APPENDIX H

Cultural Reconnaissance Report

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Historical Review for the Gustavus Airport RSA Improvements Project (No. 68287), Gustavus, Alaska

December 2009

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Executive Summary

Alaska Department of Transportation and Public Facilities (DOT&PF), in cooperation with the Federal Aviation Administration (FAA), proposes to upgrade the Gustavus airport to meet current federal standards. The town of Gustavus is located in Southeast Alaska, approximately 48 air miles northwest of Juneau, and serves as the gateway town into Glacier Bay National Park. The project is located in Sections 5, 6, 8 and 9 of Township 40 S, Range 59 E in the Copper River Meridian (58.426° N, 135.707°).

The proposed action will address the following needs:

- Additional Runway Safety Area (RSA) length and width are needed to meet FAA standards and to ensure a safe operating environment on the runway.
- Surface grading and realignment of ditches is needed to accommodate the new RSA length and width.

The RSA of runway 11/29 would be increased from 7,513 by 262 feet to 8,721 by 500 feet by adding 238 feet to the width and 409 feet to the length at the northern and 799 feet at the southern ends. Expansion of the RSA would require grading and filling, as well as excavation of new drainage ditches along the both sides of the runway.

About 800 feet of an anadromous fish stream would need to be rerouted around the northern extension of the RSA on the eastern side. Approximately 460 linear feet of a ditch would be diverted around the southern extension of the RSA on the western side. The Area of Potential Effects (APE) for this project includes the airport's existing footprint and associated ditches, and extends approximately 500 feet beyond the ditch area.

The literature survey for this report revealed several properties at the Gustavus Airport that had not been evaluated for National Register of Historic Places (National Register) eligibility. These include Glen's Ditch (JUN-01055), the runways and road system, and the ditch complex that surrounds the airport. The runways, road system, and ditch complex are now designated JUN-01094, JUN-01095, and JUN-0196, respectively. Glen's Ditch, at its actual location south of the runway instead of where it is shown in the Alaska Heritage Resources Survey (AHRS), may be eligible for the National Register under Criterion A due to its association with the homesteader period at Gustavus or under Criterion B due to its association with Glen Parker. However, it is well outside of the APE for this project and there is currently insufficient data to confirm whether it retains sufficient integrity to convey its period of significance.

The runways, road system, and ditches are recommended as eligible for the National Register under Criterion A as contributing features of a new Gustavus Airfield Historic District (JUN-01093). This district, with a period of significance from 1941 to 1958, incorporates the linear features associated with the airfield—the runways, un-paved roads, a paved road, and ditches—and the earlier established Gustavus Civilian Aeronautical Administration Compound Historic District, 1948-1958 (JUN-01047). The roads and ditches are also recommended as individually eligible under Criterion C as examples of World War-era engineering in Alaska.

The district boundaries proposed here are limited to the immediate airport grounds. There are also several non-contributing properties located within the district. These properties include the enlarged apron built in 1996 southwest of the runways' intersection, the relatively recent air terminals and hangars located along this apron and the runways, and several buildings located along Gustavus Road built since 1958.

The runways form the core and focus of the proposed district. The runways' ability to contribute to the district relies upon their design, location, and workmanship, as well as their close association with other surrounding and associated elements of the historic landscape. The proposed lengthening and widening of the RSA for Runway 11/29 would substantially change its original design and workmanship, and adversely affect the still apparent, 1940s and 1950s, spatial design of the airfield. The grading and filling planned as part of this project would relocate the drainage ditches paralleling the runways. The project will also re-route other important sections of the ditch complex. As long as the ditches are replaced "in-kind", the individual eligibility of the ditch complex would not be adversely affected. However, this dislocation does contribute to a cumulative adverse effect on the district as a whole.

The only planned change to the airport road system will occur southwest of runway 11/29. Here, a portion of a road is contained in the RSA expansion area. However, the roadway will still be graded and drivable, and will be used by airport personnel. Also, the spatial relationship of a section of this road and its associated ditch will be changed by a proposed ditch re-alignment. Both of these changes, however, are to a road section that was altered in 1996 and will not adversely affect the overall eligibility of the airport roads.

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Introduction

The following is a report on a historical review for the Gustavus Airport RSA Improvements Project (No. 68287). The ultimate goal of this study was the identification of significant properties in the project's area of potential effect (APE) that could be eligible for the National Register of Historic Places (National Register), either individually or as part of a historic district. Included is documentation prepared in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended December 12, 2000, and 36 CFR 800.

Section 106 of the National Historic Preservation Act (NHPA) requires federally funded projects to consider the effects of proposed actions on properties included on, or eligible for listing on, the National Register. The principal impact issue for cultural resources is the loss or degradation of prehistoric and historic sites, either through direct disturbance during construction or indirect disturbance due to changes in public accessibility. Cultural resources can be affected by actions that alter in any way the attributes that might qualify the resources for inclusion in the National Register. Adverse effects can result when a resource's significant characteristics are diminished.

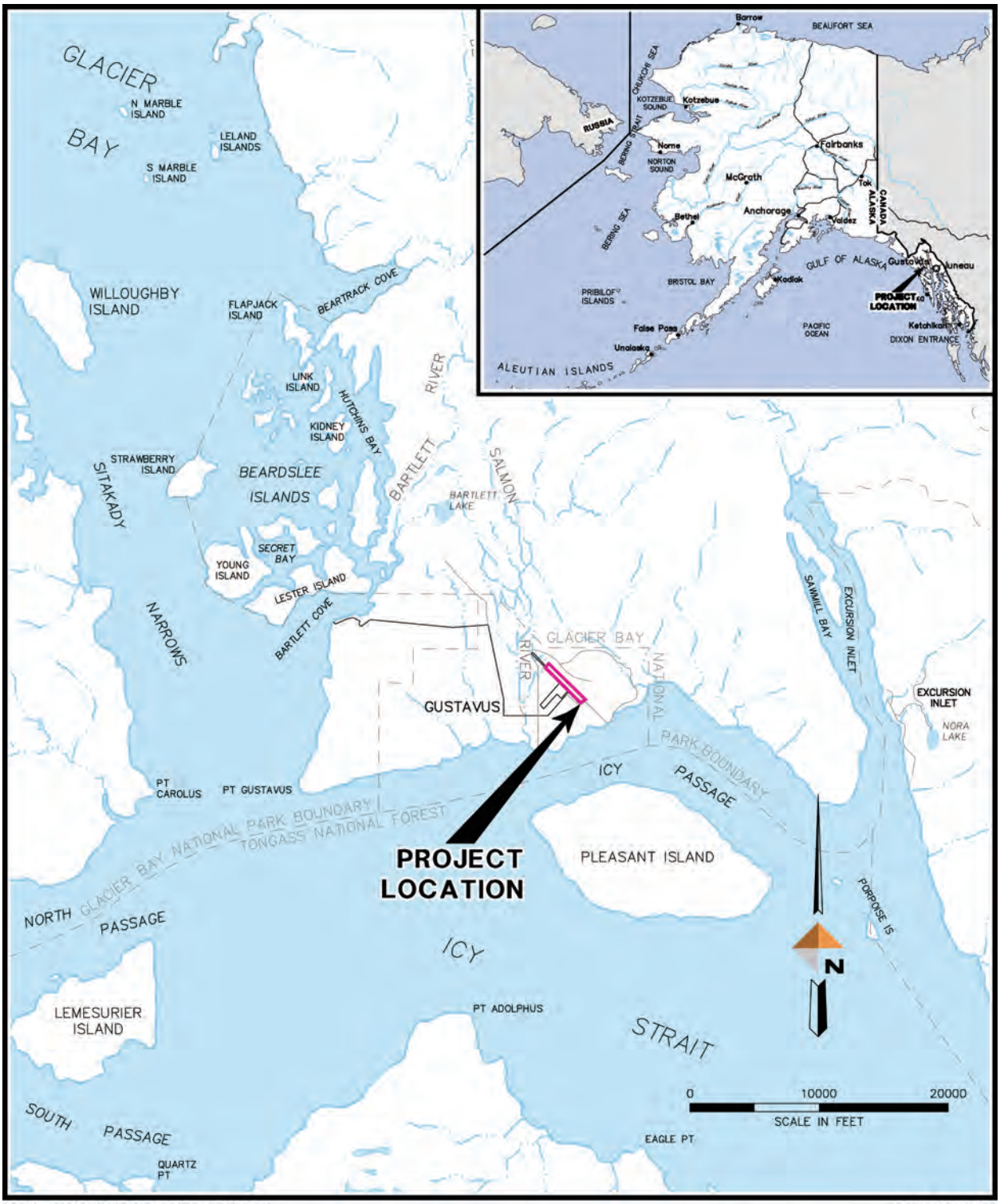
Methodology

Information utilized in this report was collected over a period of several months from a variety of sources. Written records, including published books, interagency documentation, Alaska Heritage Resources Survey (AHRS) documents, and archived material, were searched for relevant and consistent information concerning known and potential historic properties in the project area. National Register nomination forms and written local histories form the core for the following historic context. Interviews with knowledgeable Alaska Department of Transportation and Public Facilities (DOT&PF) employees and Gustavus residents provided detailed supplemental information on subjects not covered by the written literature, such as airport renovations during the last two decades. A single, one-day site visit was conducted by Cultural Resource Consultants LLC (CRC) archaeologist Sarah Meitl to collect current information on identified properties in the immediate vicinity of the Gustavus Airport, with a focus on the runways. Personnel from DOT & PF conducted a follow-up site visit that also provided information utilized in this report.

Project Description

DOT&PF, in cooperation with the Federal Aviation Administration (FAA), proposes to upgrade the Gustavus Airport to meet current federal standards. The project is located in Sections 5, 6, 8 and 9 of Township 40 S, Range 59 E in the Copper River Meridian (58.426° N, 135.707° E; Figures 1 and 2). The proposed action (Figure 3) will address the following needs:

- Additional Runway Safety Area (RSA) length and width are needed to meet FAA standards and to ensure a safe operating environment on the runway.
- Surface grading and realignment of ditches is needed to accommodate the new RSA length and width.



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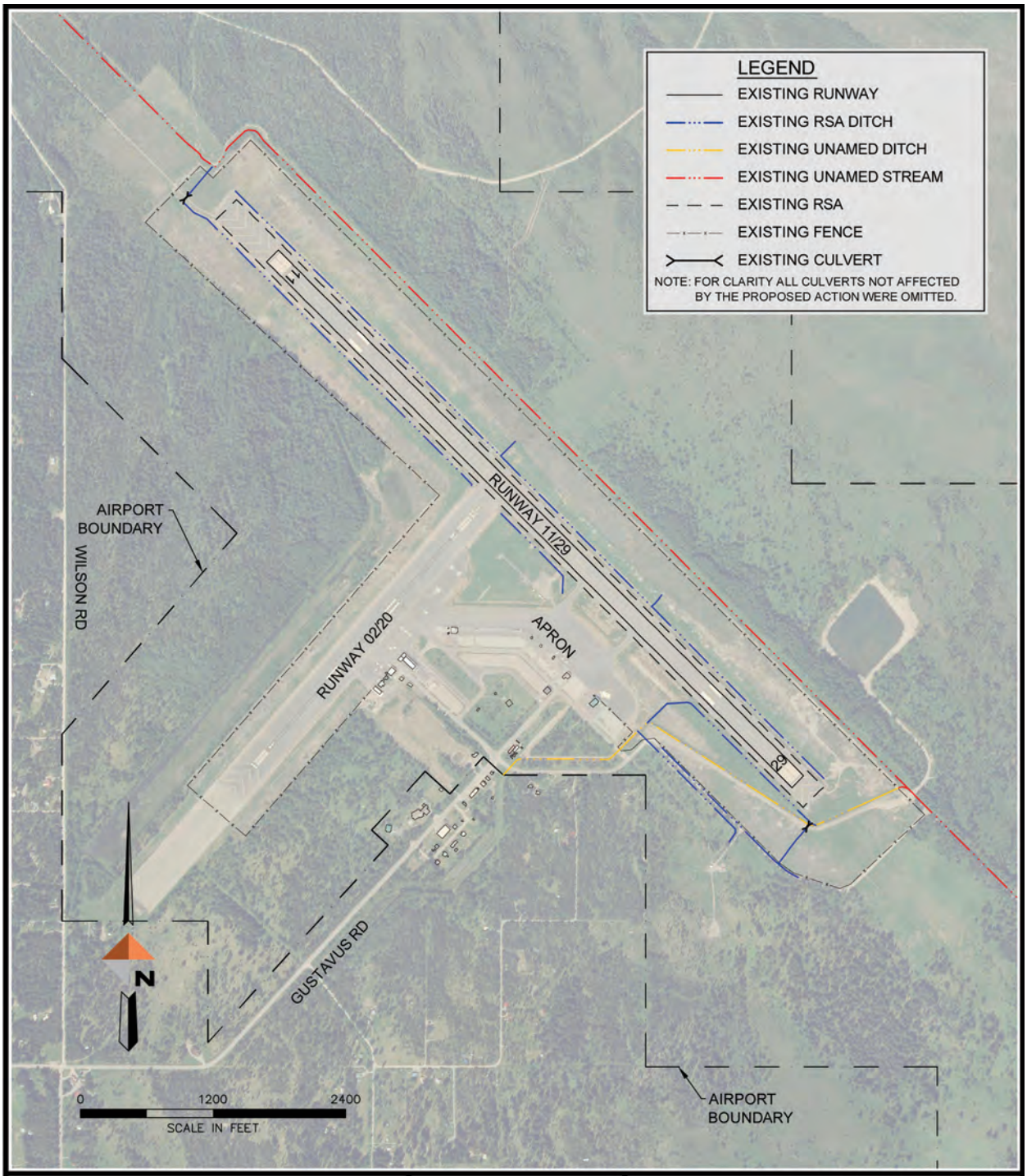
SCALE: AS SHOWN

