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Administration

Construction Development Plan

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Pacific Spaceport Complex Alaska
Narrow Cape
Kodiak, Alaska

APPROVALS AND REVISION HISTORY

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Revisions

Rev	Date	Revision Description
	7/12/2022	Initial release
1	8/1/2022	Edits to maps for legibility and minor edits for clarity
2	4/25/2023	Minor updates

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SUPPORTING DOCUMENTS

The current revision of all documents, are applicable only as specifically referenced herein.

Internal Documents

	Document Number	Document Title
1	PLN-1006	AAC ILMA Supplemental Information
2	PLN-1011	AAC ILMA Application
3	PLN-1012	AAC ILMA Environmental Risk Questionnaire

External Documents

	Document Number	Document Title

ACRONYMS

The following definitions and acronyms apply when referred to in this document:

Acronyms

Acronym	Definition
AAC	Alaska Aerospace Corporation
ILMA	Interagency Land Management Agreement
LP-3A	Launch Pad 3A
LP-3B	Launch Pad 3B
LP-3C	Launch Pad 3C
LP-3D	Launch Pad 3D
LCC	Launch Control Center
LEO	Low Earth Orbit
LOC	Launch Operations Control
LOX	Liquid Oxygen
MSF	Maintenance Storage Building
PSCA	Pacific Spaceport Complex – Alaska
RCC	Range Control Center
RMSF	Rocket Motor Storage Facility
VIBII	Vehicle Integration Building Two

1 INTRODUCTION

1.1 OVERVIEW

Alaska Aerospace is a state-owned corporation established to develop an aerospace industry in the state. Alaska Aerospace operates the Pacific Spaceport Complex – Alaska (PSCA), the nation's first commercial spaceport not collocated on a federal range, that provides responsive and efficient launch capability for Low Earth Orbit (LEO) polar, sun synchronous, and high inclination orbits. PSCA is located at Narrow Cape on Kodiak Island, Alaska. Alaska Aerospace headquarters is in Anchorage.

1.2 PURPOSE

This document will serve as the development plan as part of the supplemental information packet for Alaska Aerospace's Interagency Land Management Assignment application. The purpose of this document is to address the requirement to "Include a map or sketch plat, showing location of proposed activities in relation to survey monumentation or fixed geographical features, that fully illustrates the intended use, including the location of buildings and improvements and access points, labeled with all dimensions, and a development plan providing a complete list of proposed activities." Further supplemental information can be found in document PLN-1006 AAC ILMA Supplemental Information.

2 POTENTIAL CONSTRUCTION PROJECTS

This section will address construction that is planned on previously utilized land. These are projects such as upgrades to existing facilities or tearing down and rebuilding new infrastructure. This map includes locations of planned upgrades.

FIGURE 1: MAP OF EXTENDED CONSTRUCTION

2.1 AREA 3

This section will address the area 3 planned projects to support current and future customers. Area 3 is shown on the map with the numbers of 1,2,3, and 4.

2.1.1 Launch Pad 3A (LP-3A)

LP-3A is being kept as a tactical and suborbital pad but may also be used for staging and commodity storage of launch support equipment for Area 3 customers. It is partially developed but would require expanding the gravel pad and extending power from the main power line along the area access road. There are two locations in consideration, next to the existing gravel pad or on the other side of the road.

The unutilized land is a lightly wooded area that is slightly graded, and the area would be cleared and flattened. The pad area would be expanded to approximately fifty thousand (50,000) square feet with gravel. Potentially separate bermed pads, 8 in thick with concrete and 20 ft high x 60 ft long high berms would be built for LOX and rocket propellant. A small building 200 ft x 200 ft for payload integration may be constructed on the old pad location if the expansion location is chosen on the opposite side of the road. This is represented by 1 on Figure 1 above.

2.1.2 Launch Pad 3B (LP-3B)

To allow for the launch of larger vehicles from LP-3B, modifications will need to be made to the existing infrastructure and pad. The concrete launch pad at LP-3B will be replaced with an overall thicker lift of concrete, with a surface area of 1000 sqft and approximately 20 inches thick. Additionally, it may be required to construct two separate safety berms with a concrete slab base. General construction to include 8 in thick concrete slabs and berm dimensions of approximately 20 ft high x 60 ft long. LP-3B modification will also include the overbuild of approximately 20,000 sqft utility slabs and extension of the perimeter security fencing and vehicle gates. Site utility upgrades may be required as load requirements and service needs change as part of these infrastructure accommodations to the larger vehicle. To allow for the larger equipment to turn around, the gravel road in front of the pad may be extended approximately 14,250 sqft or 50'x 285' to make space for a truck turn around. Site modification will require the use of developed and undeveloped land. It is anticipated that pad modification could extend up to 50,000 sqft into the surrounding undeveloped property. The land is flat but would be graded and is almost completely treeless. Few, if any trees would be removed. Other development would include a water deluge system with a water catchment system; enhanced communications and data systems; lighting; cameras; lightning rods and arrestors; and fencing. The lightening arrestor would potentially have a few anchor points, 1 ft x 1 ft outside of the fence line. This is represented by 2 on Figure 1 above.

