United States Air Force
F-35A Operational Beddown - Pacific
Final
Environmental Impact Statement

Volume II
Appendices

February 2016

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Appendix A: Public Notices

of the Board on Coastal Engineering Research. The DFO, at that time, may provide additional guidance on the submission of written statements that are in response to the stated agenda for the planned meeting in question.

Dated: March 2, 2015.

Aaron Siegel,

Alternate OSD Federal Register Liaison Officer, Department of Defense.

[FR Doc. 2015–05040 Filed 3–4–15; 8:45 am]

BILLING CODE 5001–06–P

DEPARTMENT OF DEFENSE

Department of the Army

Final Environmental Impact Statement for the Modernization and Repair of Piers 2 and 3, Military Ocean Terminal Concord, CA

AGENCY: Department of the Army, DOD.

ACTION: Notice of availability.

SUMMARY: The Department of the Army (Army) announces the availability of the Final Environmental Impact Statement (EIS) for the Modernization and Repair of Piers 2 and 3 at Military Ocean Terminal Concord, California (MOTCO). The Final EIS evaluates the potential environmental and socioeconomic effects that could result from demolition and reconstruction of structural elements, replacement of infrastructure, upgrades to shore-side roads and electrical infrastructure, repair of piles at Pier 3, and maintenance dredging. Environmental consequences were evaluated for noise; air quality; geology, topography, and soils; water resources; biological resources; land use and coastal zone management; transportation; infrastructure; visual resources; recreational resources; socioeconomics; environmental justice and protection of children; cultural resources; and hazardous materials, hazardous waste, toxic substances, and contaminated sites. Based on the analysis described in the EIS, all impacts are anticipated to be less than significant. The potential for environmental impacts is greatest for the following resource areas: water resources; biological resources; transportation; infrastructure; and cultural resources.

DATES: The Army will make a final decision no sooner than 30 days after the publication of a Notice of Availability for the Final EIS in the **Federal Register**.

ADDRESSES: Please send requests for a copy of the Final EIS or written comments on the Final EIS to Mr. Malcolm Charles, Director of Public Works, Attention: SDAT–CCA–MI (Charles), 410 Norman Avenue, Concord, CA 94520; email comments to *usarmy.motco.sddc.mbx.list-eis@mail.mil;* or fax comments to (925) 246–4171 (Attention: SDAT–CCA–MI [Charles]).

FOR FURTHER INFORMATION CONTACT: Ms. Sarah Garner, Public Affairs Office, Surface Deployment and Distribution Command; telephone: (618) 220–6284; email: *usarmy.scott.sddc.mbx.command-affairs@mail.mil.*

SUPPLEMENTARY INFORMATION: The purpose of the proposed action is to modernize and repair Pier 2 and repair Pier 3 so the Army can maintain its ability to meet Department of Defense (DOD) mission requirements in support of wartime and contingency operations. Piers 2 and 3 were built in the mid-1940s and are past their structural and design life and lack modern operational efficiencies. Based on Net Explosive Weight handling capability, Pier 2 is the optimum pier for mission capability, but it cannot be used due to its degraded and nonoperational condition. Pier 3, currently the primary operational pier at MOTCO, requires some level of repair to maintain even its limited operational capability through 2019.

Alternative 1 fully implements repairs to Piers 2 and 3 with Pier 2 re-oriented to align the west end with the existing shipping channel to create a more modernized configuration. Alternative 2 would be similar to Alternative 1, but the Pier 2 footprint would not change. Alternative 3 would fully implement repairs to Piers 2 and 3, reorienting Pier 2 to create a more modernized configuration but with a larger deck surface and heavier load-carrying capacity than that proposed under Alternative 1. Under the No Action Alternative, the modernization and repair of Pier 2 and the repair of Pier 3 at MOTCO would not occur, and Pier 3 would continue to be used with loading restrictions for the remainder of its service life. The No Action Alternative provides the environmental baseline conditions for comparing the impacts associated with the other alternatives. Alternative 1 is the preferred alternative.

The Army consulted with regulatory agencies, to include the State Historic Preservation Officer, the National Park Service, the U.S. Army Corps of Engineers, the San Francisco Bay Regional Water Quality Control Board, the National Marine Fisheries Service, the U.S. Fish and Wildlife Service, and the San Francisco Bay Conservation and Development Commission.

Several of the comments received during the Draft EIS review period resulted in revisions to the Final EIS. These revisions included minor clarifications and the inclusion of updated information. The Final EIS includes responses to all comments.

Copies of the Final EIS are available for public review at the following two Contra Costa County libraries: (1) Concord Library, 2900 Salvio Street, Concord, CA 94519 and (2) Bay Point Library, 205 Pacifica Avenue, Bay Point, CA 94565. The Final EIS may also be reviewed electronically at *http://www.sddc.army.mil/MOTCO/default.aspx.*

Brenda S. Bowen,

Army Federal Register Liaison Officer.

[FR Doc. 2015–05083 Filed 3–4–15; 8:45 am]

BILLING CODE 3710–08–P

DEPARTMENT OF DEFENSE

Department of the Air Force

Notice of Intent To Prepare an Environmental Impact Statement for United States Air Force F–35a Operational Basing—Pacific

AGENCY: Department of the Air Force, DOD.

ACTION: Notice of Intent (NOI).

SUMMARY: The Air Force is issuing this notice of intent (NOI) (40 CFR 1508.22) to prepare an Environmental Impact Statement (EIS) to assess the proposed action to base two (2) F–35A squadrons (48 Primary Assigned Aircraft (PAA)) at Eielson Air Force Base (AFB), Alaska. The proposed action will also include the use of related airspace and ranges, particularly the Joint Pacific Alaska Range Complex (JPARC). The F–35A is the conventional take-off and landing version of the Joint Strike Fighter (JSF). It is a multiple-role fighter with an emphasis on air-to-ground missions.

A No-Action Alternative will be included in the EIS, whereby no F–35A squadrons would be based at Eielson AFB. The analysis of the no-action alternative will provide a benchmark to enable Air Force decision-makers to compare the magnitude of the environmental effects of the proposed action. No-action means the proposed action would not take place, and the resulting environmental effects from taking no-action will be compared with the effects of allowing the proposed activity to go forward.

Scoping: The public scoping process will be used to identify community concerns and local issues to be considered during the draft EIS development process. Federal, state, and

local agencies; Alaska Native Tribes and organizations; as well as interested persons are encouraged to provide written comments of environmental concern associated with the proposed action to the Air Force. Comments should be provided by the methods and dates indicated below.

DATES: Public scoping meetings will be held in North Pole, Fairbanks, and Delta Junction, Alaska at the following dates, times, and locations:

Tuesday, March 24, 2015, 6:00 p.m. to 8:00 p.m.

North Pole Worship Center, 3340 Badger Road, North Pole.

Wednesday, March 25, 2015, 6:00 p.m. to 8:00 p.m.

Westmark Hotel and Conference Center, 813 Noble Street, Fairbanks.

Thursday, March 26, 6:00 p.m. to 8:00 p.m.

Alaskan Steakhouse & Motel, 265 Richardson Highway, Delta Junction.

Comments on the proposal can be made at the scoping meetings, by mail, or via the project Web site at: *https://www.PACAF-F35Aeis.com.* Written comments can be mailed to: 354 FW/PA, 354 Broadway Avenue, Suite 15A, Eielson AFB, AK 99702.

Although comments can be submitted to the Air Force at any time during the EIS process, scoping comments are requested by Friday, April 17, 2015 to ensure full consideration in the draft EIS.

FOR FURTHER INFORMATION CONTACT: For questions regarding the proposed action, scoping, and EIS development, contact the Eielson AFB Public Affairs Office, at 907–377–2116 or at *354fw.pa.publicaffairs@us.af.mil.*

Henry Williams Jr.,

Acting Air Force Federal Register Liaison Officer, DAF.

[FR Doc. 2015–05014 Filed 3–4–15; 8:45 am]

BILLING CODE 5001–10–P

DEPARTMENT OF EDUCATION

[Docket No.: ED–2015–ICCD–0023]

Agency Information Collection Activities; Comment Request; Roads to Success in North Dakota: A Randomized Study of a College and Career Preparation Curriculum

AGENCY: Office of Career, Technical, and Adult Education (OCTAE), Department of Education (ED).

ACTION: Notice.