DOWL HKM	Vicinity Map GUSTAVUS AIRPORT RUNWAY SAFETY AREA IMPROVEMENTS Gustavus, Alaska	**FIGURE 1**



EXISTING CONDITIONS

Sec 5,6,8,9

T40S, R 59E

Copper River Meridian, Alaska

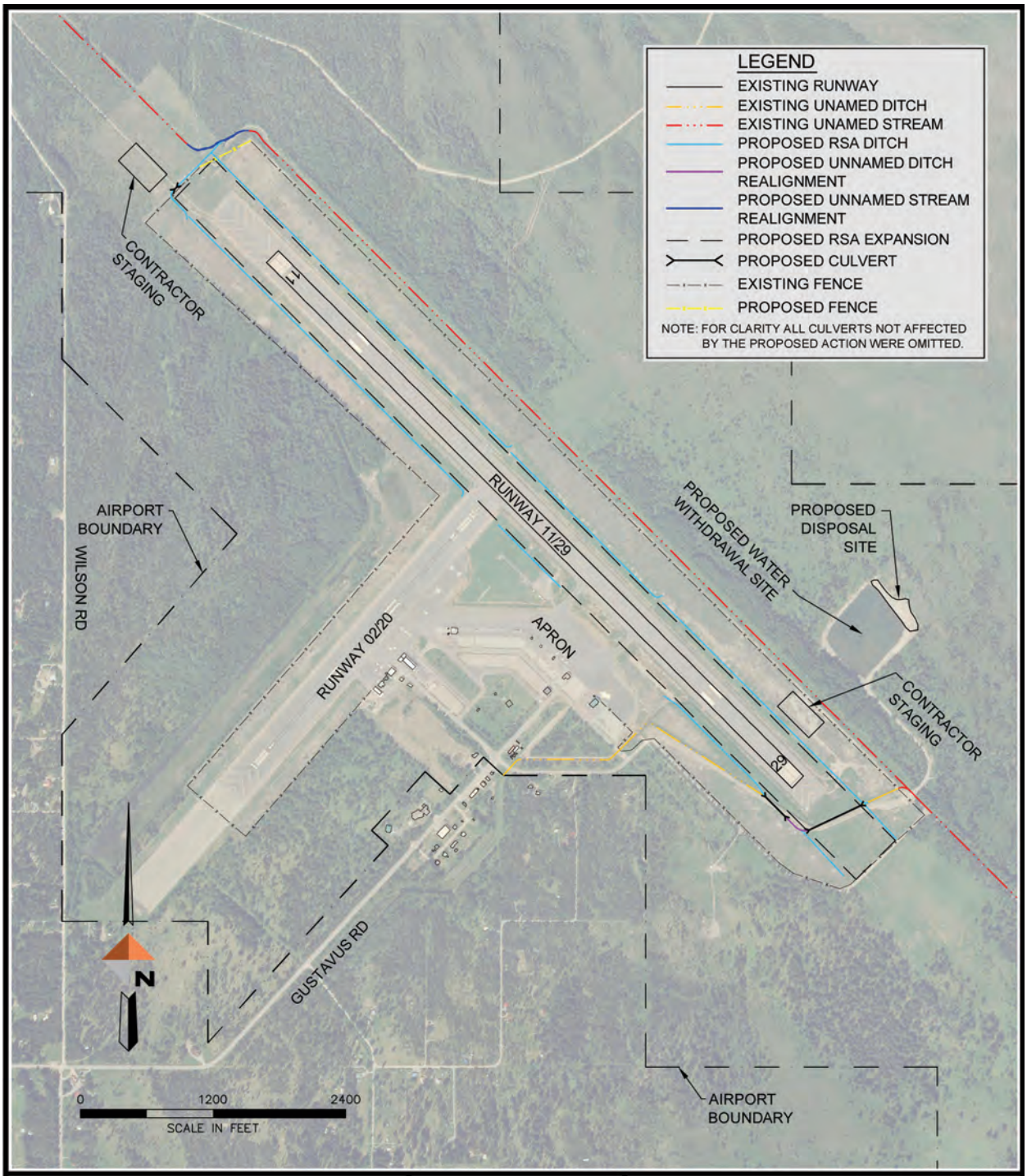
TRANSPORTATION & PUBLIC FACILITIES • STATE OF ALASKA •

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

PROJECT No 68287
GUSTAVUS AIRPORT RUNWAY SAFETY AREA IMPROVEMENTS

Gustavus, Alaska

DATE: 10/27/2009 | FIGURE 2



PROPOSED ACTION Sec 5,6,8,9 T40S, R 59E Copper River Meridian, Alaska	TRANSPORTATION & PUBLIC FACILITIES • STATE OF ALASKA •	STATE OF ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES PROJECT No 68287 GUSTAVUS AIRPORT RUNWAY SAFETY AREA IMPROVEMENTS Gustavus, Alaska DATE: 10/27/2009 FIGURE 3

Specifically, the proposed action includes:

- Lengthening and widening Runway 11/29's RSA by adding 409 feet at runway end 11 (northern) and 799 feet at runway end 29 (southern) and widening the entire RSA by adding 238 feet.
    - o Using emulsified asphalt to harden the entire RSA surface.
- Re-grading the existing RSA ditches and realigning RSA ditches or rerouting other ditches as necessary to accommodate the new RSA width and length. This work would include:
    - o Rerouting an unnamed ditch ("Existing Unnamed Ditch" in Figures 2 and 3) approximately 460 linear feet around the southern extension of the RSA on the western side and filling the former ditch channel. New ditch length will be approximately 520 linear feet.
    - o Rerouting approximately 800 linear feet of an unnamed stream ("Existing Unnamed Stream" in Figures 2 and 3) around the northern extension of the RSA on the eastern side and fill the rerouted portion. New stream length will be approximately 604 linear feet.
- Realigning a portion of airport fence near Runway 11 to accommodate the northern RSA expansion.
- Removing and replacing culverts, including,
    - o Removing and replacing one culvert near the end of Runway 11.
- Grading road sections within the extent of the proposed RSA.
    - o Grading would generate more material than needed for fill. Excess material will be disposed of in upland areas on airport property.
- Construction areas would be accessed by existing airport roads.

Runway 11/29 is currently 6,721 feet long and 150 feet wide, with a surrounding RSA that measures 7,513 by 262 feet. Under the proposed action, the latter would be expanded to 8,721 by 500 feet by adding 238 feet to the width and 409 feet to the length at the northern and 799 feet at the southern ends. Expansion of the RSA would require grading and filling, as well as excavation of new drainage ditches along the both sides of the runway.

About 1,068 feet of an anadromous fish stream would be rerouted around the northern extension of the RSA on the eastern side, and a ditch at the southern end that is a tributary to the stream will be rerouted to intersect the fish stream about 1,058 feet farther downstream.

Area of Potential Effects

The APE for the Gustavus Airport RSA Improvements (Figure 4) is not the same as the airport boundary and incorporates several nearby features that were historically associated with either the construction of or use of the airport to facilitate consideration of the project's immediate and indirect impacts. The APE includes the airport's existing footprint and sections of nearby drainage ditches and roads. The farthest extent of the APE was determined to be no more than approximately 500 feet beyond known associated historic properties.

PROPOSED DISPOSAL SITE

PROPOSED WATER WITHDRAWAL SITE

CONTRACTOR STAGING

11 RUNWAY 11/29 29

APRON

JUN-00985

CONTRACTOR STAGING

AREA OF POTENTIAL EFFECT

RUNWAY 02/20

JUN-01055
GLEN'S DITCH
LOCATION
PER AHRS

JUN-01054

JUN-01053

JUN-01052

JUN-01051

JUN-01050

JUN-00986

JUN-00987

JUN-00988

JUN-00989

JUN-01049

JUN-01048

AIRPORT BOUNDARY

WILSON RD

GUSTAVUS RD

CAA COMPOUND
DISTRICT BOUNDARY
JUN-01047

AREA OF POTENTIAL EFFECT

LEGEND

- AREA OF POTENTIAL EFFECT
- EXISTING RUNWAY
- EXISTING UNNAMED DITCH
- EXISTING UNNAMED STREAM
- EXISTING ROAD
- PROPOSED ROAD REALIGNMENT
- PROPOSED RSA DITCH
- PROPOSED UNNAMED DITCH REALIGNMENT
- PROPOSED UNNAMED STREAM REALIGNMENT
- PROPOSED RSA EXPANSION
- PROPOSED CULVERT
- EXISTING FENCE
- PROPOSED FENCE

NOTE: FOR CLARITY ALL CULVERTS NOT AFFECTED BY THE PROPOSED ACTION WERE OMITTED.

N

0 1000 2000

SCALE IN FEET

AREA OF POTENTIAL EFFECT

Sec. 5,6,8,9

T40S, R59E

Copper River Meridian, Alaska

TRANSPORTATION & PUBLIC FACILITIES · STATE OF ALASKA ·

STATE OF ALASKA
DEPARTMENT OF TRANSPORTATION
AND PUBLIC FACILITIES

Project No 68287
GUSTAVUS AIRPORT RUNWAY
SAFETY AREA IMPROVEMENTS

Gustavus, Alaska

DATE: 12/15/2009 | FIGURE 4

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Background

The town of Gustavus is located in Southeast Alaska, approximately 48 air miles northwest of Juneau, and serves as the gateway town into Glacier Bay National Park. Glaciers formed the large expanse of relatively flat land upon which Gustavus was founded. Glacial effects continue to shape the area, as isostatic rebound increases elevation and decreases wetlands (Mackovjack 1988:18). Today, the majority of townspeople earn their living through commercial fishing, tourism, or government employment.

Prehistory

To date, archaeological surveys in southeastern Alaska have recorded more than 2,100 sites. A large percentage of these are shell middens, although numerous other types of prehistoric and historic resources are known (Autrey 1992). A four-part cultural sequence for southeastern Alaska proposed by Davis (1990:197) includes a Paleomarine tradition (9000-4500 B.C.), a Transitional stage (4500-3000 B.C.), a Developmental Northwest Coast stage (3000 B.C. to European contact), and a Historic period.

The Paleomarine tradition is the earliest cultural stage yet identified within coastal southeastern Alaska. It is characterized by a well-developed microblade industry with wedge-shaped microblade cores, few or no bifacial tools, and an economy based on coastal-marine subsistence (Davis 1990:197). A number of the sites of this tradition, including Ground Hog Bay at ca. 9500 B.P. and Hidden Falls at ca. 9000 B.P, are associated with sea levels there were 8 to 15 m higher than they are today (Fedje and Christensen 1999:639).

The Paleomarine tradition is followed by a transitional stage. While this stage is not well defined, its existence is inferred because of the appearance of a ground stone tool industry, which becomes dominant over the microblade and unifacial stone tool industry by 5,000 years ago. The Developmental Northwest Coast stage is differentiated from the Paleomarine and transitional stages by the presence of shell midden deposits, ground stone and bone technology, human burials, and the establishment of large settlements or winter villages, specialized camps, and fortifications.

Traditional Native Use of the Project Area

At the time of contact, the Gustavus area was within the traditional territory of the Hoonah Tlingit (de Laguna 1990:204). The Tlingit are the most widespread and numerous of the Native peoples of southeast Alaska. Ethnographic Tlingit culture embodies most of what is normally thought of as northern Northwest Coast culture. This culture included an economy based upon fish (particularly anadromous fish); settled villages; a sophisticated wood working industry; a highly developed and distinctive art form; a social organization structured around lineages, clans, and phratries; and a ritual life focused upon totemism, shamanism, and the attainment of status through potlatching. The Tlingit were distributed in a number of localized, clan-based, territorial groups across southeast Alaska, with some 10 or more such groups being known.

At least one principal village was established in each Tlingit tribal area. It was occupied in winter, but was usually deserted in summer when families dispersed to fishing and hunting camps. Village sites were preferably located on sheltered bays with views of the approach. A sandy beach was important for landing canoes and for access to salmon streams, fresh water, timber, and good hunting, fishing, and gathering grounds. Aboriginal houses were planked rectangular structures, with excavated centers and low-pitched gabled roofs. They could accommodate six or more families and slaves, often totaling 40 to 50 persons. Palisades occasionally surrounded single houses or whole villages (de Laguna 1990:207).

According to Goldschmidt and Haas (1946:89), there were Native houses on the northern shore of Pleasant Island to the south of Gustavus and at the mouth of Strawberry Creek. They also noted "Pleasant Island is a good place to get deer, seal, blueberries and huckleberries" (Goldschmidt and Haas 1946:89). Walker recorded additional information on traditional use of the immediate project area in 1914:

> [Albert] Mills bases his claim to the land embraced in this claim upon the fact that his grand father, and later his uncle and now he owns a cabin on Pleasant Island opposite this claim. (He claims no residence in this cabin at the present time) That they and now he uses the mouth of the Kataheena River for fishing, and that his grand father formerly trapped game on the lands embraced in this claim.

A descendant of Albert Mills owns a modern cabin at the mouth of Falls Creek, southeast of the airport.

History

Exploration. The historic period in Southeast Alaska began in 1741, when one of Vitus Bering's ships reached the outer coast of the Alexander Archipelago north of Dixon Entrance (Betts and Bowers 1994:18). Captain George Vancouver visited Icy Strait in 1794 during his third year of charting the Northwest Coast. Vancouver named many of the topographic features in the area, including Dundas Bay, and was the first European to explore the Glacier Bay area (Kurtz 1995:8). When Vancouver sailed through Icy Strait, Glacier Bay was completely enclosed by the Grand Pacific Glacier. Over the next century, the glacier retreated some 40 miles, and by 1916 it had retreated 65 miles from the position observed by Vancouver.

