat / Elongated			
1:3			
1:5			

	Lab	Specs
% Organic		
% Natural Moisture		
pH of Soil		
% Sticks & Roots		
Dry Unit Weight, pcf		
% Lightweight Particles		
Uncompacted Voids of FA		
Specific Gravity of Soil		
Sand Equivalent		
Expansion Breakdown		

		Coarse		Fine	
		Lab	Specs	Lab	Specs
	Friable Particles				
	Sulfate Soundness, % Loss				
	Agg. Specific Gravity, Bulk				
	Agg. Specific Gravity, SSD				
	Agg. Specific Gravity, App.				
	% Absorption				
AASHTO T96	LA Abrasion, Total % Loss @ 100 revs % Loss	26	45 max		
ATM 313	Degradation	23	45 min		
	Nordic Abrasion				
	California Bearing Ratio				
	Organic Impurities				

Mortar Making Properties of Sand - Compressive Strength

Unwashed	Washed	Ratio	Spec
			95 min

Soil Classification

% +3"	FSV
	AASHTO
% Gravel	Unified
% Sand	
% Silt/Clay	
% Clay	

Remarks:

Not enough material for Sulfate Soundness.

DRAFT

Signature: _____
Mike Yerkes, P.E.
Regional Materials Engineer

D4 The Material as Submitted Conforms to Specifications
Yes [X] No [ ] NA [ ]

THE TEST RESULTS ARE ONLY REPRESENTATIVE OF THE MATERIAL AS SUBMITTED

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Appendix G Engineer's Estimate

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ENGINEER'S ESTIMATE
STATE OF ALASKA -- DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES -- NORTHERN REGION
PROJECT NAME: BREVIG MISSION AIRPORT LIGHTING & RESURFACING
DOT&PF NO: NFAPT00500

ITEM NUMBER	PAY ITEM	QUANTITY	UNIT	UNIT PRICE	AMOUNT
========== BASE BID ==========					
G100.010.0000	MOBILIZATION & DEMOBILIZATION	ALL REQUIRED	LUMP SUM	$ 1,500,000.00	$ 1,500,000.00
G115.010.0000	WORKER MEALS & LODGING, OR PER DIEM	ALL REQUIRED	LUMP SUM	$ 800,000.00	$ 800,000.00
G130.010.0000	FIELD OFFICE	ALL REQUIRED	LUMP SUM	$ 50,000.00	$ 50,000.00
G130.020.0000	FIELD LABORATORY	ALL REQUIRED	LUMP SUM	$ 25,000.00	$ 25,000.00
G130.040.0000	MEAL	1,278	EACH	$ 60.00	$ 76,680.00
G130.050.0000	LODGING	426	EACH	$ 150.00	$ 63,900.00
G130.060.0000	NUCLEAR TESTING EQUIPMENT STORAGE SHED	1	EACH	$ 7,000.00	$ 7,000.00
G130.110.0000	FIELD COMMUNICATIONS	ALL REQUIRED	LUMP SUM	$ 10,000.00	$ 10,000.00
G131.050.0000	ENGINEERING TRANSPORTATION	ALL REQUIRED	LUMP SUM	$ 75,000.00	$ 75,000.00
G135.010.0000	CONSTRUCTION SURVEYING BY THE CONTRACTOR	ALL REQUIRED	LUMP SUM	$ 100,000.00	$ 100,000.00
G135.020.0000	EXTRA THREE PERSON SURVEY PARTY	120	HOUR	$ 350.00	$ 42,000.00
G210.010.0000	CONTRACTOR SAFETY PLAN COMPLIANCE DOCUMENT	ALL REQUIRED	LUMP SUM	$ 30,000.00	$ 30,000.00
G700.010.0000	AIRPORT FLAGGER	ALL REQUIRED	CONTINGENT SUM	$ 50,000.00	$ 50,000.00
G700.030.0000	AIRPORT TRAFFIC MAINTENANCE	ALL REQUIRED	LUMP SUM	$ 50,000.00	$ 50,000.00
G705.010.0000	WATERING FOR DUST CONTROL	1,150	MGAL	$ 65.00	$ 74,750.00
G710.010.0000	HIGHWAY TRAFFIC MAINTENANCE	ALL REQUIRED	LUMP SUM	$ 50,000.00	$ 50,000.00
L101.020.0000	ROTATING BEACON, MEDIUM INTENSITY, L-801A	1	EACH	$ 20,000.00	$ 20,000.00
L107.010.0008	LIGHTED WIND CONE, L-807	1	EACH	$ 15,000.00	$ 15,000.00
L108.010.2008	UNDERGROUD CABLE #8 AWG, COPPER, 5kV FAA TYPE C, L-824	12,000	LF	$ 6.00	$ 72,000.00
L108.030.0006	#6 BARE COPPER GROUND CONDUCTOR	12,000	LF	$ 3.00	$ 36,000.00
L108.070.0000	GROUND ROD	16	EACH	$ 400.00	$ 6,400.00
L108.080.0012	UNDERGROUND CABLE #12 AWG, 2-CONDUCTOR, COPPER, 600V, TYPE "SOOW-A/SOOW"	500	LF	$ 7.00	$ 3,500.00
L109.030.0000	ELECTRICAL ENCLOSURE AND FOUNDATION IN PLACE	1	EACH	$ 85,000.00	$ 85,000.00
L109.050.0000	INSTALLATION OF ELECTRICAL EQUIPMENT IN NEW OR EXISTING STRUCTURE	ALL REQUIRED	LUMP SUM	$ 60,000.00	$ 50,000.00
L110.030.1002	RIGID STEEL CONDUIT, 2-INCH	850	LF	$ 50.00	$ 42,500.00
L110.080.1002	HDPE CONDUIT, 2-INCH	11,650	LF	$ 12.00	$ 139,800.00
L125.020.0000	REGULATOR, L-828	1	EACH	$ 20,000.00	$ 20,000.00
L125.030.0000	MEDIUM INTENSITY RUNWAY EDGE AND THRESHOLD LIGHT, L-861 AND L-861E	77	EACH	$ 2,000.00	$ 154,000.00
L125.040.0000	TAXIWAY EDGE LIGHT, L-861T	18	EACH	$ 2,000.00	$ 36,000.00
L125.070.0000	REMOVE RUNWAY AND TAXIWAY LIGHT	95	EACH	$ 300.00	$ 28,500.00
L125.170.0000	SPARE PARTS	ALL REQUIRED	CONTINGENT SUM	$ 10,000.00	$ 10,000.00
L125.180.0000	TEMPORARY RUNWAY LIGHTING SYSTEM	ALL REQUIRED	LUMP SUM	$ 100,000.00	$ 100,000.00
P151.040.0000	CLEARING & GRUBBING	ALL REQUIRED	LUMP SUM	$ 25,000.00	$ 25,000.00
P152.010.0000	UNCLASSIFIED EXCAVATION	10,000	CUBIC YARD	$ 7.50	$ 75,000.00
P152.200.0000	BORROW	265,500	TON	$ 12.50	$ 3,318,750.00
P165.010.0000	REMOVAL OF STRUCTURES	ALL REQUIRED	LUMP SUM	$ 10,000.00	$ 10,000.00
P167.010.0000	DUST PALLIATIVE	103,300	SQUARE YARD	$ 1.75	$ 180,775.00
P299.020.0000	CRUSHED AGGREGATE SURFACE COURSE	60,300	TON	$ 45.00	$ 2,713,500.00
P641.010.0000	EROSION, SEDIMENT, AND POLLUTION CONTROL ADMINISTRATION	ALL REQUIRED	LUMP SUM	$ 7,500.00	$ 7,500.00