SUMMARY: In accordance with the Paperwork Reduction Act of 1995 (44 U.S.C. chapter 3501 *et seq.*), ED is proposing a new information collection.

DATES: Interested persons are invited to submit comments on or before May 4, 2015.

ADDRESSES: Comments submitted in response to this notice should be submitted electronically through the Federal eRulemaking Portal at *http://www.regulations.gov* by selecting Docket ID number ED–2015–ICCD–0023 or via postal mail, commercial delivery, or hand delivery. If the regulations.gov site is not available to the public for any reason, ED will temporarily accept comments at *ICDocketMgr@ed.gov. Please note that comments submitted by fax or email and those submitted after the comment period will not be accepted; ED will ONLY accept comments during the comment period in this mailbox when the regulations.gov site is not available.* Written requests for information or comments submitted by postal mail or delivery should be addressed to the Director of the Information Collection Clearance Division, U.S. Department of Education, 400 Maryland Avenue SW., LBJ, Mailstop L–OM–2–2E319, Room 2E103, Washington, DC 20202.

FOR FURTHER INFORMATION CONTACT: For specific questions related to collection activities, please contact Braden Goetz, 202–245–7405.

SUPPLEMENTARY INFORMATION: The Department of Education (ED), in accordance with the Paperwork Reduction Act of 1995 (PRA) (44 U.S.C. 3506(c)(2)(A)), provides the general public and Federal agencies with an opportunity to comment on proposed, revised, and continuing collections of information. This helps the Department assess the impact of its information collection requirements and minimize the public's reporting burden. It also helps the public understand the Department's information collection requirements and provide the requested data in the desired format. ED is soliciting comments on the proposed information collection request (ICR) that is described below. The Department of Education is especially interested in public comment addressing the following issues: (1) Is this collection necessary to the proper functions of the Department; (2) will this information be processed and used in a timely manner; (3) is the estimate of burden accurate; (4) how might the Department enhance the quality, utility, and clarity of the information to be collected; and (5) how might the Department minimize the burden of this collection on the respondents, including through the use of information technology. Please note that written comments received in response to this notice will be considered public records.

Title of Collection: Roads to Success in North Dakota: A Randomized Study of a College and Career Preparation Curriculum.

OMB Control Number: 1830—NEW.

Type of Review: A new information collection.

Respondents/Affected Public: Individuals or Households.

Total Estimated Number of Annual Responses: 88.

Total Estimated Number of Annual Burden Hours: 22.

Abstract: The Office of Career, Technical, and Adult Education in the U.S. Department of Education is supporting an evaluation that will examine the impact of a college and career preparation curriculum for students in the 11th and 12th grades on students' college and career aspirations, planning for postsecondary transitions and adult life, and attitudes toward education and careers. The evaluation has an experimental design with school-level random assignment. This Information Collection Request includes surveys of students, instructors, and principals and protocols for site visits.

Dated: March 2, 2015.

Kate Mullan,

Acting Director, Information Collection Clearance Division, Privacy, Information and Records Management Services, Office of Management.

[FR Doc. 2015–05011 Filed 3–4–15; 8:45 am]

BILLING CODE 4000–01–P

DEPARTMENT OF ENERGY

Environmental Management Site-Specific Advisory Board, Nevada

AGENCY: Department of Energy.

ACTION: Notice of open meeting.

SUMMARY: This notice announces a meeting of the Environmental Management Site-Specific Advisory Board (EM SSAB), Nevada. The Federal Advisory Committee Act (Pub. L. 92–463, 86 Stat. 770) requires that public notice of this meeting be announced in the **Federal Register**.

DATES: Wednesday, March 25, 2015, 5:00 p.m.

ADDRESSES: National Atomic Testing Museum, 755 East Flamingo Road, Las Vegas, Nevada 89119.

FOR FURTHER INFORMATION CONTACT: Barbara Ulmer, Board Administrator, 232 Energy Way, M/S 505, North Las

General Motors Corporation North American operation, at 12950 and 13000 Eckles Road, Livonia, Michigan. The EPA identification number for the RCRA corrective action responsibilities at the Delco Chassis Industrial Land I & II Site is # MID005356621. The Site is one of the 89 sites that were placed into an Environmental Response Trust (the ''Trust'') as a result of the resolution of the 2009 GM bankruptcy. The Trust is administrated by Revitalizing Auto Communities Environmental Response.

Dated: August 17, 2015.

Samuel Borries,

Acting Director, Superfund Division.

[FR Doc. 2015–22029 Filed 9–3–15; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–9022–7]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7146 or *http://www2.epa.gov/nepa.*

Weekly receipt of Environmental Impact Statements (EISs).

Filed 08/24/2015 Through 08/28/2015.

Pursuant to 40 CFR 1506.9.

Notice

Section 309(a) of the Clean Air Act requires that EPA make public its comments on EISs issued by other Federal agencies. EPA's comment letters on EISs are available at: *https://cdxnodengn.epa.gov/cdx-enepa-public/action/eis/search.*

EIS No. 20150245, Third Draft Supplemental, BOEM, TX, Gulf of Mexico OCS Oil and Gas Lease Sale 248, Comment Period Ends: 10/19/2015, Contact: Michelle Nannen 504–731–6682.

EIS No. 20150246, Final, FHWA, IA, Eastern Hills Drive and Connecting Roadways, Review Period Ends: 10/05/2015, Contact: Michael La Pietra 515–233–7302.

EIS No. 20150247, Final, USN, CA, LEGISLATIVE—Renewal of Naval Air Weapons Station China Lake Public Land Withdrawal, Review Period Ends: 10/05/2015, Contact: Teresa Bresler 619–532–4452.

EIS No. 20150248, Draft, USAF, AK, United States Air Force F–35A Operational Beddown—Pacific, Comment Period Ends: 10/19/2015, Contact: Toni Ristau 907–377–2116.

EIS No. 20150249, Final Supplement, BOEM, LA, Gulf of Mexico OCS Oil and Gas Lease Sales: 2016 and 2017, Central Planning Area Lease Sales 241 and 247, Eastern Planning Area Lease Sale 226, Review Period Ends: 10/05/2015, Contact: Gary D. Goeke 504–736–3233.

EIS No. 20150250, Draft, USFS, WV, 2016–2020 Fernow Experimental Forest, Comment Period Ends: 10/19/2015, Contact: Thomas M. Schuler 304–478–2000.

EIS No. 20150251, Draft, NOAA, USFWS, MI, PROGRAMMATIC—Restoration Resulting from the Kalamazoo River Natural Resource Damage Assessment, Comment Period Ends: 10/19/2015, Contact: Julie Sims 734–741–2385. The U.S. Department of the Interior's Fish and Wildlife Service and the U.S. Department of Commerce's National Oceanic and Atmospheric Administration are joint lead agencies for the above project.

EIS No. 20150252, Final, USFWS, CO, Rocky Mountain Arsenal National Wildlife Refuge, Review Period Ends: 10/05/2015, Contact: Bernardo Garza 303–236–4377.

Amended Notices

EIS No. 20150177, Draft, NHTSA, REG, Phase 2 Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Comment Period Ends: 10/01/2015, Contact: James MacIsaac 202–366–9108 Revision to the FR Notice Published 06/26/2015; Extending the Comment Period from 08/31/2015 to 10/01/2015.

Dated: September 1, 2015.

Karin Leff,

Acting Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 2015–22019 Filed 9–3–15; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

[FRL–9927–86–OEI]

Cross-Media Electronic Reporting: Authorized Program Revision Approval, State of Hawaii

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice.

SUMMARY: This notice announces EPA's approval of the State of Hawaii's request to revise/modify certain of its EPA-authorized programs to allow electronic reporting.

DATES: EPA's approval is effective September 4, 2015.