Homesteading. The first non-native settlers in the Gustavus area arrived in 1914, but they only stayed a few years due to isolation and harsh conditions. Settlers continued to arrive over the succeeding decades and over the years 17 homesteads were proved up (Howell and Johnson 2006:10). Originally known as Strawberry Point, the town was renamed by the U. S. Postal Service in 1925 after Point Gustavus, which lies seven miles to the southwest (Howell and Johnson 2006:11). While the land was beautiful, it was a difficult place to make a living. In the hopes of increasing their prosperity, the settlers engaged in a diverse range of economic activities, including farming, ranching, fishing, working in the cannery at Excursion Inlet, operating a lumber yard, and occasionally working part of the year somewhere else. They also

invested in the area by building homes, roads, bridges, drainage ditches, and even a small runway.

With improving modes of transportation, Gustavus gradually became less isolated. Many of the homesteaders had boats of their own and would make periodic trips to Hoonah or Juneau for supplies. Merchant vessels also stopped at Gustavus or Excursion Inlet for goods produced by the homesteaders. The small runway built by Charlie Parker also served the community, and at least on one occasion it was used to fly a patient for medical treatment in Juneau (Mackovjak 1988:81).

The situation changed significantly when Gustavus was first surrounded and then included into Glacier Bay National Monument. President Calvin Coolidge established Glacier Bay National Monument in 1925 and in 1939 the monument was expanded to include the Gustavus area. Gustavus' growth was stalled as new settlers were reluctant to come and people moved away, since all non-patented land was withdrawn for the monument. However, some members of the community did not leave, especially those who had proved up on their homesteads, and others moved to Gustavus as plans by the military to build a large airfield nearby were unveiled.

World War II and the Civilian Aeronautics Administration (CAA). Alaska's importance as a transportation and defense center became apparent even before the United States' entrance into World War II. As civilian air transportation began to outstrip other modes of transportation in the state (Naske and Slotnick 1979:107-108), the need for aviation facilities was answered by a series of governmental actions in late May and June of 1940, including the Civil Aeronautics Act and the allocation of military funds:

> On May 27, Representative Jennings Randolph (W.Va.) spoke to the opening session of the National Aviation Forum. Randolph stressed the need for developing an air transport network in Alaska to meet civilian transportation and cargo needs. The establishment of airfields would likewise serve as a vital link in the nation's defense network. Following Randolph's speech was a June 5 announcement saying that the Civil Aeronautics Authority (CAA) had approved the establishment of an air route between Juneau and Seattle. It was anticipated that Gustavus would serve as an alternative landing site during those frequent occurrences when Juneau was weathered in. Coinciding with the CAA's announcement was a statement from Governor Ernest Gruening saying that the construction of Alaska airfields was now assured. The military would provide funding to construct the new airfields as well as upgrade several existing sites. Much of the impetus for making this funding a reality had resulted from the repeated prodding of General Simon B. Buckner, the officer in charge of Alaska's military defense. The result was that by the fall of 1941 a string of CAA airfields, at Gustavus and other locations, were nearing completion. The Gustavus Point Field consisted of two paved and lit runways—one 7,500 feet long, the other one mile long. Maintenance shops, housing facilities, radio control tower, and a service road were constructed to support the operation (Kurtz 1996:3-4).

The bombing of Pearl Harbor and invasion of Attu and Kiska islands by Japan added more urgency to the development of infrastructure in Alaska. The military began strengthening defenses throughout the state by building or augmenting facilities that would decrease the response time necessary to defend American Territory. The Glacier Bay region, including Gustavus and nearby Excursion Inlet, was one such focus of military construction (Kurtz 1996). In preparation for the airfield's construction, land for a military reserve was removed from the Glacier Bay National Monument shortly before 1941. The airfield was built to serve as a base for heavy-bombers, like the B-29, to fight in the Aleutians, but by the time construction was finished the war had moved farther south in the Pacific. However, Japan was still a threat and the airfield was used for the duration of the war for other support purposes (Catton 1995:95; Kurtz 1996:4).

With the withdrawal of most military forces from Alaska following the Aleutian campaign, the Army turned over airfields like the one on Point Gustavus to the CAA. The lands surrounding the airfield were transferred back to Glacier Bay Monument, while the airfield and associated facilities were transferred to the CAA. Many hoped that the "first-class airfield" at Gustavus would become a hub for air traffic in Southeast Alaska. Although the CAA completed the Gustavus airfield with War Department funds, it did so with an eye to the civilian air navigation pattern that it thought would likely develop after the war. However, Gustavus Point Airfield never became a hub and by 1950 it was only used in emergencies by major carriers (Catton 1995:95-99; Kurtz 1997:4).

The Gustavus airfield underwent additional improvements during the early years of CAA's solo management to facilitate civilian use. The airfield ultimately comprised two paved and lighted runways that were capable of serving the largest commercial aircraft then existent (Catton 1995:95). Morrison Knudson Corporation received a contract in 1948 to continue development of the facility. This round of improvements is thought to have been complete in 1951 (Howell and Johnson 2006:13).

How much of the complex associated with the airfield was constructed by 1945 when the CAA took over the over the facility remains unknown. The earliest discovered aerial photo of the facility is from 1948 and earlier, detailed construction data or inventories have yet to be found, even after several intensive searches (cf. Catton 1995, Chattey 1999, Howell and Johnson 2006; and Kurtz 1995). However, evidence suggests that the working facilities, such as the runways, of the airfield were already complete. Many of the buildings currently associated with the CAA district were built after 1948, but the general layout of the airfield changed little between 1948 and 1959 (compare Figures 5 and 6).

Wayne Howell and Julie Johnson (2006:12-13) described the overall scope and impact of the airfield project well:

> The undertaking was monumental when viewed in the context of the remoteness of the area and the lack of development up until that time. The project area was almost 10 miles long and 3 miles wide. It eventually sprawled across some 15 square miles of land, and involved massive movement of earth, materials,

Figure 5. Gustavus Airfield in 1948.

equipment and labor…The site of the airfield was entirely wetland, covered much of the year by ankle deep water, so one of the first orders of business was to ditch and drain much of it. In all, undertaking required dredging more than 10 miles of broad and deep ditches around the runway sites and along roads and other installations (ditch dimensions as much a 50 feet wide and 10 feet deep are common). This project altered the natural drainage pattern and accelerated the transformation of the Gustavus landscape from wetland to land eminently more developable by humans, a significant factor which greatly facilitated the eventual growth of Gustavus. The need for access to distant navigational aids (radio beacons), the barge landing, and fuel tank farm required significant improvement of existing roads. This resulted in the construction of some seven miles of paved roads and six miles of un-paved roads in a community which up until that time had very few developed roads. An engineered bridge replaced an aging drawbridge across the Salmon River. A landing platform for barges hauling equipment and materials was constructed in the Salmon River, and a bulk fuel storage facility was constructed along the Gustavus waterfront on Icy Passage,

Figure 6. Gustavus Airport in 1959.

where fuel barges could land and off load their cargo. The layout of these projects – runways, ditches, roads, harbor development and bulk fuel storage – transformed what had been an isolated homesteader community, and set the template for the eventual growth and development of Gustavus. The layout imposed by CAA still determines development in the community today.

Recent History (the last fifty years). Since World War II, the Gustavus Airport has been under the jurisdiction of the CAA (1945-1958), FAA (1958-1973), and the State of Alaska (1973-present) (Howell and Johnson 2006:15-16). Documentation of routine maintenance or alterations to the airfield has yet to be found, although current evidence suggests that some of

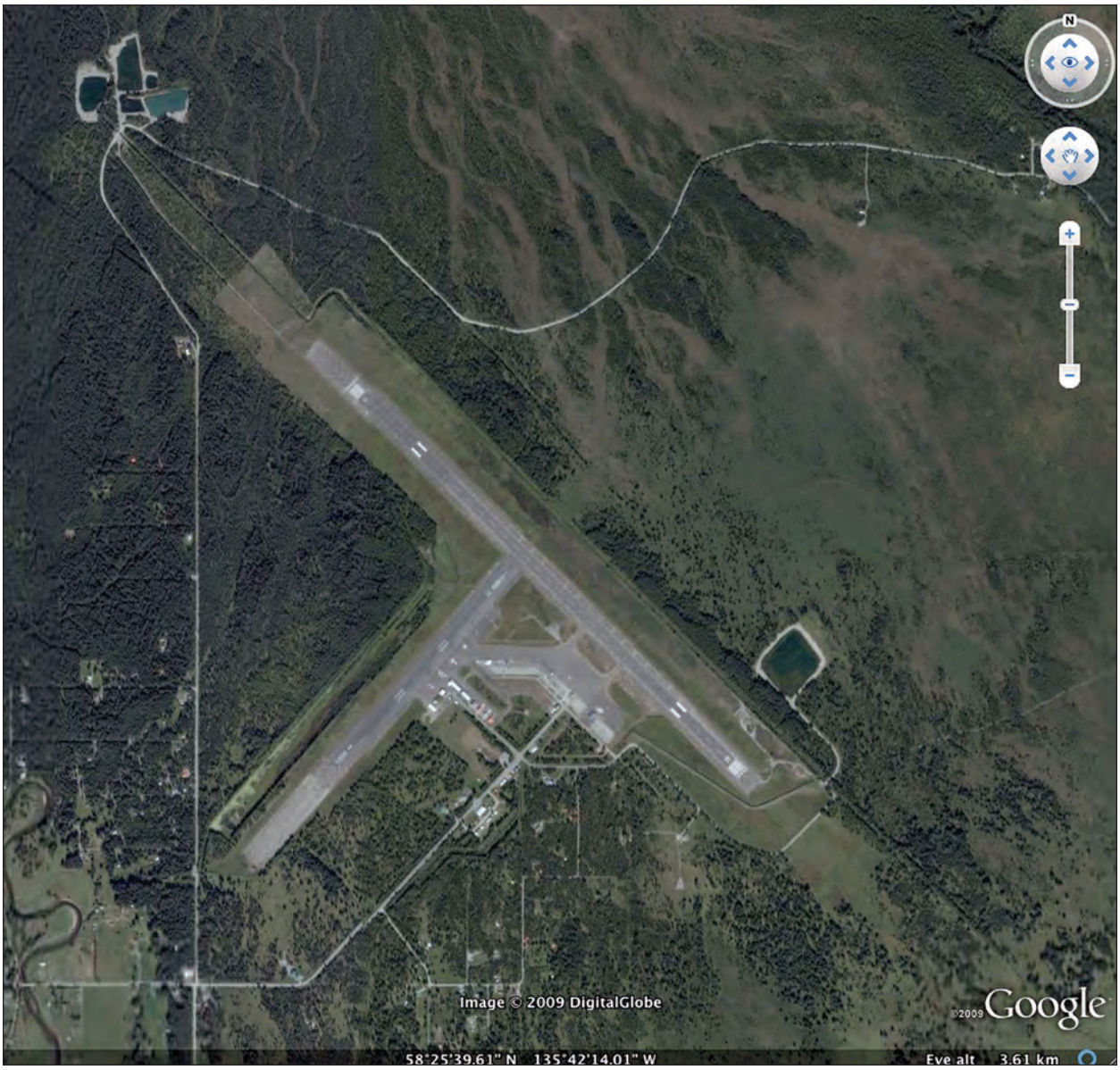


Figure 7. Gustavus Airport in 2009.

the facility's features have changed very little. A comparison of aerial photographs from 1948 and 1959 (see Figure 5 and 6) and a 2009 Google Earth image (Figure 7) show that the size, configuration, and spatial orientation of the runways and the majority of the roads and ditches near the airfield have remained the same.

Other features of the airfield have been altered. Over the years, some properties, such as the communications towers and original buildings, were dismantled for parts or removed intact for use by Gustavus residents. Exactly when this began is unknown, although by the late 1990s many of Gustavus' World War II and CAA-period features were gone (Chattey 1999; Kurtz 1995). DOT&PF has also made numerous changes to the facilities. Roads on airport property and the runways have been repaved or patched numerous times. Unpaved roads were also maintained through grading (Gary Franzen, personal communication 2009). However, other

than beaver dam destruction, only one of the ditches has needed maintenance; the ditch extending southeast of runway 11/29 to Icy Strait was dredged sometime within the last ten years (John T. Scott II, personal communication 2009).

In 1987, the runways were rehabilitated or repaired by sealing cracks or patching. Also at that time, a blast pad was added to runway "10/28" (now 11/29, see below), which extended the pavement an undetermined amount (Verne Skagerberg, personal communication 2009).

The next major construction event was the 1997 Gustavus Airport Resurfacing and Apron Improvements project. The main focus of this project was the construction of an apron southwest of the junction between the two runways. Also, asphalt was removed from a number of areas, including the southern end of runway "1/19" (now 2/20, see below), although the original base here was undisturbed. To accommodate the expanded apron, a road and ditch on the southwest side of runway 29 were shifted farther to the southwest (John T. Scott II, personal communication 2009).

One of the plan sheets for the project shows "the paving of the runway itself, out to 75 feet out from the centerline" and a "Plant Mix Seal Coat" extending a further 56 feet out from the edge of the runway (see Figure 8). The latter is the paved portion of the current RSA (Tripp 2009b:1) The area beyond the edge of the RSA was graded. Any existing pavement beyond the Plant Mix Seal Coat was either used as Recycled Asphalt Pavement (RAP) or simply broken up into chunks. RAP was used in a number of places on the project, in particular on the taxiways and in the apron area (Tripp 2009b:2).