2.1.3 Launch Pad 3C (LP-3C)

To provide uninterrupted equipment travel from the production facility to the vehicle launch pad a raceway would be constructed in Area 3, VIBII Tent Structure to LP-3C. Construction of the raceway will include a 12 ft – 14 ft, 140 ft long 3500 sqft. Raceway will be constructed of either asphalt or concrete with a thickness of 6-12 inches respectively. Raceway will be constructed on the previously developed land at LP-3C in Area 3. LP-3C may increase the size of concrete for the LOX and Fuel areas and add an additional concrete pad for additional rocket stage testing. This is represented by 3 on Figure 1 above.

2.1.4 Launch Pad 3D (LP-3D)

LP-3D is a gravel pad, but the plan is to upgrade it to a multi-use government/commercial launch pad that can be used for liquid, solid, and hybrid propellant boosters. The area is already partially utilized but will be expanded into unused land. Approximate acreage is 5 acres. The slightly slanted land would be flattened, and the few trees would be removed. The pad would be developed with a layer of 3 ft of concrete 10,000 sqft and potentially 2 separate bermed pads, 8 in thick with concrete and 20 ft high x 60 ft long high berms. The bermed pad’s purpose is for the placement of LOX and rocket propellant. Other development would include a water deluge system with an environmentally approved water catchment

system; enhanced communications and data systems; lighting; cameras; lightning rods; fencing; and an area for installation of a temporary tent and small vehicle integration facility. This is represented by 4 on Figure 1 above.

2.2 Operations Center

2.2.1 Launch/Range Control Center (LCC/RCC)

The LCC would be expanded 75 x 100 ft to accommodate additional offices and personnel. The building would be expanded into a parking lot, not impacting any new land. The parking lot would be expanded slightly, approximately 75 ft x 100 ft into where the balloon launch building is located currently. This would require the building to be pulled down, but no new areas would be developed. This is represented by 6 on Figure 1 above.

2.2.2 Maintenance Support Facility

The area directly adjacent to and west of the existing soft-sided storage facilities located behind the Maintenance Support Facility is being used for a third soft-sided storage or metal facility. The land is partly paved, and the paved area would be extended a short distance of 60 ft x 80 ft of asphalt, 3 in thick. Little to no land changes would be required. This is represented by 7 on Figure 1 above.

2.2.3 Fire Response Facility

To better provide for fire response, a separate Fire Response Facility (FRF) should be constructed outside of the launch pad clear zone safety areas and near the existing infrastructure and road system. The plan is a new FRF be built between the current RCC and the EMCC. The new building would be where there is currently a paved lot. The building would be 60 ft x 100 ft with power, water, communications and data systems, and cameras being extended to it. This is represented by 8 on Figure 1 above.

2.2.4 Optics Cables

To support better internet connectivity onsite, more internet cables will be installed to the Operations Center buildings including the EMCC, LCC, MSF, and other building. These cables will be buried 1-3 ft deep. The cables could span the entire approximately 1,200 ft length. This is all previously disturbed areas and no major changes to the land would be made. This is represented by 8 on Figure 1 above.

2.3 Launch Vehicle and Payload Storage Facilities

The launch vehicle and payload storage areas are being assessed to understand the requirements of current and future customers. AAC is currently reviewing 2 options that may be executed. This is represented by 9 on Figure 1 above.

2.3.1 Option 1

Two additional storage facilities are planned next to the existing two Rocket Motor Storage Facilities. The land was already flattened and cleared. The structures would be two more 92.5 ft x 28.17 ft earthen

covered facilities. Additional construction for supporting utilities such as power, communications, fencing extensions, and lightning protection would be installed.

2.3.2 Option 2

Storage is also planned for the area, adjacent to and east of the existing RMSF. The land was already flattened and cleared. This would include little grading and paving concrete 300 x 600 ft, 8 in thick. Fences would be installed, and power and lighting would be extended.