FOR FURTHER INFORMATION CONTACT: Karen Seeh, U.S. Environmental Protection Agency, Office of Environmental Information, Mail Stop 2823T, 1200 Pennsylvania Avenue NW., Washington, DC 20460, (202) 566–1175, *seeh.karen@epa.gov.*

SUPPLEMENTARY INFORMATION: On October 13, 2005, the final Cross-Media Electronic Reporting Rule (CROMERR) was published in the **Federal Register** (70 FR 59848) and codified as part 3 of title 40 of the CFR. CROMERR establishes electronic reporting as an acceptable regulatory alternative to paper reporting and establishes requirements to assure that electronic documents are as legally dependable as their paper counterparts. Subpart D of CROMERR requires that state, tribal or local government agencies that receive, or wish to begin receiving, electronic reports under their EPA-authorized programs must apply to EPA for a revision or modification of those programs and obtain EPA approval. Subpart D provides standards for such approvals based on consideration of the electronic document receiving systems that the state, tribe, or local government will use to implement the electronic reporting. Additionally, § 3.1000(b) through (e) of 40 CFR part 3, subpart D provides special procedures for program revisions and modifications to allow electronic reporting, to be used at the option of the state, tribe or local government in place of procedures available under existing program-specific authorization regulations. An application submitted under the subpart D procedures must show that the state, tribe or local government has sufficient legal authority to implement the electronic reporting components of the programs covered by the application and will use electronic document receiving systems that meet the applicable subpart D requirements.

On July 23, 2015, the Hawaii Department of Health (HI DOH) submitted an application titled ''State & Local Emissions Inventory'' for revisions/modifications to its EPA-approved programs under title 40 CFR to allow new electronic reporting. EPA reviewed HI DOH's request to revise/modify its EPA-authorized programs and, based on this review, EPA determined that the application met the standards for approval of authorized program revisions/modifications set out in 40 CFR part 3, subpart D. In accordance with 40 CFR 3.1000(d), this notice of EPA's decision to approve Hawaii's request to revise/modify its following EPA-authorized programs to allow electronic reporting under 40 CFR parts 51, and 70 is being published in the **Federal Register**:

NOTICE OFAVAILABILITY
UNITED STATES AIR FORCE F-35A OPERATIONAL BEDDOWN - PACIFIC
DRAFT ENVIRONMENTAL IMPACT STATEMENT

The United States Air Force has prepared a Draft Environmental Impact Statement (DEIS) in accordance with the National Environmental Policy Act. The Secretary of the Air Force identified two alternatives for analysis: the Proposed Action Alternative and a No-Action Alternative. The Proposed Action Alternative would beddown two F-35A squadrons (48 primary assigned aircraft and 6 backup aircraft) at Eielson Air Force Base (AFB), while maintaining the existing 354th Fighter Wing missions and other tenant organizations. Under the No-Action Alternative, no F-35A aircraft would be assigned to Eielson AFB, but all current missions would continue; currently scheduled construction, not related to the F-35As, would be completed.

A 45-day review and public comment period for the Draft EIS was initiated when the Notice of Availability was announced in the *Federal Register* on September 4, 2015. The Draft EIS is available for download from the project website at www.pacaf-f35aeis.com. The public comment period will end on October 20, 2015.

On September 21, 22, and 23, public hearings will be held from 6:00 to 9:30 p.m. There will be an open house between 6:00 and 6:30 p.m., where Air Force personnel will be available to answer questions about the proposal and DEIS. The formal public hearing begins at 6:30 p.m. After a brief presentation to provide the results outlined in the Draft EIS, public comments pertaining to the environmental analysis and findings presented in the DEIS will be taken. A stenographer will record the formal public hearing. If all commentors have had an opportunity to comment, the Hearing Officer may adjourn the meeting before 9:30 p.m.

City/Town	***Date***	***Location***
North Pole, Alaska	September 21, 2015	North Pole Middle School, Auditorium 300 E 8th Ave
Delta Junction, Alaska	September 22, 2015	Delta High School, Small Gym 1655 N Clearwater Rd
Fairbanks, Alaska	September 23, 2015	West Valley High School, Auditorium 3800 Geist Rd

Comments (written and oral) can be presented at any of the hearings. During the 45-day review and comment period, comments also can be sent via U.S. Postal Service to F-35A Pacific Basing EIS, 354 FW/PA, 354 Broadway Avenue, Suite 15A, Eielson AFB, AK 99702 or electronically submitted via the project website at www.pacaf-f35aeis.com. Written, oral, and electronic comments will be considered equally, but to ensure inclusion in the Final EIS, all comments must be submitted by October 20, 2015.

PUBLIC HEARINGS
UNITED STATES AIR FORCE F-35A OPERATIONAL BEDDOWN - PACIFIC
DRAFT ENVIRONMENTAL IMPACT STATEMENT

Public hearings will be held on September 21, 22, and 23 for the F-35A Operational Beddown Draft Environmental Impact Statement (EIS). All hearings will be held from 6:00 to 9:30 p.m. There will be an open house between 6:00 to 6:30 p.m., where Air Force personnel will be available to answer questions about the proposal and Draft EIS. The formal public hearing begins at 6:30 p.m. After a brief presentation outlining the Draft EIS findings, public comments pertaining to the environmental analysis and findings will be taken. A stenographer will record the formal public hearing. If all commentors have had an opportunity to comment, the Hearing Officer may adjourn the hearing before 9:30 p.m.

City/Town	***Date***	***Location***
North Pole, Alaska	September 21, 2015	North Pole Middle School, Auditorium 300 E 8th Ave
Delta Junction, Alaska	September 22, 2015	Delta High School, Small Gym 1655 N Clearwater Rd
Fairbanks, Alaska	September 23, 2015	West Valley High School, Auditorium 3800 Geist Rd

Comments (written and oral) can be presented at any of the hearings. Throughout the 45-day review and comment period, comments also can be sent via U.S. Postal Service to F-35A Pacific Basing EIS, 354 FW/PA, 354 Broadway Avenue, Suite 15A, Eielson AFB, AK 99702 or electronically submitted via the project website at www.pacaf-f35aeis.com. Written, oral, and electronic comments will be considered equally, but to ensure inclusion in the Final EIS, all comments must be submitted by October 20, 2015.

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Appendix B: Stakeholder Mailing List

Prefix	First	Last	Organization Name	Address	City	State	Zip
Governor	Bill	Walker	State of Alaska	P.O. Box 110001	Juneau	AK	99811
Congressman	Don	Young	Alaska Representative	4241 B Street, Ste 203	Anchorage	AK	99503
Senator	Daniel S.	Sullivan		101 12th Avenue, Suite 328	Fairbanks	AK	99701
Senator	Lisa	Murkowski	Alaska Senator	510 L Street, Suite 600	Anchorage	AK	99501
Ms.	Pamela	Day	Congressman Don Young Office	2111 Rayburn House Office Building	Washington	DC	20515
Mr.	Chad	Padgett	Congressman Don Young Office	4241 B Street, Ste 203	Anchorage	AK	99503
Ms.	Amy	Erickson	Senator Lisa Murkowski Office	510 L Street, Suite 600	Anchorage	AK	99501
Mr.	Edward	Hild	Senator Lisa Murkowski Office	709 Hart Senate Office Building	Washington	DC	20515
Mr.	Patrick	Flynn	Anchorage Assembly Chair	632 W. 6th Ave., Ste. 250	Anchorage	AK	99501
			Anchorage Assembly Members	632 W. 6th Ave., Ste. 250	Anchorage	AK	99501
Senator	Click	Bishop	Alaska State Legislature	State Capitol, Room 115	Juneau	AK	99801
Senator	John	Coghill	Alaska State Legislature	301 Santa Claus Lane, North Pole Plaza Mall, Ste. 3B	North Pole	AK	99705
Senator	Pete	Kelly	Alaska State Legislature	State Capitol, Room 516	Juneau	AK	99801
Representative	Gabrielle	LeDoux	Alaska State Legislature	State Capitol, Room 118	Juneau	AK	99801
Representative	Steve	Thompson	Alaska State Legislature	1292 Sadler Way, Ste. 308	Fairbanks	AK	99701
Representative	Pete	Higgins	Alaska State Legislature	State Capitol, Room 424	Juneau	AK	99801
Representative	Tammie	Wilson	Alaska State Legislature	301 Santa Claus Lane, North Pole Plaza Mall, Ste. 3B	North Pole	AK	99705
Representative	Scott	Kawasaki	Alaska State Legislature	1292 Sadler Way, Ste. 308	Fairbanks	AK	99701
Representative	Doug	Isaacson	Alaska State Legislature	State Capitol, Room 13	Juneau	AK	99801
Representative	David	Guttenberg	Alaska State Legislature	1292 Sadler Way, Ste. 304	Fairbanks	AK	99701
Representative	David	Talerico	Alaska State Legislature	State Capitol, Room 104	Juneau	AK	99801
Mayor	John	Eberhart	City of Fairbanks	800 Cushman Street	Fairbanks	AK	99701
Mayor	Pete	Hallgren	City of Delta Junction	P.O. Box 1625	Delta Junction	AK	99737
Mayor	Merrill	Sanford	City/Borough of Juneau	155 S. Seward Street	Juneau	AK	99801
Mayor	Bryce	Ward	City of North Pole	125 Snowman Lane	North Pole	AK	99705
Mayor	Virgie	Thompson	City of Houston	P.O. Box 940027	Houston	AK	99694
Mayor	Luke	Hopkins	Fairbanks North Star Borough	809 Pioneer Road, P.O. Box 71267-1267	Fairbanks	AK	99701