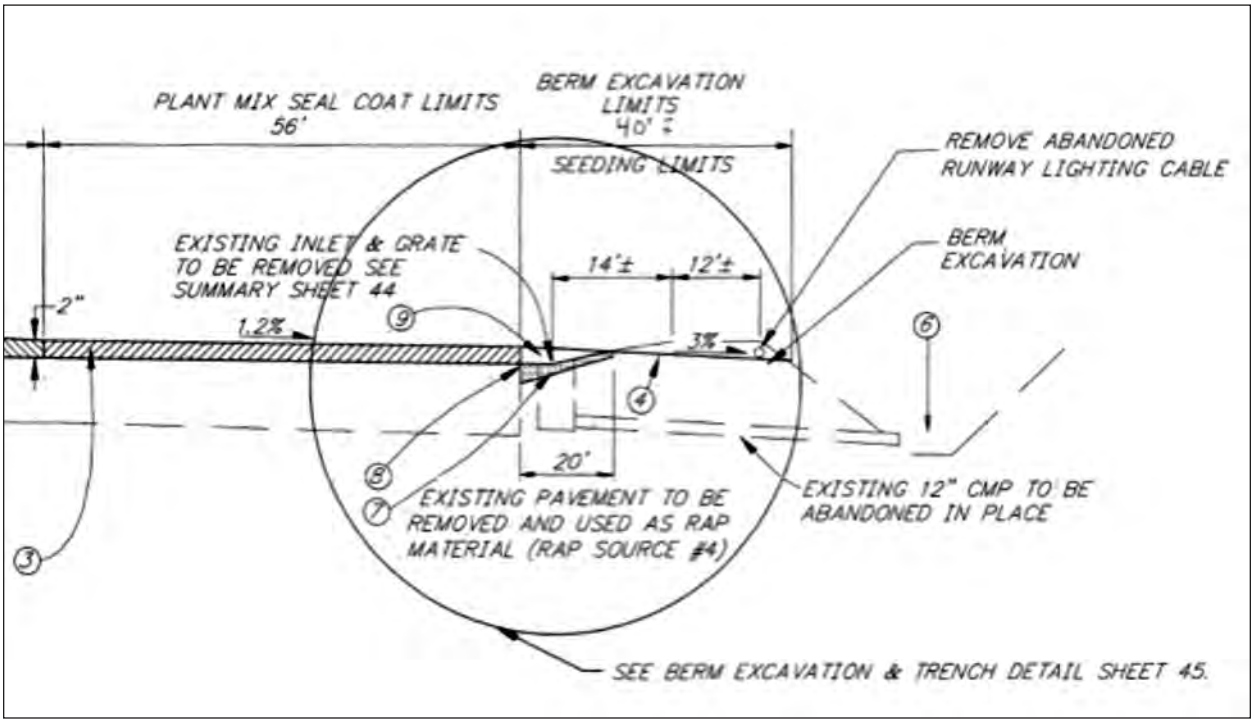


Figure 8. Detail of a plan sheet from the 1997 Gustavus Airport Resurfacing and Apron Improvements project showing the extent of the "Plant Mix Seal Coat."

Prior to the 1997 project, there was a berm about 20 feet out from the edge of the RSA. This berm, however, was removed when the RSA was graded to create a 3% slope out to ditches (Tripp 2009b:2).

In the years after 1997, areas surrounding the modern airport, especially on-approach areas, were clear-cut and a fence was put in. Some time between 2000 and 2003 the runways were renamed due to change in the magnetic declination. Runway 10/28 became 11/29 and 1/19 became 2/20 (compare Figures 9 and 10). The runways were again rehabilitated in 2005 and 2006. According to 2009 FAA data, runways 11/29 and 2/20 currently measure 6,721 by 150 feet and 3,146 by 60 feet, respectively (AirNav.com 2009).

Previous Evaluations

The cultural properties associated with the Gustavus Airport have been considered numerous times, but most evaluations largely focused on buildings or similarly constructed properties. Paul Chattey (1999) evaluated Alaskan air navigation facilities associated with the CAA. The only Gustavus property considered by Chattey was Building 200 (JUN-00985), which was not considered eligible due to a lack of information to confirm its integrity (Chattey 1999:205). However, other evaluations considered such features as sidewalks, roads, berms, drainage ditches, runways, and contrasting open spaces.

The National Park Service (Park Service) conducted an examination of Gustavus Airport in 2005 and 2006. This work was aimed at the documentation and evaluation of buildings owned by the Park Service. This work led to the establishment of the Gustavus Civilian Aeronautical Administration Compound Historic District, 1948-1958 (JUN-01047; hereafter referred to as the CAA Historic District). Originally, this district was termed the CAA Airfield Compound, with a period of significance from 1941 to 1951 (Johnson and Howell 2006). However, both the name of the district and its period of significance were later modified to more accurately reflect the age and association of its contributing properties.

When this historic district was initially proposed, it was suggested to represent a variation of "a cultural landscape – an aviation landscape – with dozens of contributing features that were scattered across some 15 square miles" (Howell and Johnson 2006:17). However, the Park Service study ultimately focused only the compound at the airport and the broader landscape was not evaluated.

The August 2006 version of the district nomination included 11 contributing properties owned by federal, state, and private landholders. The Park Service found the district eligible under Criterion A, with "Military Development in Glacier Bay region – World War II" and "Transportation" as "areas of significance" and a 1941 to 1951 period of significance (Howell and Johnson 2006). However, the Alaska State Historic Preservation Officer (SHPO) disagreed with aspects of nomination and suggested that the district, while indeed eligible under Criterion A, had a period of significance of 1948 to 1958 and should be termed a "compound" instead of an "airfield":

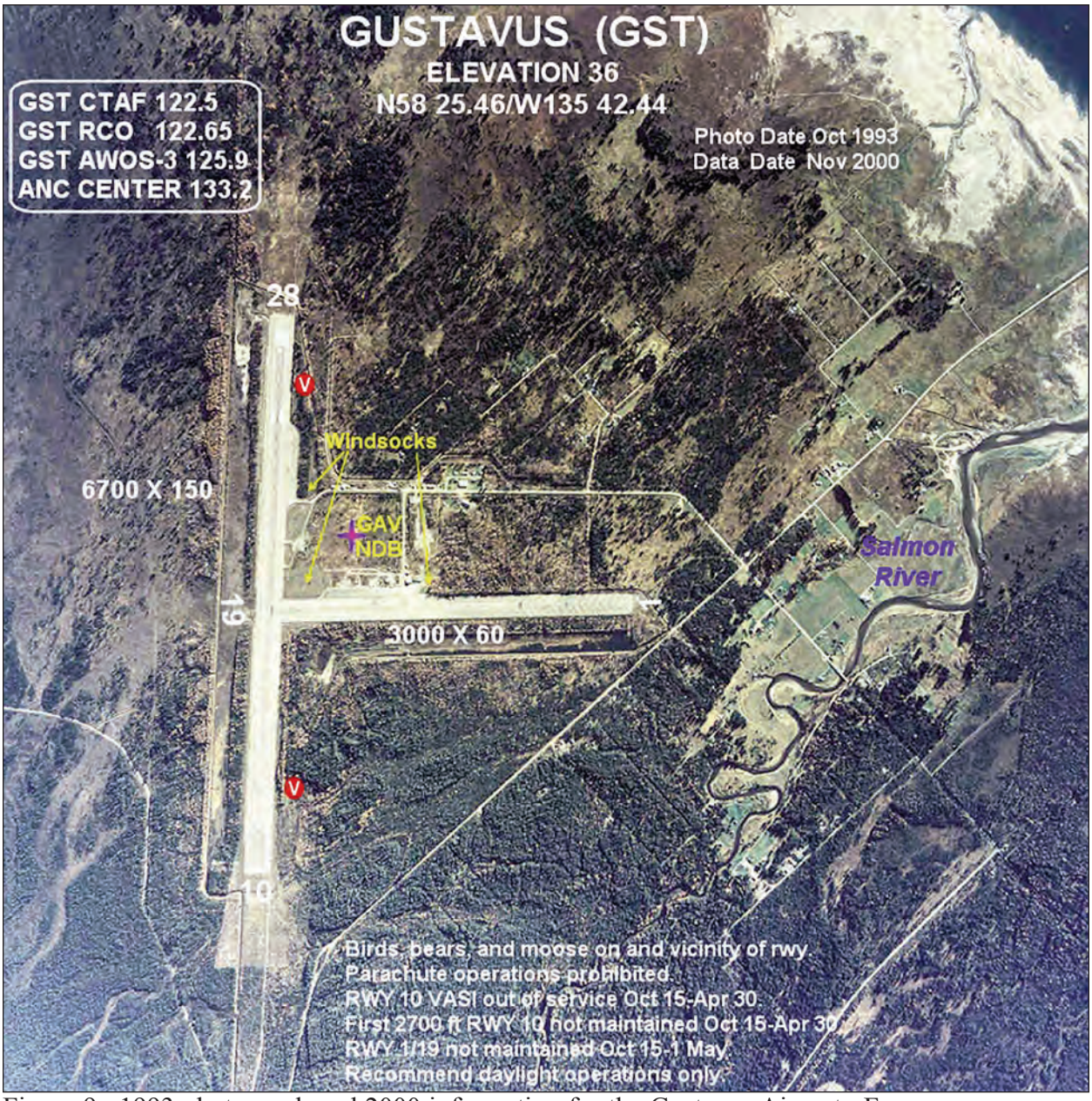


Figure 9. 1993 photograph and 2000 information for the Gustavus Airport. From http://www.alaska.faa.gov/fai/images/SEAK/GST-a.jpg.

> We also decided to refer to the district as a compound rather than airfield. In the determination of eligibility, two significant contributing components of the airfield, the runway and ditch, were not addressed. If the National Park Service chooses to evaluate the airfield rather than the compound, please address these two resources (Bittner 2006).

The last known project concerning cultural resources in the APE occurred in 2006 in association with the Gustavus Energy Infrastructure Project (Krupa 2006). This project involved construction of a new power plant adjacent to the DOT [sic] Maintenance Shop (JUN-01051; see below).

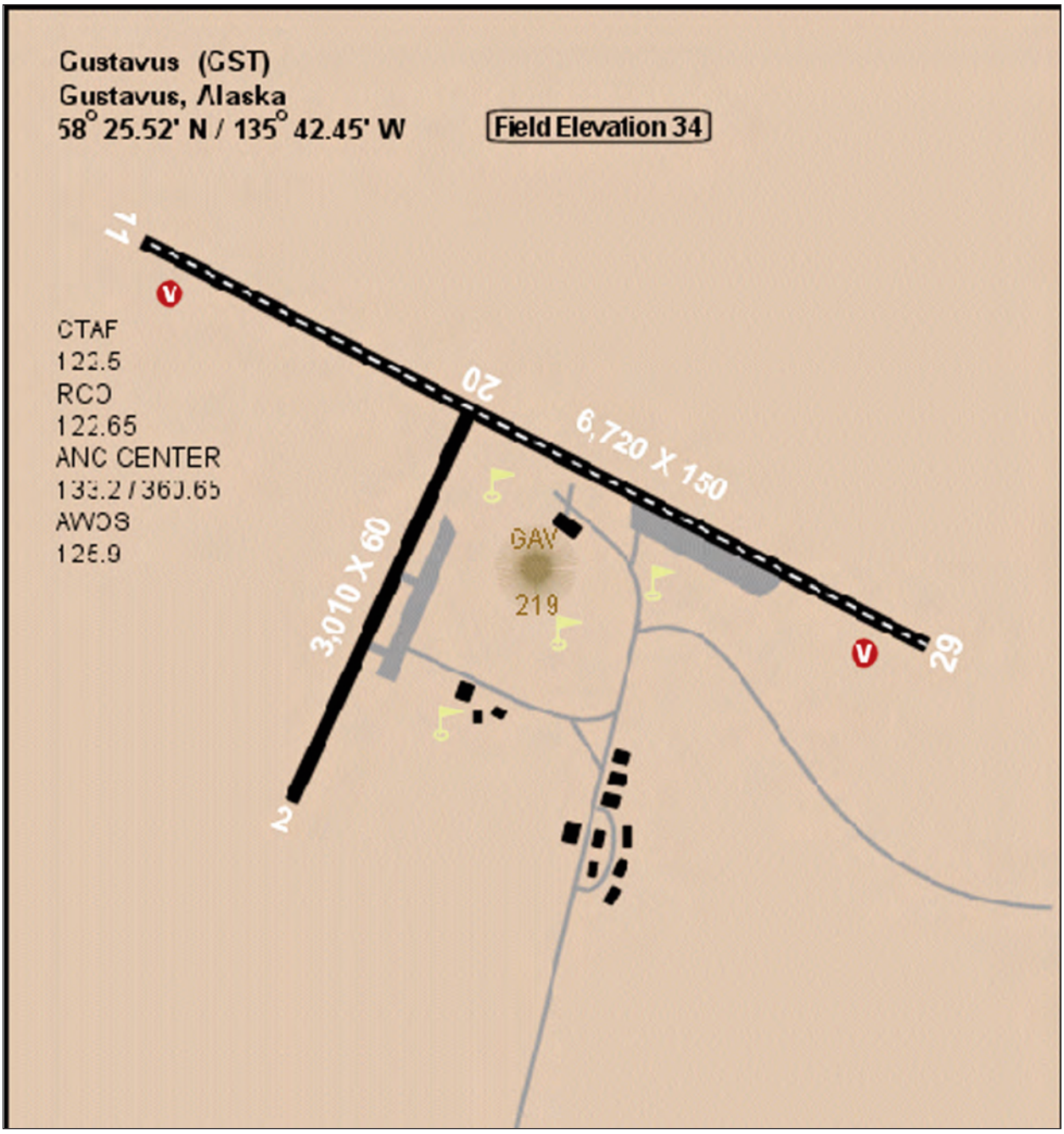


Figure 10. 2003 FAA diagram of the Gustavus Airport. From http://www.alaska.faa.gov/fai/images/ARPT_DIAGRAMS/GST.gif.