3 NEW CONSTRUCTION

The new construction section will address construction projects that are planned on new land. This includes things like new buildings and new launch pads. New construction location options are shown on the following map.

FIGURE 2: MAP OF NEW CONSTRUCTION

3.1 LAUNCH PAD 1A AREA

3.1.1 Launch Pad 1B

An area approximately 6 acres, will be constructed near Launch Pad 1 to accommodate both rocket propellant (fuel and oxidizer) tanks, along with piping that connects the tanks to the launch pad and an access road that allows the transport of the tanks from existing paved roadway to the fueling pads. The concrete rocket propellant pads 60 ft x 40 ft, 8 inches thick will have berms 20 ft high x 60 ft long to protect the launch structure from any unintended damage. The land is already flat and mostly clear of trees. Little grading would be necessary, and few trees (approximately <20) would be removed. This is represented by 10 on Figure 2 above.

3.2 Rocket Motor Storage Expansion

For the planned expansion of the rocket motor storage facility, AAC is assessing the following options. This is represented by 11 on Figure 2 above.

3.2.1 Option 1 Liquid Oxygen Plant

To reduce the amount of chemicals being trucked into the site, and to keep up with customer needs, liquid oxygen (LOX) will be produced in a medium sized building. The building size is still being determined but the total facility footprint will have an area less than 100 ft x 200 ft. Utilities, power, communications, cameras, and fencing would be installed. The land is mostly flat, and few trees would need to be removed. Little grading would be required.

3.2.2 Option 2 Launch Vehicle Propellant Storage Area

Having launch vehicle propellant storage at PSCA provides an increase in safety by minimizing the number of tanker truck trips required to transport propellants from Kodiak to PSCA. Tanks would be installed in a new propellant storage area located adjacent to the Rocket Motor Storage Facility area, on the west side of the existing facilities. The plan includes 60,000 square feet of land directly west of the RMSF for storage of liquid oxygen, helium, nitrogen, and other oxidizers. The land is fairly flat, and treeless. The area would be flattened and paved with concrete 8 inches thick, with the proper catchment systems installed.

3.3 Area 3

3.3.1 LP-3A Launch Pad

AAC is evaluating the addition of an additional 100 ft x 100 ft flat concrete and gravel pad to support potential suborbital launch and recover pad for future customers. The location is across the road from the exiting LP-3A pad and will be given new number as we move forward. This is represented by 12 on Figure 2 above.

3.3.2 LP-3B Water Tank

AAC is evaluating the addition of a water tank in Area 3 with the following options. This is represented by 12 on Figure 2 above.

3.3.2.1 Option 1

Area 3 waterline installation will be a project to provide fire protection and a future potable resource for operations in this area. The waterline will be extended from the mainline and a small pump and hydrant will be built. 2500 ft of pipe will run 5-7 ft below the surface.

3.3.2.2 Option 2

A water tank and a well of approximately 80 ft in depth will be built to help with fire suppression. A 30 x 30 ft water tank pad will be built of concrete 6-8 inches thick and the total area with the well will be 100 ft x 100 ft. The land is flat and treeless but would be graded.

3.3.3 LP-3B and LP-3C Access Roads

Small roads would be constructed along the outside edge of the fences at Pad 3B and 3C for the purpose of fire suppression clearing to the south. The road would be 25 ft wide approximately 800 ft long and 3 ft deep of gravel. The land is flat with little elevation change and clear of any trees but would be leveled for the road. This is represented by 13 on Figure 2 above.

3.3.4 LP-3C

To create more room for customer parking and equipment storage, the areas on either side of the VIBII tent Structure will be turned into 100 ft x 300 ft gravel storage and parking areas, with 3 ft deep of gravel. The area is flat and mostly treeless but would be graded and potentially a few trees would be removed, between 5-20. Fencing would extend around the area for safety as well as power for lighting. This is represented by 14 on Figure 2 above.

3.3.5 LP-3D Storage

The plan is to make an area adject to Pad D in Area 3 for laydown and logistics yard. This area buildout will include fencing around a new gravel pad, 3 ft deep of gravel, 300 x 600 ft, a drainage culvert, and power. This area is currently undeveloped and lightly wooded. The land would be flattened and cleared if necessary. This is represented by 15 on Figure 2 above.