Prefix	First	Last	Organization Name	Department Name	City	State	Zip
			EIS Review Coordinator	USEPA Region 10	Seattle	WA	98101
Ms.	Karen	Kelleher	Bureau of Land Management	Anchorage District Office	Anchorage	AK	99507
Mr.	Alan	Bittner	Bureau of Land Management	Anchorage Field Office	Anchorage	AK	99507
Mr.	Brad	Smith	NMFS	Protected Resources Division	Anchorage	AK	99513
Ms.	Barbara	Mahoney	NMFS	Habitat Conservation Division	Anchorage	AK	99513
Ms.	Kristin	K'eit	USDOI - Bureau of Indian Affairs		Anchorage	AK	99503
Mr.	Eugene	Virden	USDOI - Bureau of Indian Affairs		Juneau	AK	99802
Mr.	Philip	Johnson	USDOI	Environmental Policy and Compliance	Anchorage	AK	99501
Mr.	Herbert C.	Frost	USDOI - National Park Service	Alaska Regional Office	Anchorage	AK	99501
			U.S. Army Corps of Engineers	Alaska District	Joint Base Elmendorf-Richardson	AK	99506
Mr.	Robert	Bouchard	U.S. Department of Transportation	Maritime Administration	Washington	DC	20590
Ms.	Sandra	Garcia-Aline	U.S. Department of Transportation	Federal Highway Administration	Juneau	AK	99802
Mr.	Bob	Lewis	U.S. Department of Transportation	Federal Aviation Administration	Anchorage	AK	99513
Mr.	Richard	Krochalis	U.S. Department of Transportation	Federal Transit Administration, Region 10	Seattle	WA	98174
Ms.	Jennifer	Curtis	U.S. Environmental Protection Agency	Region 10	Anchorage	AK	99513
Ms.	Dianne	Soderlund	U.S. Environmental Protection Agency	Region 10	Anchorage	AK	99513
Mr.	Lor	Socheata	U.S. Fish and Wildlife Service	Anchorage Fish and Wildlife Field Office	Anchorage	AK	99501
Mr.	Geoffrey	Higgins	U.S. Fish and Wildlife Service	Alaska Regional Office	Anchorage	AK	99503
Mr.	Larry	Hartig	Alaska Department of Environmental Conservation		Juneau	AK	99801
Ms.	Alice	Edwards	ADEC - Air Quality		Juneau	AK	99801
Ms.	Kristin	Isaacson	ADEC - Spill Prevention		Juneau	AK	99801
Ms.	Michelle	Hale	ADEC - Water		Juneau	AK	99801
Brigadier General	Leon "Mike"	Bridges	Alaska Department of Military and Veterans Affairs		Joint Base Elmendorf-Richardson	AK	99505
Ms.	Judith	Bittner	Alaska Department of Natural Resources	Office of History and Archaeology	Anchorage	AK	99501
Ms.	Claire	LeClair	Alaska Department of Natural Resources	Parks and Outdoor Recreation	Anchorage	AK	99501
Mr.	Brent	Goodrum	Alaska Department of Natural Resources	Division of Mining, Land, and Water	Anchorage	AK	99501
Mr.	Marty	Rutherford	Alaska Department of Natural Resources	Office of the Commissioner	Anchorage	AK	99501
Mr.	Robert	Campbell	Alaska Department of Transportation	Central Region	Anchorage	AK	99519
Mr.	John	Parrott	Alaska DOT Ted Stevens Anchorage International Airport		Anchorage	AK	99519
Mr.	William	O'Leary	Alaska Railroad Corporation		Anchorage	AK	99510
Mr.	Jim	Dodson	Fairbanks Economic Development Corporation		Fairbanks	AK	99701
Mr.	Pete	Lewis	Fairbanks-North Star Borough School District		Fairbanks	AK	99701
Mr.	Tim	Jonese	Doyon Utilities		Fairbanks	AK	99701
			Era Helicopters LLC		Anchorage	AK	99502
Mr.	Tom	George	Aircraft Owners and Pilots Association		Frederick	MD	21701
Ms.	Deb	Hickok	Fairbanks Convention and Visitors Bureau		Fairbanks	AK	99701
Mr.	Jesse	VanderZanden	Fairbanks International Airport		Fairbanks	AK	99709
Mr.	Jack	Hebert	Cold Climate Housing Research Center		Fairbanks	AK	99709
Ms.	Joan	Frankevich	National Parks Conservation Association	Alaska Regional Office	Anchorage	AK	99501
			Greater Fairbanks Chamber of Commerce		Fairbanks	AK	99701
Ms.	Nadine	Winters	North Pole Economic Development Corporation		North Pole	AK	99705
	Brian	Ochs	Federal Aviation Administration	Alaskan Region	Anchorage	AK	99513
Ms.	Katherine	Kerr	Advisory Council on Historic Preservation		Washington	DC	20001

First	Last	Title	Organization Name	Address	City	State	Zip
Aaron	Schutt	President	Doyon Limited	1 Doyon Place, Suite 300	Fairbanks	AK	99701
Rene	Nicklie	President	Native Village of Cantwell	P.O. Box 94	Cantwell	AK	99729
Fred	Stevens	First Chief	Native Village of Eagle (IRA)	P.O. Box 19	Eagle	AK	99738
Mary	Narygandoa	First Chief	Venetie Village Council	P.O. Box 81119	Venetie	AK	99781
Donald	Charlie	Tribal Chief	Nenana Traditional Council	P.O. Box 356	Nenana	AK	99760
Curtis	Sommer	Chairperson	Native Village of Tanana	P.O. Box 130	Tanana	AK	99777
Roberta	Hamilton	President	Village of Dot Lake	P.O. Box 2279	Dot Lake	AK	99737

Organization Name	Address	City	State	Zip
Alaska Resources Library and Information Services (ARLIS)	3211 Providence Drive, #111	Anchorage	AK	99508
Alaska State Court Law Library	303 K Street	Anchorage	AK	99501
Alaska State Library and Historical Collections	333 Willoughby Avenue	Juneau	AK	99811
Delta Junction Library	2291 Deborah Street	Delta Junction	AK	99737
Eielson AFB Library	2518 Central Avenue	Eielson AFB	AK	99702
Elmer E. Rasmuson Library	310 Tanana Loop	Fairbanks	AK	99775
Fairbanks North Star Bureau/Noel Wien Library	215 Cowles Street	Fairbanks	AK	99701
Fairbanks Law Library	101 Lacey Street	Fairbanks	AK	99701
North Pole Branch Library	656 North Pole High School Boulevard	North Pole	AK	99705