Known Sites

Currently, there are no known prehistoric sites in the area of the Gustavus Airport. There are, however, several historic properties in the vicinity of the modern airport listed in the AHRS (see Figure 4). Collectively, these are associated with World War II, the CAA, and the earlier, homesteader period.

The CAA Historic District (Figure 11) is located on Gustavus Road, less than a half mile from the airport. Its eleven contributing properties (there are indeed two Community "Chests") include:

- CAA Cottage 20 (JUN-00986)
- CAA Boiler Plant (JUN-00987)
- CAA Cottage 21 (JUN-00988)
- CAA, Cottage 22 (JUN-00989)
- Chatham School District House 1 (JUN-01048)
- Chatham School District House 2 (JUN-01049)
- Former Gustavus Community Association Preschool (JUN-01050)
- DOT Maintenance Shed (JUN-01051)
- Gustavus Electric Company Generator Building (JUN-01052)
- The Community Chest (JUN-01053)
- The Community Chest (JUN-01054)

Two other properties listed in the AHRS that are not contributing elements of the CAA District are Building 200 (JUN-00985) and Glen's Ditch (JUN-01055). Building 200 was a storage shed next to runway 11/29 built by the CAA. It was determined ineligible for the National Register in 1999 and demolished (John T. Scott II, personal communication, 2009).

According to the AHRS, Glen's Ditch outlines the southern side of the CAA Historic District, continues east along Gustavus Road towards the airport, and runs around the western and southern ends of runway 11/29. However, new information indicates that the AHRS location is incorrect and that Glen's Ditch actually lies south of the airport, outside of the project APE, running southward toward the shore of Icy Strait (John T. Scott II, personal communication 2009).

Unevaluated Properties

Background research for this project revealed several properties at or near the Gustavus Airport that had not been evaluated for National Register eligibility. These include Glen's Ditch (the actual location south of the airport), the runways and road system, the ditch complex that surrounds the airport, potential remnants of an early lighting and power system, and other earthworks. The runways, road system, and ditch complex are now designated JUN-01094, JUN-01095, and JUN-01096, respectively. These properties, in addition to those already mentioned, are either from the homesteader period or part of a historic landscape dating to World War II and the CAA period.

Periods of Significance and Associated Features

The following sections provide the historic context and current site descriptions of potential historic properties to facilitate determinations of significance, evaluations of integrity, and recommendations of effect. Properties in the general project area are associated with two periods of significance: Homesteading, 1917-1959, and World War II and the CAA, 1941-1958.

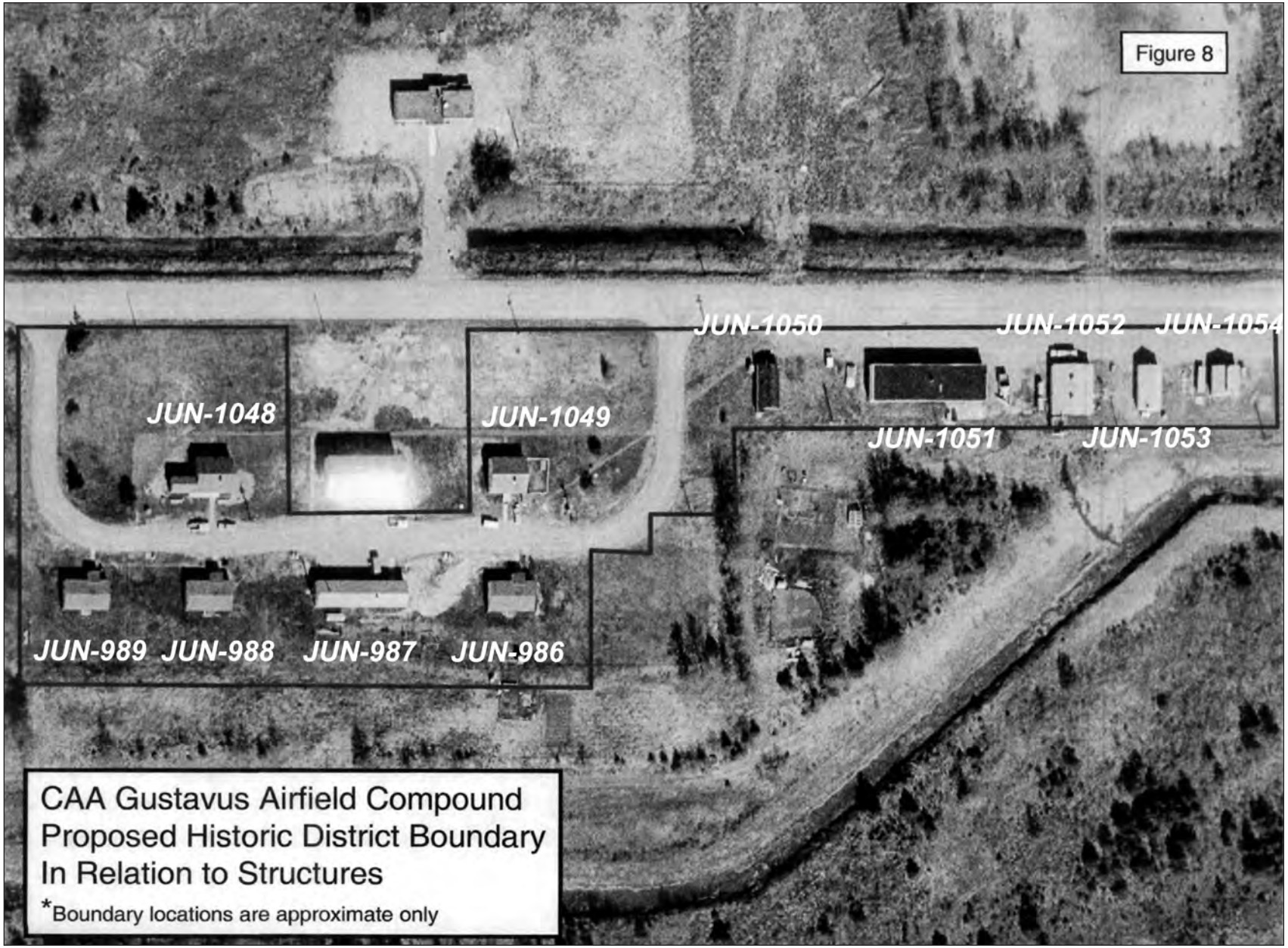


Figure 11. Boundary of the CAA Historic District. From Howell and Johnson 2006, with AHRS numbers added.

In many parts of the country, the World War II and the CAA periods were more clearly separated. However, at Gustavus, evidence suggests that the CAA, while playing a secondary role, was involved in the development and creation of the airfield before they took control of the facility in 1945 (Catton 1995:95-99; Kurtz 1996:4). Properties that may be significant within these periods are described after a detailed statement of their historic context.

Homesteading, 1917-1959

The construction effort that produced the Gustavus Airport complex was extensive and while its impact on the landscape was profound, it did not produce all of the earthwork in the Gustavus area. Glen's Ditch (JUN-01055)—named after the man who constructed it, Glen Parker—is one example. Parker moved to Gustavus with his parents in 1917 and helped them establish their homestead. He started working on his own homestead when he turned 21 and in 1938 filed patent on it (Mackovjack 1988:42-43). His homestead was the closest one to the soon to be established Gustavus Airport. Parker worked at the airport for many years and took personal interest in its upkeep, even after he retired (John T. Scott II, personal communication, 2009).

Parker constructed the ditch to help drain some of the wetlands on his property, and likely extended his ditch to connect with the ditches surrounding the runways to aid drainage for the whole area (John T. Scott II, personal communication, 2009). The start date for construction on the ditch is unknown, although a picture dated sometime between 1930 and 1939 shows Parker next to what is called "a good start on his ditch" (Gustavus Historical Archives and Antiquities 2007). The end date of construction is also undetermined. Aerial photos dated to 1948 (cf. Figure 5) show the ditch stretching from his house on the homestead running all the way to a natural drainage to the Icy Strait, but John Scott, a Gustavus resident, said that Parker was still working on his ditch in the 1960s. Whether this work was routine maintenance or active construction (possibly widening) remains unknown.

Glen's Ditch was given the wrong location when it was originally reported to the AHRS. The "Glen's Ditch" listed in the AHRS is actually a section of ditch built in conjunction with the airfield, rather than the ditch located on Glen Parker's property. Parker's long association with the airfield and his prominence in the community likely account for why a section of the ditch complex was attributed to him.

This ditch may be eligible for the National Register under Criterion A due to its association with the homesteader period at Gustavus, and if other, more appropriate, properties can not be found, may also be eligible under Criterion B due to its association with Glen Parker. However, it is well outside of the APE for this project and there is currently insufficient data to confirm whether it retains sufficient integrity to convey its period of significance. This property does not contribute to the CAA Historic District.

World War II and the CAA, 1941-1958

It is difficult to judge the relationships and relative age of various properties associated with the Gustavus airfield, since construction details remain hard to locate. However, by combining the

information currently available, including written descriptions of the facility and local knowledge, the inter-relationship of the roads, runways, and ditches has become apparent. Their close association began from the first day of construction, continues to the present day, and connects the historic landscape.

Many of the historic properties in the vicinity of the modern Gustavus Airport only exist due to the unique circumstances of the nation and Alaska at the start of World War II. Under peacetime circumstances, the construction of this level of facility at Gustavus would have been highly unlikely. The land was flat and swampy, with little local reason to justify the expenditure of time and money. The population was small, its resources and products for market were minimal and ubiquitous, and there was no supporting infrastructure.

However, in response to the threat of Japanese invasion, the military quickly produced several first-class facilities all over Alaska (usually in cooperation with the CAA) in preparation for our nation's defense. Some of these facilities include the Alaska Highway, Yakutat Airport, and Dutch Harbor. In Gustavus' case, it was the only piece of flat land on the Great Circle Route in Southeast Alaska that could adequately come to defend the state capital Juneau (Howell and Johnson 2006:11) and after one year of construction there was a functioning airfield at Gustavus (Matson 1972:83).

Due to the need for speed and the sub-optimal location of the runways, the chosen construction techniques were aimed at efficiently meeting several engineering obligations with the least amount of effort. Construction began with draining the wetlands to make the site more suitable. Drainage ditches were located so that the dirt could be used to build up the adjacent roads and the runways. What dirt was left over was piled on the opposite side of the ditches as berms (John T. Scott II, personal communication, 2009). The relationship is such that for every road or runway there is a corresponding ditch and by most ditches there is a berm. This construction technique provided a useful way to construct features that would be traversed, while also reducing the likelihood of flooding by having a drainage system right next to these features. Ditches are a defining feature of World War II-era roads and runways at Gustavus and vice-versa.

Gustavus Airfield Runways (JUN-01094). Charlie Parker, Glen Parker's brother, reportedly built the first landing strip in Gustavus on a homestead that he patented next to his brother's. This runway was scarcely a half-mile long and was likely destroyed when the new airfield was built (John T. Scott II, personal communication, 2009).

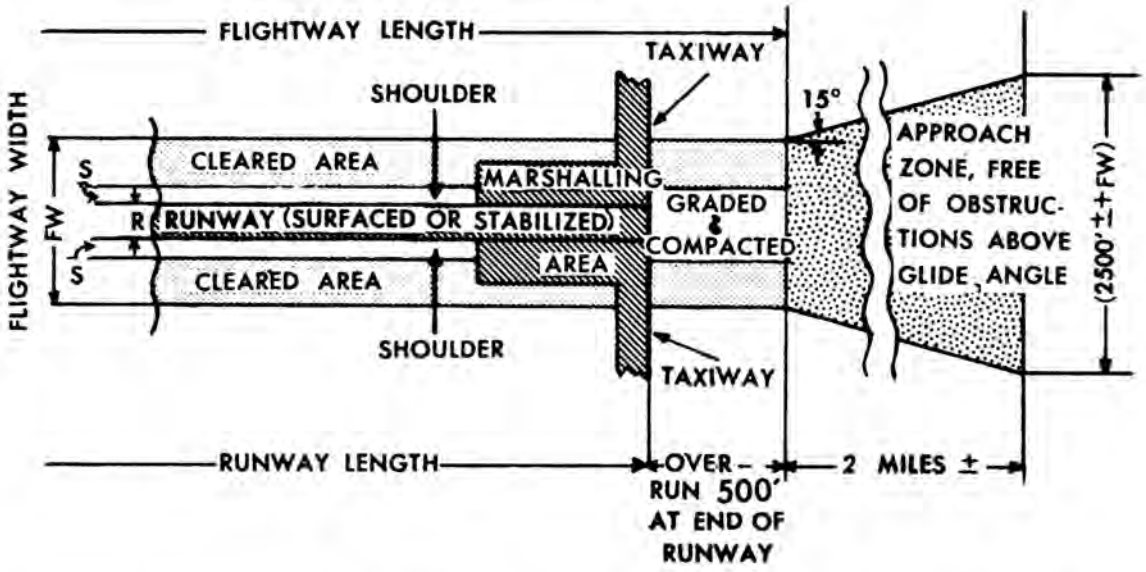
Construction of the Gustavus airfield took only one year (Matson 1972:83) and was nearly finished in the fall of 1941 (Kurtz 1995:86). All available evidence suggests that the runways were built to military specifications (see Figures 12, 13, and 14). In addition to the "T" shaped airfield with two paved and lit runways, the airfield had considerable support facilities, including maintenance shops, housing facilities, radio control towers, and a service road (Catton 1995:95; Kurtz 1996:4).