3.3.6 Future Launch Pad 3E (LP-3E)

A new launch pad would be constructed past the existing Pad 3D. The pad would be 100 ft x 100 ft of compacted gravel, enclosing 100 ft diameter concrete pads for a launch stool, liquid oxygen fuel berm, rocket propellant berm, and a 50 ft x 80 ft fabric Vehicle Integration Building (VIB-1) for launch vehicle processing and storage. Berms would be 20 ft high x 60 ft long and the pads would be 8in thick with concrete. The gravel road would be extended approximately 700 ft, 25 ft wide, and 3 ft deep. The land is flat and there are few (> 10 trees). Grading and tree removal would be completed as necessary. Other structures would be a 3ft fence, cameras, utilities, and lightening protection. This is represented by 16 on Figure 2 above.

3.4 Operations Center

3.4.1 Light Manufacturing, Fabrication Facilities, and Warehousing

Development of these land uses must be located outside of the widest launch pad clear zone, resulting in the only location capable of supporting this type of development is north of the Pasagshak Road in the upper area of the spaceport west of the LOC. The land is mostly flat and clear of trees. The land would be flattened prior to use. The area is 1000 x 400 ft, and all new buildings would be in this area. Power, water,

communications and data systems, cameras, lightning rods, and fencing would be installed around the buildings. This is represented by 17 on Figure 2 above.

3.4.2 Antenna Field Expansion

The expansion of the antenna field includes multiple options that may be considered based on customer and facility needs. The following describes the options.

3.4.2.1 Option 1

Due to increased customer rate the ability to have multiple telemetry systems set up and in an operational condition is critical to supporting customer cadence. For this effort expanding the existing leveled graveled area inside of the antenna field fencing is planned. The estimate would be for the addition of a 150 ft x 250 ft area of additional gravel 24 in in depth added to the inside of the antenna field perimeter security fence with an extension to the existing power and comms utilities present at the site. This is represented by 18 on the map above.

3.4.2.2 Option 2

There are increasing negative effects to system performance in adding more antenna systems to support customer requirements. To reduce interference between antenna systems expansion beyond the existing Antenna Field footprint would be required. An immediate expansion of 300 ft by 300 ft area due east of the antenna field would be planned with a clearance of approximately 14 - 20 trees and addition of gravel, electrical power, communication vaults, and lightning rod protection would be added in the proposed area. The perimeter security fence would be expanded from the existing fence to cover the additional area to comply with DoD security requirements. This is represented by 19 on Figure 2 above.

3.4.2.3 Option 3

To support addition of customer antenna installations, a 1250 ft long 12 ft wide single lane gravel 3 ft deep access road would be added along the top ridge line due east from the existing access road exit of the antenna field. Three 150 ft by 200 ft gravel 8 in deep pad areas would be added and individually fenced, with power and comms feeds added along the access road. One additional tree would be required to be removed in addition to the 14-20 proposed in Option 2. This is represented by 20 on Figure 2 above.

3.4.2.4 Option 4

A proposal for a large passive High Frequency receiving array to support atmospheric ionosphere research has been received. If other antenna field expansion Options have been enacted, a 200 ft access road would be required. If no other expansion plans have been enacted an 800 ft long access road would be required. The expanded site itself would require a 1500 ft x 5 ft wide gravel access path running approximately parallel to the existing ridgeline in an east to west orientation. Small 20 ft by 20 ft gravel pads 8 in deep for each antenna element would be required along access path. Electrical and Comms feeds would be required for each antenna element/pad area along the access path. A 5ft wildlife/livestock fence would

be added approximately 1500 ft by 40 ft in size around antenna array. This is represented by 21 on Figure 2 above.

3.4.3 Antenna Diagnostics Tower

To facilitate diagnostics and maintenance of safety critical antennas an installation of a far-field boresight/diagnostics tower will be built. The installation of a 150 ft tall Rohn antenna tower will be between MSF and the Antenna field. Clearance of a 2-acre area of overgrowth in a previously cleared area will be required. An addition of a 10 ft by 10 ft by 2 ft thick concrete pad for the antenna base, and an addition of 6 6ftx4ftx4ft concrete anchor points for antenna guy wire mounting within the cleared area will be required. This is represented by 22 on Figure 2 above.

3.4.4 Rocket Park Upgrade

To create a more welcoming entrance to the spaceport the entryway will be redone. 5-10 concrete pads will be put down, 10 ft x 10 ft approximately 12 inches thick, to provide bases to erect more rocket shells and other aerospace-related statutes. The land is already flattened and cleared. Fencing, power, communications, and utilities will be extended. A small building 40 ft x 40 ft may be built to support increased numbers of visitors related to aerospace operations at the site. This is represented by 23 on Figure 2 above.