SCOPING

First	Last	Organization	Address	City	State	Zip
North Pole Alaska, March 24, 2015						
Patty	Keys		3371 Fernwood Avenue	North Pole	AK	99705
Doug	Isaacson		1003 Shirleytrend	North Pole	AK	99705
Daniel	Stimpfel		2030 My Ct	North Pole	AK	99705
Christina	Nelson		FNSB 809 Pioneer Road	Fairbanks	AK	99701
Kellen	Spillman		FNSB 809 Pioneer Road	Fairbanks	AK	99701
Matt	Ruger		2635 Lancelot Drive West	North Pole	AK	99705
Larry	White		3587 Kaltag Drive	North Pole	AK	99705
Joshua	Loft		709 Badger Road	North Pole	AK	99705
David	Gregoroff		519 W. 5th Avenue	North Pole	AK	99705
Elizabeth	Holm		2454 San Augustin Drive	North Pole	AK	99705
Shelly	Severa		P.O. Box 56418	North Pole	AK	99705
Ricky	Janssen		P.O. Box 57280	North Pole	AK	99705
Hopkins	Luke	Mayor	P.O. Box 71267	Fairbanks	AK	99707
Donald	Trometter		P.O. Box 56056	North Pole	AK	99705
Laura	Evans		3027 VFW Street	North Pole	AK	99705
Rhonda	Bayles	Congressman Young	P.O. Box 84076	Fairbanks	AK	99708
David and Judith	Hastings		2236 Independence Circle East	North Pole	AK	99705
James	Dodson	Fairbanks Economic Development	330 Wendell Avenue, Suite E	Fairbanks	AK	99701
Karl	Gohlke		1840 2nd Avenue	Fairbanks	AK	99701
Carl	Brill		2641 Yakutat Drive	North Pole	AK	99705
Mark	Thomas		P.O. Box 55625	North Pole	AK	99705
Howard A	Otis		6055 St. Nicholas	North Pole	AK	99705
Lori	Axhelm		3415 Moosewalk Road	North Pole	AK	99705
Jerry	Koerner		P.O. Box 56881	North Pole	AK	99705
Tom	George		P.O. Box 83750	Fairbanks	AK	99708
Stu	Sibitzky		3730 Helensdale	North Pole	AK	99705
Jerry	Lymburner		P.O. Box 56797	North Pole	AK	99705
Fairbanks Alaska, March 25, 2015						
Lanien	Livingston		809 Pioneer Road	Fairbanks	AK	99701
Jay	DuVal		P.O. Box 73404	Fairbanks	AK	99707
Susan	Iverson		P.O. Box 10659	Fairbanks	AK	99710
Tom	Moyer		1512 Ithaca Road	Fairbanks	AK	99709
Nadine	Winters		P.O. Box 83272	Fairbanks	Ak	99708
Kellen	Spillman		809 Pioneer Road	Fairbanks	AK	99701
Mike	Wright		867 Senate Drive	Fairbanks	AK	99712
Rick	Sotie		506 Gahaley Road	Fairbanks	AK	99701
Cindy	Walker		P.O. Box 72795	Fairbanks	AK	99707
Roger	Burggraf		830 Sheep Creek Road	Fairbanks	AK	99709
Shawna	Henderson		572 Line Drive	Fairbanks	AK	99709
Ryan	Grimes		325 Eureka Avenue	Fairbanks	AK	99701
Eric	Chase		P.O. Box 84495	Fairbanks	AK	99708
Bill	Brophy		301 Snowy Owl	Fairbanks	AK	99712
Jim	Eddy		314 Iditarod	Fairbanks	AK	99701
Mario	Gotto		64 Pepperdine Drive	Fairbanks	AK	99709
Wolfgang	Kreisman		P.O. Box 8394	Fairbanks	AK	99708
John	Eberhart	Mayor	800 Cushman St.	Fairbanks	AK	99701
Barbara	Sperl		2253 Bridgewater Drive	Fairbanks	AK	99709
Thomas	Hartnell	Golden Valley Electric Association, Inc.	758 Illinois Street	Fairbanks	AK	99701
Steve	Skaggs		13502 Saddlecreek Drive	Louisville	KY	40245
John	MacCheyne		831 Eton Blvd	Fairbanks	AK	99701
Tim	Byrnes		696 Slater Drive	Fairbanks	AK	99701
Patrick	Dolan		1909 Kittiwake Dr., Apt. 5	Fairbanks	AK	99709
Delta Junction Alaska, March 26, 2015						
Gary	Hall		P.O. Box 1481	Delta Junction	AK	99737
Flower	Cole		P.O. Box 568	Delta Junction	AK	99737
Website						
Chad	Hutchison	Senator John Coghill's Office	Capitol Building Rm. 119	Juneau	AK	99801
Lisa	Williamson		111 Charles St.	Fairbanks	AK	99701
Wesley	Madden	Madden Real Estate	1105 Tyrol Street	Fairbanks	AK	99712
Lisa	Herbert	Greater Fairbanks CoC	100 Cushman St., Suite 102	Fairbanks	AK	99701
Joan	Frankevich	National Parks Conservation Association	750 W. 2nd Ave. Suite 205	Anchorage	AK	99587
Adam	White	The Alaska Airmen Association	4200 Floatplane Dr.	Anchorage	AK	99502

HEARINGS

First	Last	Organization	City	State	Zip
North Pole Alaska, September 21, 2015					
David	Prusak	Interior Gas Utilities	Fairbanks	AK	99707
Karl	Kassel	FNSB Assembly	Fairbanks	AK	99709
Buzz	Otis		North Pole	AK	99705
Chris	White		Fairbanks	AK	99707
Jim	Anderson		North Pole	AK	99705
Billy	Blackburn		North Pole	AK	99705
Jim	White		Fairbanks	AK	99701
Thomas and Debra	Rasson		North Pole	AK	99705
Paul and Debbie	Coben		North Pole	AK	99705
Ryan	Grimes		Fairbanks	AK	99701
Frank	Dunekle		North Pole	AK	99705
Eric	Lanser		Salcha	AK	99714
Marilyn and Keith	Fye		North Pole	AK	99705
James	Foster		North Pole	AK	99705
Gene and Hilary	Freeman		Fairbanks	AK	99707
Rolando and Gina	Miranda		North Pole	AK	99705
Sean	Wilson		North Pole	AK	99705
Jeff	Samuel		North Pole	AK	99705
Marie	Thomas		North Pole	AK	99705
Delta Junction Alaska, September 22, 2015					
Cheryl	Helkenn		Delta Junction	AK	99737
Dawn	Grossmann	Rep. Jim Colver	Delta Junction	AK	99737
Mike	Murphy		Delta Junction	AK	99737
Don	Quarbert		Delta Junction	AK	99737
Fairbanks Alaska, September 23, 2015					
Dan	Schmidt	FNSB School District	Fairbanks	AK	99701
Gary	Atwood		Fairbanks	AK	99709
Chris	Miller		Fairbanks	AK	99775
Heather	Koponen		Fairbanks	AK	99709
Ron	Dearborn		Fairbanks	AK	99709
Suzanne	Summerville		Fairbanks	AK	99079
Debra or Mark	Greer		Fairbanks	AK	99709
John and Shirley	Hanghett		Fairbanks	AK	99701
Jerry	Walker		Fairbanks	AK	99709
Jeff	Gregory		Fairbanks	AK	99701
John	Minto		Fairbanks	AK	99712
Kristina	Whitmer		Fairbanks	AK	99701
Rynnieva	Moss		Fairbanks	AK	99711
James	Cruikshank		Fairbanks	AK	99709
Rod	Combellick		Fairbanks	AK	99708
Stan	Halvanser		Fairbanks	AK	99701
Tasha	Thomas		North Pole	AK	99705
Wendell	Shiffler		Fairbanks	AK	99709
Jake	Locd		Salcha	AK	99714
Wesley	Madden		Fairbanks	AK	99701
Nadine	Winters		Fairbanks	AK	99708
Email Request					
Shane	Bennett		Clear	AK	99704
Julie	Morris	Homefire Country Inn	Anderson	AK	99744
Peter	Hallgren	Mayor	Delta Junction	AK	99737

Appendix C: Coordination and Consultation Correspondence

Government-to-Government

Scoping Notification

DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

17 March 2015

Recipient Name
and
Address

SUBJECT: ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE U.S. AIR FORCE F-35A OPERATIONAL BASING – PACIFIC

Dear Mr. Schutt

1. Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and its implementing regulations, the United States Air Force (Air Force) intends to prepare an EIS to analyze the potential impacts on the human environment from the proposed basing of two F-35A operational squadrons at Eielson Air Force Base in Alaska—located in the Pacific Air Forces (PACAF) Area of Responsibility (AOR). The proposed action includes basing two squadrons (48 Primary Assigned Aircraft and 6 Backup Assigned Aircraft) at the base, additional military and civilian personnel, existing facility and infrastructure modifications, and new construction. New/increased aircraft operations would occur at the airfield. As existing special use training airspace can accommodate F-35A training, no new/expanded airspace is proposed. As required by the NEPA, a No-Action Alternative, whereby no F-35A squadrons would be based at Eielson AFB will also be analyzed.

2. The Air Force published a Notice of Intent (NOI) to prepare an EIS in the *Federal Register* initiating the public involvement process. Public scoping meetings will be held in North Pole, Tuesday, March 24, 2015 at the North Pole Worship Center on 3340 Badger Road; in Fairbanks, on March 25, 2015 at the Westmark Hotel and Conference Center, 813 Noble Street; and in Delta Junction, on March 26, 2015 at the Alaska Steakhouse & Motel, 265 Richardson Highway. The meetings will be open-house format, from 6:00 – 8:00 pm each night, with notices published a week before the meetings in local newspapers.