SECTION II AIRFIELDS

125. GENERAL CRITERIA FOR ALL AIRFIELDS (TM 5-255, TB ENG 18)

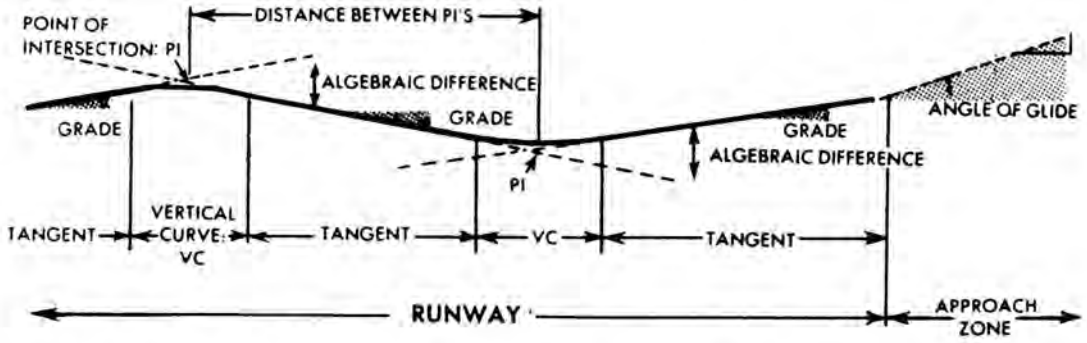
a. Criteria for runway and related elements (see b below)

(1) Plan.



Note: Runway extension in clear zone mechanically stabilized to carry occasional plane

(2) Criteria for longitudinal grade along center line of runway.



1. Distance between PI's not less 1,000 feet.
2. Vertical curves .... Minimum length 666 feet per each 1% algebraic difference.
3. Longitudinal grade .... not greater than 1½% for heavy bombers and not greater than 2% for lighter aircraft.
4. Angle of glide .... obstruction-free slope 40 to 1 is desired. Military necessity may require steeper slope but in no case shall it be steeper than 20 to 1.
5. Visibility .... there must be unobstructed view from any point 10 feet above runway to any other point 10 feet above runway for length of runway, but not over 7,000 feet.

Figure 12. General criteria for all airfields. From War Department 1947:152.

(3) Cross section of flightstrips include:

Runway—prepared area located along centerline of flightstrip on which aircraft normally land and take off.

Shoulder—graded and compacted area, on each side of runway, to minimize risk of accident to aircraft running off or landing off the runway.

Side Ditch,—and

Cleared area—located adjacent to and outside of shoulders, has stumps cut close to ground, has boulders removed, and is roughly graded to minimize hazard when over-run by aircraft.

(4) CROWNED CROSS SECTION (Vertical scale exaggerated)

(5) SLOPED CROSS SECTION (Vertical scale exaggerated)

(6) Required transverse slopes.

Surface	% Slope (min)	(max)
Mechanically stabilized soil and bituminous surface treatments, other than asphaltic concrete	1.5	2.0
Asphaltic and portland cement concrete	1.0 to	2.0
Shoulders	1.5	3.0
Side Ditches	1:12	1:8

Figure 13. Typical airfield cross sections. From War Department 1947:153.

Type of aircraft	Type of field	Length (ft)		Width (ft)	
		Runway length at sea level*	Over-run at each end of runway	Runway	Shoulders (each side)
		RL	P	R	S
Artillery liaison planes, L-type	Minimum for operations	750	----	50	----
	Standard tactical	1000	----	50	----
Fighter and light cargo including P-38, P-39, P-40, P-47, P-51, C-46, and C-47	Minimum for operations	3600	----	100	25
	Standard tactical	5000	500	120	60
Light bomber and cargo including B-25, B-26, C-47, C-54, and C-46 with glider	Minimum for operations	4000	----	100	25
	Standard tactical	5500	500	150	75
Heavy aircraft including B-29, B-32, B-36, P-47N (as long range fighter escort), C-99	Minimum for operations	7000	500	150	100
	Standard tactical	8000	500	200	150

* Increase these runway lengths 10 percent for each 1000 feet of elevation of site above sea level. In regions of high temperature or of low atmospheric pressure, an additional 10 percent is desirable. Recommended minimum lengths of landing strips at advanced landing fields with runways are same as minimum runway lengths. Fighters with overload (bombs or belly tanks) require 1000 additional feet of runway.

Figure 14. Recommended field dimensions. From War Department 1947:154.

Over the years, the original airfield has evolved into the modern airport. The runways were repaved, a fence was put in and vegetation was mowed down around the airport, structures altered alongside the runways, and the apron was considerably enlarged. The runways were sealed and patched in 1987 and a blast pad was added to runway "10/28" (currently 11/29) in 1987, which extended the pavement by an unknown amount (Verne Skagerberg, personal communication 2009). Also, some of the asphalt was removed from runway 2/20 in 1997, although the original base was undisturbed. As Howell and Johnson (2006:18) described the situation:

> The runways, and for that matter, the entire immediate airfield grounds, have undergone continual maintenance and incremental transformation. Though the runways retain their original orientation, they have been resurfaced several times, most recently in 2000-2001. All of the original communication, navigational and lighting equipment has been replaced, and all of the original CAA buildings located directly on the airport have been destroyed or removed. This includes at least 17 buildings of various uses. Leases on lots for hangars and airline offices have been let by Alaska DOT, and new buildings line the east and south sides of both runways. The entire airport was fenced in 2000-2001, and new lighting has been installed in 2005-2006. In short, the entire landscape of the airport has been transformed, and with the exception of the original orientation of the runways, it little resembles the original CAA facility.

The aviation industry was still developing at the time of the airfield's original construction, although it's design reflects the industry standards of military runways during World War II . During the 1940s, planes were still relatively small and light, and the minimum requirement for landing areas was much smaller than today. A crosswind runway, such as seen at Gustavus, was of equal importance to the main runway, since having two runways of similar length greatly increased the probability of a safe landing under poor conditions.

Additional safety precautions often included clearing above ground obstacles around the runways and grading, compacting, or surfacing immediately adjacent areas to the landing surface. However, the concept of an additional runway safety area beyond the shoulders or over-run areas, which could be as narrow as 100 feet, had not yet been developed. Below ground obstacles, such as ditches, were often placed in very close proximity to the runways. Today's airports have much longer and wider paved areas, and even longer and wider zones set aside for emergency use which may not contain above or below ground obstacles that can threaten planes and personnel.

Both CRC archeologist Sarah Meitl and a group from DOT&PF have made recent visits to the airfield. The following is based on their combined observations. Meitl inspected runways and ditches on June 24, 2009. The DOT&PF team, including Bruce Brunette, Materials Engineer; Jim Scholl, Environmental Analyst; Charles Tripp, Engineering Manager; Al Steineiger, Design Group Chief; and Bill Holbrook, Engineer, traveled to Gustavus on August 4, 2009, to observe the World War II-era pavement and determine if the objectives of the RSA project could be met

without significantly impacting it (Tripp 2009a:1). John Scott, DOT&PF employee and local resident, joined them in Gustavus.

The present airport has characteristics of both World War II and more recent design. The runways have always been paved and as older pavement degraded, a new layer of pavement was placed on top. When a new lighting system was installed within the last decade, the pavement was reported to be 18 inches deep with several visible layers (Mike Pederson, personal communication 2009). However, the original extent of pavement was not maintained with each successive paving. The perimeter of the paved surface is not uniform; instead, it is a series of successively smaller pavements placed one on top of another. The topmost pavement measures 263 feet by 7,535 feet, although the total extent of visible pavement—old and new—is roughly 294 feet by 7,662 feet. These measurements were made with a measuring wheel and should be accurate to within a foot.

The original extent of the lowest level of pavement that remains is difficult to judge because of encroaching vegetation and fragmentation at the edges due to age and stress. However, original pavement extending beyond the highest level of pavement was found at the northern and southern ends of runway 11/29 and sporadically along the eastern edge of runway 11/29.

At the southern (29) end of the runway, World War II -era pavement extends approximately 50 feet beyond the end of the existing RSA (Figure 15). Some of the pavement is badly cracked and broken up into large pieces, especially where there has been vehicle traffic (Tripp 2009a:1-3). At the northern (11) end of the runway, there is what "looks like a fairly extensive area of World War II pavement [that is] fairly continuous near the edge of the RSA, less so as one moves away off the end of the RSA. It extends to as much as 60 feet off the RSA in one area. In another it extends only about 18 feet before it breaks up into chunks" (Tripp 2009a:21-22).

Four different levels of pavement and two different kinds of paving material were visible at the northern end of runway 11/29. The lowest two levels are apparently World War II -era pavement. This paving material is "blacker" than what is used today, with few visible rocks since it has a larger ratio of tar to aggregate. It also likely included screened and washed aggregate instead of the crushed rock that is standard today (Jim Scholl, personal communication, 2009). In contrast, the top two visible pavements included a large number of visible rocks (Figure 16).

The grading and "harvesting" of asphalt during the 1997 improvements project accounts for the general absence of continuous paved surface or paved base course beyond the paved edge of the existing RSA. There are, however, two 5- by 30-foot stretches of somewhat intact asphalt surface between Runway Signs 3 and 2 (large signs used by pilots to determine the distance remaining to the end of the runway). These stretches "were already at or close to design elevation, where the cross section transitions from the area to be backfilled to the berm to be cut" and escaped being broken up when the RSA was re-graded (Tripp 2009b:3).

Between the greatest extent of visible pavement and the paralleling ditches is a grassy area similar to the "shoulder" depicted in Figures 12 and 13. This area slopes down and away from

Figure 15. World War II-era pavement at the southern (29) end of the runway. From Tripp 2009a:2.

the paved area and could originally have been as narrow as 20 feet, although the average distance from the highest level of pavement to the paralleling ditches is 42 feet.

Two World War II -era roads still provide access to runway 11/29 from the north and south. Access from the east is by way of either the new apron's two access points onto the southern half of runway 11/29, or onto runway 2/20 from locations that likely date to World War II . There is no vehicular access from the west. Modern lights have been inserted both into and off of the pavement to guide planes during landing and take-off. A few signs also line the edges of the runways to mark distance and to identify the runways. No buildings line the northern, eastern, or southern edges of runway 11/29, or the northern and western edges of runway 2/20. The only buildings near the runways border the new apron or the southern edge of runway 2/20, and are much larger and of a different style than those commonly built for World War II or CAA purposes.

Military specifications required that a runway capable of landing a B-29, like Gustavus, be at least 150 feet wide, with shoulders on each side between 100 and 150 feet wide. They also needed at least 7,000 feet of surface or stabilized length, with an additional 500 feet of "over-run" at each end. Since the remaining extent of pavement is uncertain, the distance between ditches will be used as a proxy for the runway's maximum dimensions. Distance between the ditches paralleling the runways to the east and west is roughly 350 feet, which meets the minimum requirements. The lowest paved surface is over 7,500 feet long and the distance between ditches at the northern and southern ends of runway 11/29 is at least 8,000 feet, which also meets minimum requirements. World War II-era specifications do not provide much detail

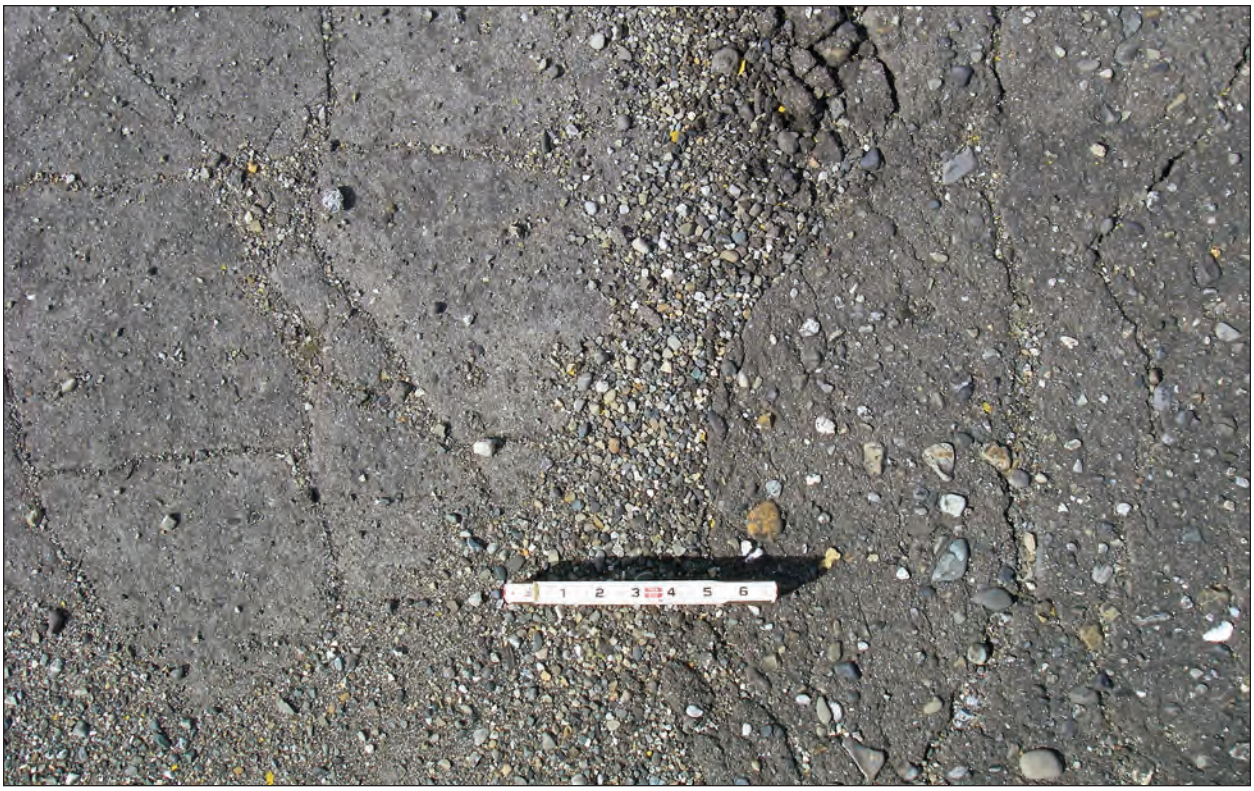


Figure 16. Layered pavement, with World War II-era pavement to the left. CRC LLC 2009.

on shoulder and "over-run" areas beyond requirements for compaction and amount of slope. Therefore, it is possible that part or all of the shoulders and "over-run" areas at Gustavus were originally paved with the same surfacing as the landing area, a modification from the specifications that was an adaptation to the then-wet conditions at the airfield.