P641.030.0000	TEMPORARY EROSION, SEDIMENT, AND POLLUTION CONTROL	ALL REQUIRED	LUMP SUM	$ 80,000.00	$ 80,000.00
P641.040.0000	TEMPORARY EROSION, SEDIMENT, AND POLLUTION CONTROL ADDITITIVES	ALL REQUIRED	CONTINGENT SUM	$ 30,000.00	$ 30,000.00
P641.060.0000	WITHHOLDINGS	ALL REQUIRED	CONTINGENT SUM	$ 1.00	$ 1.00
P641.070.0000	SWPPP MANAGER	ALL REQUIRED	LUMP SUM	$ 30,000.00	$ 30,000.00
P670.010.0000	HAZARD MARKER BARRIER, PLASTIC	62	EACH	$ 250.00	$ 15,500.00
P671.010.0000	RUNWAY CLOSURE MARKER, VINYL MESH	12	EACH	$ 2,500.00	$ 30,000.00
P671.020.0000	RUNWAY CLOSURE MARKER, ILLUMINATED	4	EACH	$ 23,500.00	$ 94,000.00
P671.040.0000	TAXIWAY CLOSURE MARKER, VINYL	1	EACH	$ 2,050.00	$ 2,050.00
T901.020.0000	SEEDING	1,250	POUND	$ 150.00	$ 187,500.00
T908.040.0000	MULCH - HYDRUALIC EROSION CONTROL PRODUCTS	92,500	SQUARE YARD	$ 2.00	$ 185,000.00

Base Bid Subtotal:	$10,807,606
Less Construction Engineering 644 ( ) Exclusion's:	$147,501
Base Bid Total Less 644 ( ) Exclusion's:	$10,660,105
Construction Eng. (15% Base Bid)	$1,621,100
Construction Total No ICAP	$12,428,800
Indirect Cost Allocation Plan (ICAP 5.88%)	$730,800
Construction Total	**$13,159,600**
Utility Relocation	
ROW Acquisition	$0
Design	
Environmental Mitigation	$0
Subtotal	**$0**
Grand Total	**$13,160,000**