3. We invite your participation at the scoping meetings, but if you cannot attend one of the meetings listed above or would prefer to meet individually, please contact me at 907-377-6101 to arrange a meeting. Comments may also be submitted in writing or on the project website. Written comments should be sent in care of: F-35A Pacific Operational Basing EIS, 354 FW/PA, 354 Broadway Avenue, Suite 15A, Eielson AFB, AK 99702. Please submit comments electronically at www.PACAF-F35Aeis.com. Comments submitted in writing or via the website are given equal consideration.

S/S 17 March 2015

MICHAEL P. WINKER, Colonel, USAF
Commander

Attachment
F-35 Fact Sheet

Government-to-Government Coordination

GOVERNMENT-TO-GOVERNMENT COORDINATION

In accordance with Section 106 of the National Historic Preservation Act (36 Code of Federal Regulations Part 800.3), the Native American Graves Protection and Repatriation Act, and Executive Order #13007, federally-recognized Alaska Native Tribes were sent a letter on August 13, 2015. The letters included information on the basing action, alternatives considered, and a request asking whether they wanted to initiate formal government-to-government consultation on the proposed action. If they wished to meet, they were asked to contact the Eielson AFB Wing Commander.

In mid-October 2015, Eielson AFB contacted representatives of the tribal entities to ascertain whether they had any concerns about the Proposed Action Alternative and if they would like to conduct formal consultation. Table C-1 lists the representatives contacted and their response.

Table C-1. Government-to-Government Consultation Status

Tribe	***Comment***
Aaron Schutt, President Doyon Limited Fairbanks, AK 99701	Jessica Obed stated Doyon had no comments or concerns on 10-22-2015 per phone conversation.
Rene Nicklie, President Native Village of Cantwell Cantwell, AK 99729	10-20-2015 Mr. Arnel requested an e-mail to be forwarded to Rene Nicklie. 10-21-2015 Sent e-mail requesting any concerns.
Fred Stevens, First Chief Native Village of Eagle (IRA) Eagle, AK 99738	10-20-2015 Joan Wallis stated the council had no input on the letter received per phone conversation. Note: Fred Stevens has replaced Bertha Ulzi as Chief, list updated.
Mary Narygandoa, First Chief Venetie Village Council Venetie, AK 99781	10-20-2015 was informed that Mary Narygandoa was new tribal chief and given a contact number and left message.
Donald Charlie, Tribal Chief Nenana Traditional Council Nenana, AK 99760	10-20-2015 Tribal Administrator Cathy Morgan stated the Council had no comments and was for the F-35A beddown per phone conversation.
Curtis Sommer, Chairperson Native Village of Tanana Tanana, AK 99777	10-20-2015 Curtis Sommer had no negative concerns and was for the F-35A beddown per phone conversation.
Tracy Charlie Smith, President Village of Dot Lake Dot Lake, AK 99737	10-20-2015 Left message for President Tracy Charlie Smith. 10-21-2015 Smith replied no concerns per e-mail reply.
John Soloman, First Chief Circle Native Community Circle, AK 99733	10-22-2015 Jessica Fields stated the Council had no comments or concerns regarding the F-35A beddown per phone conversation.
Stephanie Herbert, First Chief Chalkyitsik Village Council Chalkyitsik, AK 99788	10-20-2015 unable to contact. Continuing to pursue.
Daren Gene, President Native Village of Gakona Gakona, AK 99586	10-20-2015 left phone message with clerk. Village is moose hunting at this time. 10-22-2015 left phone message with clerk.
Larry Sinyon, President Cheesh-Na Tribal Council Chistochina, AK 99586	10-20-2015 sent documents via e-mail for review.

DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

AUG 1 3 2015

Colonel Michael P. Winkler, USAF
Commander
354th Fighter Wing
354 Broadway Street Unit 19A
Eielson AFB AK 99702-1899

Recipient Name
and
Address

Dear Ms. Hamilton

The Air Force is proposing to base up to two squadrons of F-35A aircraft at Eielson Air Force Base (AFB) by early calendar year 2021. The action would base up to 54 aircraft and add approximately 2,765 military and civilian personnel, contractors, and dependents to the existing base population. On base, construction would occur adjacent to the runway to support aircraft operations and maintenance, on Quarry Hill for munitions igloos, and a new dorm to accommodate increased unaccompanied personnel. There would be an increase of aircraft operations at the airfield. Off base, operations in the northern portion of the Joint Pacific Alaska Range Complex (JPARC) airspace would also increase. No new or expanded special use airspace is proposed under this action, as the existing JPARC airspace configuration adequately supports F-35A training for combat readiness. F-35A pilots would strictly adhere to all aircraft avoidance areas, altitude restrictions, and seasonal adjustments specified in the JPARC airspace; and munitions use would be restricted to existing air-to-ground military training ranges underneath JPARC airspace. No construction would occur in areas underlying the airspace. Please see the attached summary for more detailed information covering the proposal.

An Environmental Impact Statement (EIS) is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 and the Council on Environmental Quality (CEQ) regulations implementing NEPA (40 Code of Federal Regulations [CFR] 1500-1508) and Air Force NEPA regulations at 36 CFR Part 989. As a part of the NEPA process, Government-to-government consultation with federally-recognized Native American tribal requirements is required per Executive Order 13175: *Memorandum on Government-to-Government Relations with Native American Tribal Governments*; Department of Defense (DoD) Instruction 4710.02: *DoD Interactions with Federally-Recognized Tribes*; and Air Force Instruction (AFI) 90-2002: *Air Force Interactions with Federally-Recognized Tribes*. In addition, consultations are being conducted in accordance with the National Historic Preservation Act (NHPA) and regulations at 36 CFR Part 800.

in detail with you, and would also like hear from you regarding any comments, concerns, and suggestions you may have.

If you wish to meet with me to discuss the F-35A proposal as well as your concerns about the effects on your interests if this proposal is implemented, I invite you to call me at (907) 377-6101 to arrange a meeting.

Sincerely

s/s

MICHAEL P. WINKER, Colonel, USAF
Commander

Attachment:
Summary of the Proposal

Introduction

During the 1980s, the United States (U.S.) Air Force assessed its tactical capabilities against projected threats and determined a multirole aircraft deficiency would emerge in the near future. Such a deficiency could jeopardize the United States' ability to ensure its forces have the freedom of action to conduct operations against opposing forces. As a result, the Air Force developed a strategy to modernize the aging inventory of legacy aircraft with an almost all-stealth fighter force by 2025. This began with the F-22 Raptor in the early 1990s. In 1993, the Joint Advanced Strike Technology Program was established to define and develop a common joint strike fighter airframe that would fill multiple combat roles and meet the growing sophistication of enemy defense systems. In 1994, the U.S. Congress and the Department of Defense (DoD) determined the Joint Strike Fighter (JSF) (or F-35 Lightning II) would be developed to replace and supplement Air Force legacy fighter and attack aircraft such as the F-16 Fighting Falcon and A-10 Thunderbolt II.

The F-35 is a supersonic, single seat, single-engine, all weather fighter aircraft capable of performing and surviving combat missions. The F-35 is capable of speeds up to Mach 1.5 and can employ air-to-ground, air-to-air, and guided weapons from an internal weapons bay. The Air Force F-35A version also possesses a 25-millimeter cannon for close air support and anti-armor missions. It also employs defensive countermeasures such as flares, although its stealth characteristics may reduce the need for such measures.

The Air Force has begun the strategic basing process for this unique aircraft and has identified installations to receive the first F-35A beddowns. Pilot training and operational testing for the F-35A is already established at Eglin Air Force Base (AFB) in Florida, Edwards AFB in California, Nellis AFB in Nevada, and at Luke AFB in Arizona. Two basing locations already have been identified to support operational squadrons: Hill AFB in Utah (Ops #1), where aircraft will start arriving in 2015 and 2) Burlington National Guard Station in Vermont (Ops #3), which is scheduled to receive F-35As in 2020. Under this Proposed Action, the second operational (Ops #2) F-35A beddown is planned in the Pacific Air Forces (PACAF) Area of Responsibility (AOR). This beddown proposal consists of basing two F-35A squadrons, with the first aircraft scheduled for delivery in 2019. The Environmental Impact Statement (EIS) analyzes the impacts associated with implementing Ops #2 within the PACAF AOR.