Road System (JUN-01095). There were only a few, "user-built" roads in the Gustavus area before the construction of the airfield. However, "some 7 miles of surfaced roads and 6 miles of un-surfaced roads" were constructed to access navigational equipment, areas around the airfield, and shore-side facilities (Howell and Johnson 2006:13). All available evidence suggests that these roads were built to military specifications, including the crowns, widths, ditches, and straight alignments (see Figures 17, 18, and 19).

The road designers also filled a local need by extending the roads to homesteads and the future city center. "The roads alone created an essential infrastructure for Gustavus, apart from the role the roads played for the CAA" (Howell and Johnson 2006:13). The CAA used the road system to maintain the airfield and interact with the homesteaders. This interaction was a key component to the CAA's history at Gustavus (Howell and Johnson 2006:14-15) and would likely not have been such a success without the ease of access that the road system provided.

Roads are a dynamic resource and are rarely kept in their original state. This is true for many of the Gustavus roads. Howell and Johnson (2006:16-17) assert that the roads have been maintained and modernized to the point that they are no longer eligible, even though they

continue to serve the community:

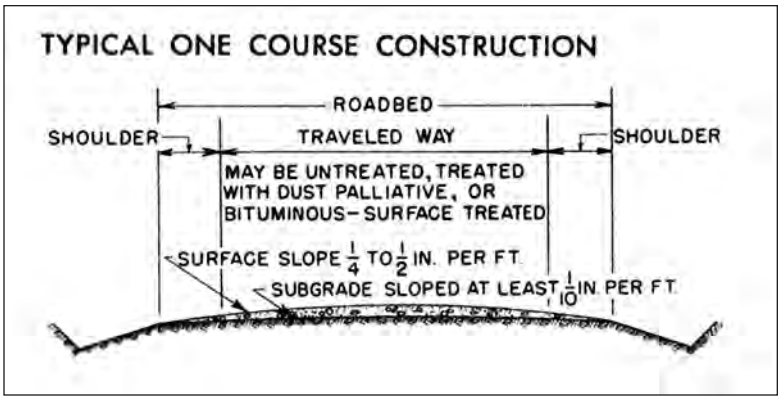


Figure 17. Typical cross section of a one course road. From War Department 1947:133.

> The surfaced roads were never maintained in that form by AK DOT, and over the years many sections devolved into pot-holed gravel roads as the asphalt surface disintegrated. Though the original road alignments remain, the DOT upgraded and resurfaced the roads in the late 1990s. Only one section of original CAA road remains intact; it is called Towers Road and is located on private property where it spurs off of Mountain View Road.

Their comments, however, only reference the surfaced roads that were built in conjunction with the airfield, while ignoring the six miles of un-paved roads. In addition, some of the roads have recently been re-paved with bituminous material, which is more in keeping with the historic character of the paved road system at Gustavus.

Only one road was measured and photographed during Meitl's reconnaissance in June 2009. The dirt road running north from the north end of runway 11/29 begins as a two-track closest to the runway, but becomes a solid road beyond the modern airport fence to the north. The reduced traffic load within the fence has likely allowed vegetation to grow in between the tire tracks. Between the widest edges of the tracks, the road measures 15 feet 6 inches. There are no ditches on either side of the road, as the roadbed is built up above the landscape by several feet. The road crosses over one of the ditches, with a large metal culvert allowing the continued flow of water. The ditch has a different character on either side of the road. To the west, it is fairly shallow and wide, making it similar in form to the ones that

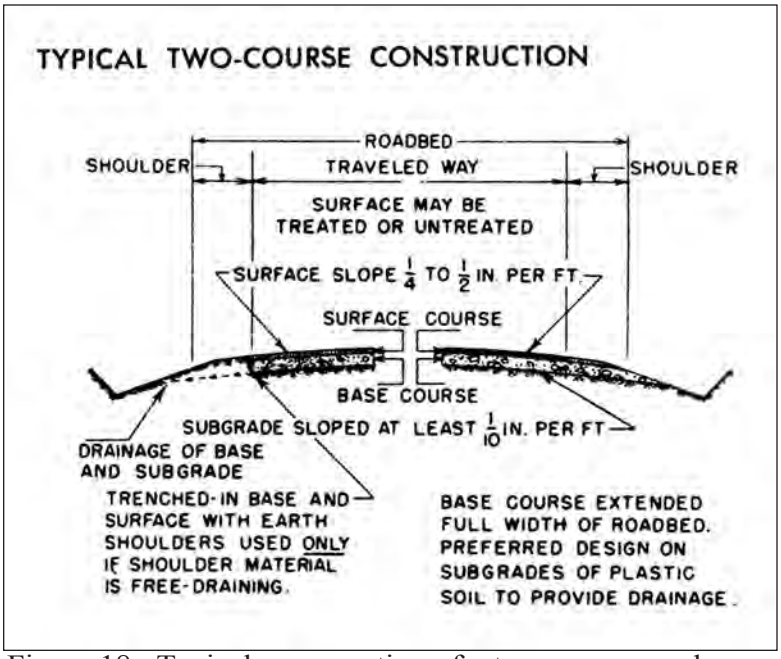


Figure 18. Typical cross section of a two-course road. From War Department 1947:134.

parallel the runways. To the east, however, the ditch is wider, deeper, and more trapezoidal in shape.

Airfield Ditches (JUN-01096). As with other historic landscapes, the ditches at the Gustavus Airport were built to incorporate natural features. Some were dug to drain into near-by natural streams. Others were constructed to run directly, and straight, to distant Icy Strait. The ditches have been addressed in one other cultural resource evaluation. Howell and Johnson (2006:17) state that the ditches no longer have the integrity necessary to be eligible for the National Register, as they have become natural themselves:

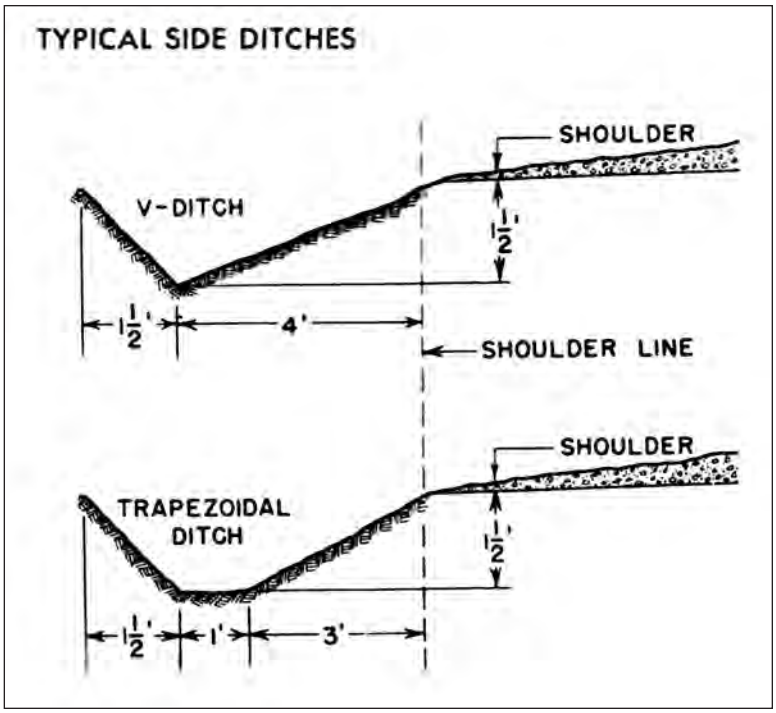


Figure 19. Typical cross section of a road-side ditch. From War Department 1947:135.

> Ditches continue to provide drainage for broad swaths of the landscape, but all have evolved into anadromous fish streams, as they all link to natural streams and facilitate salmonid migration. All of Gustavus' ditches are now actively managed by Alaska ADF&G. In a sense they have evolved into natural streams, and ADF&G regulations preclude any significant alteration to them.

However, this seems to ignore the fact that the ditches were made to connect to natural systems and some of their features, such as straight alignments and sharp turns, can readily distinguish a man-made from a natural watercourse. It also does not take into account the ditches' historical significance. Not only were the ditches constructed as part of a original airfield, likely to military specifications, but they also helped completely alter the surrounding landscape. The resulting drier environment allowed the growth of different plants and eased movement across the land for both people and cattle. Much of Gustavus' growth has been tied to both the changed landscape and the airfield. It is also important to note that isostatic rebound is occurring at Gustavus, but the land has changed at an accelerated pace due to the drainage ditches.

Four different kinds of ditches, varying in dimension and shape, were identified during CRC's field reconnaissance in June 2009. These can be grossly divided into collectors and feeders. The ditches closest to the runways are feeders and are either u-shaped or trapezoidal. According to their design, these shallower ditches direct excess water into larger, deeper collector ditches that are farther from the runways and eventually connect to larger natural systems. Due to

isostatic rebound, few of the ditches have standing or running water during dry periods. Even during heavy rains, water accumulation is minimal in most of the ditches (Mike Pederson, personal communication, 2009).

The ditch paralleling the western edge of runway 11/29 (Figure 20) is a feeder ditch, similar to—but larger than—the trapezoidal ditch illustrated in Figure 21. This ditch is as much as 6 feet deep, 6 feet wide at the bottom, and 26 feet 6 inches wide at the top. Paralleling the runway to the east is another feeder ditch that is now generally u-shaped, although it, too, was likely originally trapezoidal. It is at most 5 feet deep and 22 feet wide, although vehicles traversing across, along side, and even in, the ditch have likely altered its shape and dimensions.

One collector ditch trends northwest to southeast along the western side of runway 11/29, then angles east-southeast of the runway to connect with a second collector (the "Existing Ditch" in Figures 2 and 3; Figure 21). A third collector ditch (the "Existing Stream" in Figures 2 and 3) is located just to the north of runway 11/29. It runs east-west, then makes a 90-degree turn to the south to parallel the eastern side of runway. It then connects with the other collector ditch just south of the runway and continues along a straight alignment to Icy Strait. The ditches are large and trapezoidal, measure between 8 and 17 feet deep and at least 12 feet across on the bottom, and—in places—contain several feet of flowing water.

Figure 20. Feeder ditch paralleling the western edge of runway 11/29. View northwest. CRC LLC 2009.

Figure 21. Collector ditch south of runway 11/29. CRC LLC 2009.

The bank heights and slopes of the ditches vary. In some cases, both banks have the same height and roughly the same slope. In other cases, one bank is as much as two feet higher than the opposite bank and/or has a steeper or shallower slope than the other. Where the trapezoidal form is best preserved, the bank farthest from the runway is higher and has a steeper slope. This design maintains the proportions of the military specifications, while the size and depth of the ditches likely reflects the then-overly wet conditions at Gustavus.

The eastern feeder ditch's connection to the larger collector at the southern end has been destroyed by sand/gravel extraction. The elevation difference in this area is such that run-off could flow from the feeder into the collector, but its path is no longer determined by its original design. This was the only observed location where the ditch system has been irreparably altered.

Lighting Remnants and Wiring. The original airfield at Gustavus was advanced for its time. In addition to being paved, it had full lighting and communication systems. These have been upgraded over the years and most of the original components replaced. For example, the 1997 Gustavus Airport Resurfacing and Apron Improvements project removed what was left of an abandoned, buried lighting system (see Figure 8). However, few remnants can still be found on airport grounds.

Roughly 150 feet south of the southeastern edge of runway 11/29 is a 3 1/2-foot tall pole topped by a 14-inch square piece of plywood. The pole was about 10 inches in diameter and the plywood is 1 inch thick. A hemispherical piece of metal sat on top and centered on the plywood. Two heavily coated wires extended up the wood pole, under the plywood, and up through the centered metal part. Four attaching mechanisms, for an unknown piece of equipment, were placed along the top edges of the plywood, roughly equidistant from the plywood's corners. Each mechanism was able to pivot 180 degrees parallel to the plywood's edge and was comprised of several independent pieces, including an eyehole bolt, one or two wing nuts, and a lock pin.

Approximately 200 feet to the south is a 50-foot long, lighting or power pole that has fallen across the collector ditch south of runway 11/29 (see Figure 21). It is 14 inches in diameter. Wiring and at least one bolt were secured to the pole.