Why base the F-35As in the Pacific?

The proposed beddown and operation of the F-35A within the PACAF AOR meets the President and Secretary of Defense's directives to reduce vulnerabilities and provide rapid worldwide deployment. The PACAF F-35A beddown also provides a stabilizing presence within the region by providing efficient and effective response to threats. The purpose of this beddown proposal is to maintain efficient and effective combat capability and mission readiness in the PACAF AOR as the Air Force faces deployments across a spectrum of conflicts while also providing for homeland defense. Beddown and operation of the F-35A at a PACAF AOR base represents a major step toward this goal. This beddown action assures availability of combat-ready pilots in the PACAF AOR flying the most advanced fighter aircraft in the world.

What is the proposed action?

After receiving the decision that Ops #2 would take place in the Pacific, PACAF, Air Combat Command (ACC), and Deputy Assistant Secretary of the Air Force (Installations) Strategic Basing Division undertook an Enterprise-Wide evaluation to identify a suitable location to base the F-35A in the PACAF AOR. All bases considered for basing were U.S. Air Force main operating installations currently supporting the combatant commander for fighter operations. Based on strategic requirements, site survey results, and application of the selection criteria, the Secretary of the Air Force selected Eielson AFB, located in Interior Alaska, as the preferred location for basing the two F-35 squadrons (48 Primary

Assigned Aircraft [PAA] and 6 Backup Aircraft Inventory) in the PACAF AOR. Two alternatives were identified for analysis in the EIS—the no-action and proposed action alternatives.

No-Action Alternative

Per CEQ regulations (40 CFR §1502.14(d)) implementing NEPA, analysis of a No-Action Alternative is required. "No action" means that the Proposed Action (i.e., F-35A beddown) would not take place, and the resulting environmental effects from not taking the action are compared to the effects of implementing the Proposed Action. Under the No-Action Alternative, no F-35 beddown would occur and no on-base construction or personnel increases would be implemented, major flying exercises and routine training would continue to be supported at Eielson AFB.

The 354th Fighter Wing (354 FW) is the host unit at Eielson AFB with the mission to prepare aviation forces for combat, deploy airmen in support of global operations, and enable the staging of forces. To accomplish that mission, the 354 FW implements flying operations, mission support, maintenance, and medical care functions. Located adjacent to the Joint Pacific Alaska Range Complex (JPARC), the largest over land training complex in the U.S., the 345 FW's 18th Aggressor Squadron familiarizes combat-ready forces with the tactics used by potential adversaries. As of December 2014, there were approximately 5,400 military, civilian, contractor, and military dependents supported on base.

Aircraft operating out of Eielson AFB primarily use the northern portion of the JPARC special use airspace and range assets (Figure 1). On average, aircraft operate in the JPARC airspace 240 days a year. Of this total, about 60 days during the spring and summer, support a higher operational tempo that includes Red Flag operations and major flying exercises such as Northern Edge. As mentioned earlier, during this time, aircraft and pilots from other U.S. bases and allied nations would visit to conduct operations and exercises that simulate combat conditions.

Proposed Action Alternative

This alternative would add two squadrons of F-35As, consisting of 48 PAA, and 6 Backup Aircraft Inventory (i.e., replacement aircraft when a PAA is not in operation) to the existing missions of the 354 FW at Eielson AFB.

Personnel. Basing two F-35A squadrons and associated support and maintenance functions are expected to add 1,563 military and civilian personnel to the base by early calendar year 2021. This date reflects when both squadrons would be fully operational. This and the addition of projected military dependents, would increase the base population to 8,184, or grow by about 51 percent from the No-Action conditions.

Facilities. New and modified infrastructure and facilities would be required at Eielson AFB to support the proposed beddown. Proposed construction, modification, repair, and infrastructure improvements would occur between fiscal years 2016 (FY16) and FY20. Total acreage disturbed, which includes equipment laydown areas, construction clearing/grading, and landscaping, would be approximately 66 acres, of which about 21 acres are newly disturbed (i.e., on areas previously not currently supporting buildings or pavement).

Airfield and Airspace Operations. As with current aircraft operations, F-35As would primarily operate in the northern portion of JPARC airspace, in the Military Operations Areas (MOAs), Air Traffic Control Assigned Airspace (ATCAAs), and Restricted Areas in the immediate vicinity of Eielson AFB. The Proposed Action Alternative would result in the addition of approximately 8,640 sorties per year or 26,106 airfield operations (i.e., takeoffs, landings, and pattern work) to existing base flight activities. Once the beddown is complete, approximately 96 percent of the total airfield operations would occur during the environmental daytime hours (i.e., 7:00 a.m. to 10:00 p.m.). The F-35A airfield operations would result in a 148-percent increase in daytime operations and a 10-percent increase in the overall environmental nighttime operations. Existing standard departure and arrival routes, as well as noise abatement procedures would be used by the F-35A.