There is also heavy insulated wire either lying on top of or embedded into the ground at both the northern and southern ends of runway 11/29, and in one of the roadbeds south of the runway. The wire itself was about 1/8 inch thick and surrounded by ½-¾ inch of spongy black plastic. The plastic, in turn, was wrapped with a cloth-like material that spiraled down the length of the wire.

Borrow Pit. The borrow pit, visible in aerial photographs, is between the eastern feeder and collector ditches. It extends roughly ¾ the length of the runway and is more or less 200 feet across. It is bordered to the west by a 10- to 15-foot wide berm that parallels the eastern feeder ditch and rises in height to the level of the crown of the runway. In at least one location, a separate ditch runs through the berm and connects the eastern feeder ditch with this pit.

Miscellaneous Earthworks. Several additional earthworks were discovered on the airport grounds. A relatively small, rectangular embankment was found to the south and east of runway 11/29, just west of the fence line. The interior of the embankment was a foot and a half lower in elevation than the surrounding terrain and held a rusted fuel drum. Its age and original function are unknown.

Significance

In order for a particular property—a district, site, building, structure, or object—to qualify for the National Register, it must meet one or more of the Criteria for Evaluation and retain enough historic integrity necessary to convey its significance (National Park Service 2002). Properties may be individually eligible for the National Register or eligible as contributing resources in a historic district. A historic district "possesses a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development...A district can comprise both features that lack individual distinction and individually distinctive features that serve as focal points" (National Park Service 2002:5). The latter may not warrant an individual eligibility determination, but are contributing elements of a district that does meet the criteria of significance.

The National Register Criteria are:

> A. Association with events that have made a significant contribution to the broad patterns of history.
> B. Association with the lives of significant persons.
> C. Embodiment of the distinctive characteristics of a type, period, or method of construction, or representation of the work of a master, or possession of high artistic values, or representation of a significant and distinguishable entity whose components may lack individual distinction.
> D. Having yielded, or having the ability to yield, information important in prehistory or history.

Integrity is the ability of a property to convey its significance. The seven aspects of integrity (location, design, setting, materials, workmanship, feeling and association) are defined in National Register Bulletin 15, Part VIII (National Park Service 2002). Historic integrity is "the authenticity of a property's historic identity, evidenced by the survival of physical characteristics that existed during the property's prehistoric or historic period. The following are the seven qualities of historic integrity:

- Location is the place where the historic property was constructed or the place where the historic event took place.
- Design is the composition of elements that constitute the form, plan, space, structure, and style of a property.
- Setting is the physical environment of a historic property that illustrates the character of the place.
- Materials are the physical elements combined in a particular pattern or configuration to form the structure during a period in the past.
- Workmanship is the physical evidence of the crafts of a particular culture or people during any given period of history.
- Feeling is the quality that a historic property has in evoking the aesthetic or historic sense of a past period of time.
- Association is the direct link between a property and the event or person for which the property is significant.

Bulletin 15 states that "To retain historic integrity a property will always possess several, and usually most, of the aspects" (National Park Service 2002:44). Properties important under Criteria A or B ideally should retain some features of all seven aspects of integrity. However, integrity of design and workmanship might not be as important as other aspects (National Park Service 2002:46). To be eligible under Criterion C, a property must retain the physical features that characterize its type, period, or method of construction. Retention of design, workmanship, and materials are usually more important than location, setting, feeling, and association. For properties eligible under Criterion D, integrity is based upon the property's potential to yield specific data that addresses important research questions (National Park Service 2002:46).

Eligibility Recommendations

Several properties in the APE, including the ditch complex, road system, and runways, were constructed over 50 years ago and so meet the basic requirement for inclusion in the National Register. Available information also suggests many important characteristics of the properties have remained much the same since their construction.

Gustavus Airfield Historic District (JUN-01093)

The airfield runways, road system, and ditches are recommended as eligible for the National Register under Criterion A as contributing features of a Gustavus Airfield Historic District (JUN-01093). This new district, with a period of significance from 1941 to 1958, incorporates the linear features associated with the airfield—the runways, un-paved roads, a paved road, and ditches—and the earlier established CAA Historic District. The name change reflects the broad area of significance that this property represents. The expanded period of significance includes the years from 1941 to 1951 originally suggested by the Park Service for the CAA Historic District and the later dates—1948 to 1958—recommended by the SHPO. Expanding the concept of the district in both space and time from a post-1948 "compound" and including the runways, ditches, and roads—all of which available evidence indicates were under construction by 1941—follows both the Park Service's assessment of the property and SHPO's concerns and recommendations.

The district boundaries proposed here are limited to the immediate airport grounds. Contributing properties include the runways, roads, and ditches, and the 11 properties nominated in 2006. There may be properties located outside of the current APE that could contribute to the district, but assessment of these is beyond the scope of the present project. There are also several non-contributing properties located within the district, including the enlarged apron built in 1996 southwest of the runways' intersection, the relatively recent air terminals and hangars located along this apron and the runways, and several buildings located along Gustavus Road built since 1958.

The expanded district represents the evolution in place of a "first-class" airfield and its continuing use and maintenance was part of broader patterns in Alaskan history. The airfield's beginning highlights a very specific moment in U.S. history when American military commanders and political leaders believed whole-heartedly that Japan was intent on invading mainland Alaska. Its continued maintenance and growth in the succeeding decade and a half reflects a post-World War II boom funded by the federal government.

Airfield Runways (JUN-01094)

Although not considered individually eligible, the two runways are recommended as contributing elements of the historic landscape of the Gustavus Airfield Historic District. The runways provide a focus and a justification for activities that occurred in the district, while also providing form for the development of the surrounding area. Because of past changes, the runways do not have enough integrity to be recommended as individually eligible under Criteria

A for their association with World War II and the CAA Period, or under Criterion C as examples of World War II-era engineering in Alaska.

The loss of World War II and CAA period buildings and other support structures has modified the setting, association, and feeling of the runways, although some aspects of these remain due to the proximity of the earthworks and the distance of the new construction from the majority of runway 11/29. The runways have undergone numerous paving events that have not maintained the original length, width, and material of the original runways. In 1997, pavement was "harvested" from all the runways for the apron and runway resurfacing. This work also removed what was left of an abandoned, buried lighting system and flattened berms that were just outside of the 1997 RSA to create an even slope from the pavement to the ditches. Given this, there are likely only a few intact areas of pavement left around the runways.

However, evidence of its original size and basic construction techniques still exist. Demonstration of the runway's original design and workmanship can be found in the visible pavement along the outside edge of the newer pavements, in the underlying substrate, and in the paralleling ditches and shoulders. Vegetation clearance around the modern airport is also consistent with the original construction. Some areas around the airfield were cleared to the ground in 1948, while in others the vegetation was not high enough to require clearing.

Airfield Roads (JUN-01095)

The roads within modern airport property are recommended as eligible under Criterion A as part of the Gustavus Airfield Historic District for their World War II and CAA association. They are also recommended as individually eligible under Criterion C as an example of World War II-era engineering in Alaska. The roads and the ditches beside them formed the template for later CAA and homesteader construction and development. They also greatly improved the agricultural quality of the land, and eased access, which increased homestead profitability and efficiency.

The un-paved roads maintain their location, design, materials, and workmanship, with the exception of an alteration in 1996 when the apron was expanded. This caused both a road and its corresponding ditch to be re-aligned. The original configuration was maintained, however, with the road running parallel to the edge of the runway pavement and the ditch on the outside or southern side of the road. The re-alignment only affected a few hundred feet of road and was a minor change, given the overall extent of the road system.

Due to lack of use and re-growth of vegetation, some of the roads may not be as wide as they were originally. Others have been given a new purpose, such as the road running north from runway 11/29 that now leads to a quarry. Their setting also may have changed slightly due to recent development and the dismantling or neglect of World War II features such as the barge facility or navigational equipment. However, road sections near the modern airport still have the same spatial relationship to the ditches and the runways, and their association and feeling are intact enough to convey the sense of time. Their non-modern look and their destinations (whether still operational or not) all contribute to their historic character. The roads generally

"fit" with the surrounding development, which has been largely planned around the original airfield design.

A now paved, u-shaped road that runs through the district retains its location, setting, feeling and association. Its original design is evident through the road's continued use as the main thoroughfare to and from both the CAA compound and the airport, although original materials and workmanship were lost when the road was re-done in the late 1990s.

Airfield Ditches (JUN-01096)

The airfield ditches are recommended as eligible under Criterion A as contributing features of the Gustavus Airfield Historic District for their World War II and CAA association. They are also recommended as individually eligible under Criterion C as well preserved examples of World War II-era engineering in Alaska. The ditch complex, which allowed for development of the airfield on the low glacial flat at Gustavus, is an important part of the historic landscape. The size and extent of the ditches are also emblematic of the large amount of human labor that went into what Howell and Johnson (2006:12-13) described as the monumental undertaking that resulted in the Gustavus airfield.

Comparison of 1948 and 1959 aerial photos to Google Earth images show that there have been few changes to this ditch system. Between 1948 and 1959, an additional ditch was added at the southwest edge of runway 11/29. Many of the ditches are also more prominent in the 1959 photograph. It remains hard to discern whether this is because the ditches were enlarged between 1948 and 1959, or whether the ditches were water-filled when the photograph was taken in 1959. Both of these changes occurred during the broad period of significance of the airport (1941-1958) and do not adversely affect the property's integrity.

As noted above, a section of ditch was re-aligned in 1996 when the airport apron was expanded. The re-alignment only affected a few hundred feet of the ditch system and can be considered a minor change given the size of the ditch complex. At an unknown point in time, gravel and sand harvesting destroyed the connection between the east paralleling feeder ditch and the east collector ditch.

The location, design, materials, and workmanship of the airfield ditches have stayed the same, with the exception of the 1996 re-alignment and the section destroyed by gravel and sand harvesting. It is possible that the rest of the ditches are no longer exactly the width and depth they were immediately after their construction, mostly due to natural erosion processes, but they are still visible and functioning elements of the landscape. Their setting may have changed slightly due to development or neglect, but they are still next to roads and runways and perform their original purpose of draining the area. Their association and feeling are also intact enough to convey the sense of time; their close proximity to the roads and runways is a World War II design feature, which now conflicts with industry practice safety standards. The ditches call to mind a time when the land was much wetter than it is today and generally "fit" with the surrounding development, which has been largely planned around World War II and post-war

construction. As such, the World War II and CAA historic landscape at the Gustavus Airport has remained largely untouched by development, a rare circumstance in Alaska.

Lighting Remnants and Wiring

The few remaining remnants of the lighting system are not recommended as eligible, although they are likely contemporary with other elements within the broader Gustavus Airfield Historic District. Too little of this large and important system has survived to the present to retain its integrity.

Miscellaneous Earthworks

The rectangular embankment is not recommended for eligibility at the present time due to a lack of information about the property, although it may be contemporary with other properties within the broader Gustavus Airfield Historic District. Its eligibility may be revised as more information is found.

Recommendation of Effect

The recommended National Register eligibility of the Gustavus Airfield Historic District (JUN-01093) is based on the co-existence of the runways, the roads, the ditches, and the buildings in the CAA Historic District. Despite past changes, the district as a whole retains many of the seven aspects of integrity. All of the proposed changes associated with the upgrade of the Gustavus Airport are either at or near the runways and have potential to affect the eligibility of the district and individual properties contained within it. Because of the cumulative magnitude of the effect of the proposed project, CRC recommends that the effect on the district be considered adverse.

The runways form the core and focus of the district. The runways' ability to contribute to the district relies upon their design, location, and workmanship, as well as their close association with other surrounding and associated elements of the historic landscape. The proposed lengthening (by over 1,200 feet) and widening (by 238 feet) of the RSA for Runway 11/29 would substantially change its design and workmanship, and affect the still apparent, 1940s and 1950s, spatial arrangement of the airfield. The proposed alterations will also affect runway 11/29, resulting in a loss of proportionality between the runways themselves, now largely apparent from the air. Construction activities, including grading around the perimeter of the RSA could also damage or destroy the few remaining areas of original pavement that have no modern equivalent.

The increase in distance between the landing area and the ditches would also constitute a serious departure from World War II-era design, which called for a much shorter and narrower safety area bounded by ditches. In a way, moving the ditches out from the runway and using emulsified asphalt to harden the new RSA surface would actually be in keeping with the original design concept of having pavement extend to the greatest possible extent. However, this too would affect the airfield's proportionally, a key design element. During WWII, the

airfield had two paved, "T-oriented" runways of similar size extending nearly to the ditches that bordered them. This project would expand the paved area around 11/29 by several degrees of magnitude, while the paved area around 2/20 would remain smaller than its original construction specifications.

The complex of drainage ditches (JUN-01096) around the airfield cover an extensive area; the majority of which maintain all seven aspects of integrity. The project will relocate the feeder ditches along the edges of the runway and re-route many important sections of the collector ditches. While the new ditches will resemble the original, the new system will be placed on the landscape according to a modern design philosophy. Currently, the ditches are arranged close to the runways according to World War II-era concepts of safety and need, while the new ditches will be distanced from the runways to accommodate modern safety standards. As long as the ditches are replaced "in-kind", the individual eligibility of the ditch complex will not be adversely affected. However, this dislocation does contribute to the cumulative adverse effect on the district as a whole.

The only planned change to the airport road system (JUN-01095) will occur southwest of runway 11/29. Here, a portion of a road is contained in the RSA expansion area. However, the roadway will still be graded and drivable, and will be used by airport personnel. Also, the spatial relationship of a section of this road and its associated ditch will be altered by a proposed ditch re-alignment. Both of these changes, however, are to a road section that was altered in 1996 and will not adversely affect the overall eligibility of the district or the roads themselves.

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