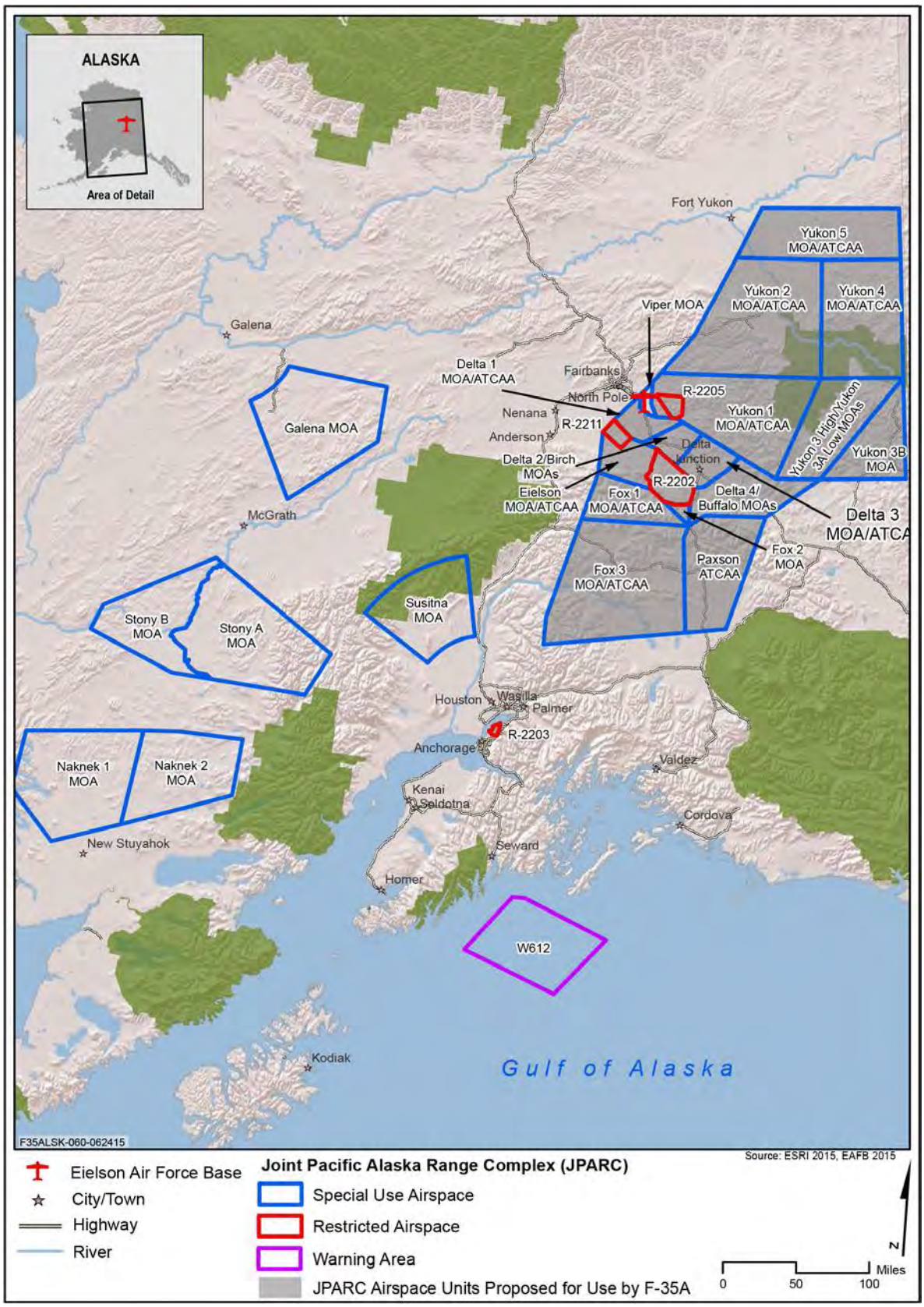


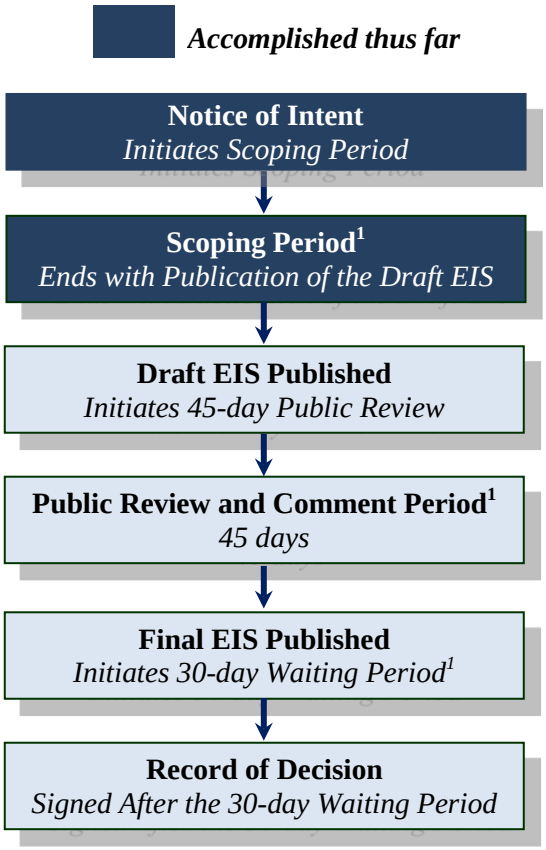
Figure 2.2-3. Joint Pacific Alaska Range Complex

For F-35A operations in JPARC airspace, 99 percent would occur between 7:00 a.m. and 10:00 p.m. (or environmental daytime hours) and less than 1 percent would occur between 10:00 p.m. and 7:00 a.m. (or environmental nighttime hours). Generally, the beddown of F-35A aircraft at Eielson AFB would introduce about 10 percent more operations in northern JPARC airspace.

Overview of the National Environmental Policy Act

The National Environmental Policy Act (NEPA) is the national charter for promoting productive harmony between man and the environment and minimizing the impacts of federal actions. This law requires all federal agencies to consider potential environmental impacts in making decisions about those actions. Public involvement is an essential part of the process. Through involving the public and completing detailed environmental analysis, the NEPA process helps the decision maker arrive at the best possible informed decision.

Informed decisions are based on a candid and factual presentation of environmental impacts. We are seeking public input and any suggestions the public might have for the basing proposal. To accomplish the environmental analysis, the Air Force is collecting data, conducting research, and analyzing potential effects of the proposed action and alternatives on the affected environment. Resources such as airspace management, air quality, noise, and biological and cultural resources are being examined. The type and extent of impacts resulting from the proposed basing is being identified and the degree to which these impacts might potentially affect resources are being analyzed and presented in the Environmental Impact Statement (EIS). Both the draft and final EIS will be available for public review and comment.



[1]Opportunities for public involvement

Scoping for this EIS began with publication of the Notice of Intent (NOI) in the Federal Register on March 5, 2015. During scoping, the Air Force held meetings in North Pole, Fairbanks, and Delta Junction. During scoping, issues of concern included noise generated at the airfield by low-altitude aircraft, and in the airspace by higher-altitude aircraft creating sonic booms; the effects of noise to humans, wildlife, livestock, and quality of life; increased air emissions further deteriorating North Pole air quality; increased wildland fire danger from ordnance in the Delta Junction area; the effects of aircraft-generated noise on recreating in the state and national parks; and how increased military air traffic could impact civil aviation in the region.

Comments also included requests for a detailed narrative as well as tabular information on airspace use; to include complete source/reference information and internet hyperlinks for all pertinent operational sideboards; provide maps showing the MOA boundaries overlaid on conservation system unit boundaries; convenient means of comparing alternatives and related impacts; describe the potential impacts to the natural soundscape; especially consider special use areas under or near MOAs; use appropriate metrics to analyze the acoustic environment for noise sensitive areas; evaluate potential impacts to subsistence; and analyze impacts on any federally listed species.

The next opportunity for public involvement follows publication of the Draft EIS, anticipated in the Fall of 2015.

Agencies

Scoping Notification

First	Last	Organization Name	Department Name	City	State
		EIS Review Coordinator	USEPA Region 10	Seattle	WA
Karen	Kelleher	Bureau of Land Management	Anchorage District Office	Anchorage	AK
Alan	Bittner	Bureau of Land Management	Anchorage Field Office	Anchorage	AK
Brad	Smith	NMFS	Protected Resources Division	Anchorage	AK
Barbara	Mahoney	NMFS	Habitat Conservation Division	Anchorage	AK
Kristin	K'eit	USDOI - Bureau of Indian Affairs		Anchorage	AK
Eugene	Virden	USDOI - Bureau of Indian Affairs		Juneau	AK
Philip	Johnson	USDOI	Environmental Policy and Compliance	Anchorage	AK
Herbert C.	Frost	USDOI - National Park Service	Alaska Regional Office	Anchorage	AK
		U.S. Army Corps of Engineers	Alaska District	Joint Base Elmendorf-Richardson	AK
Robert	Bouchard	U.S. Department of Transportation	Maritime Administration	Washington	DC
Sandra	Garcia-Aline	U.S. Department of Transportation	Federal Highway Administration	Juneau	AK
Bob	Lewis	U.S. Department of Transportation	Federal Aviation Administration	Anchorage	AK
Richard	Krochalis	U.S. Department of Transportation	Federal Transit Administration, Region 10	Seattle	WA
Jennifer	Curtis	U.S. Environmental Protection Agency	Region 10	Anchorage	AK
Dianne	Soderlund	U.S. Environmental Protection Agency	Region 10	Anchorage	AK
Lor	Socheata	U.S. Fish and Wildlife Service	Anchorage Fish and Wildlife Field Office	Anchorage	AK
Geoffrey	Higgins	U.S. Fish and Wildlife Service	Alaska Regional Office	Anchorage	AK
Larry	Hartig	Alaska Department of Environmental Conservation		Juneau	AK
Doreen	Parker-McNeill	Alaska Department of Fish and Game	Regional Supervisor	Fairbanks	AK
Alice	Edwards	ADEC - Air Quality		Juneau	AK
Kristin	Isaacson	ADEC - Spill Prevention		Juneau	AK
Michelle	Hale	ADEC - Water		Juneau	AK
Leon "Mike"	Bridges	Alaska Department of Military and Veterans Affairs		Joint Base Elmendorf-Richardson	AK
Judith	Bittner	Alaska Department of Natural Resources	Office of History and Archaeology	Anchorage	AK
Claire	LeClair	Alaska Department of Natural Resources	Parks and Outdoor Recreation	Anchorage	AK
Brent	Goodrum	Alaska Department of Natural Resources	Division of Mining, Land, and Water	Anchorage	AK
Marty	Rutherford	Alaska Department of Natural Resources	Office of the Commissioner	Anchorage	AK
Robert	Campbell	Alaska Department of Transportation	Central Region	Anchorage	AK
John	Parrott	Alaska DOT Ted Stevens Anchorage International Airport		Anchorage	AK
William	O'Leary	Alaska Railroad Corporation		Anchorage	AK
Jim	Dodson	Fairbanks Economic Development Corporation		Fairbanks	AK
Pete	Lewis	Fairbanks-North Star Borough School District		Fairbanks	AK
Tim	Jonese	Doyon Utilities		Fairbanks	AK
		Era Helicopters LLC		Anchorage	AK
Tom	George	Aircraft Owners and Pilots Association		Frederick	MD
Deb	Hickok	Fairbanks Convention and Visitors Bureau		Fairbanks	AK
Jesse	VanderZanden	Fairbanks International Airport		Fairbanks	AK
Jack	Hebert	Cold Climate Housing Research Center		Fairbanks	AK
Joan	Frankevich	National Parks Conservation Association	Alaska Regional Office	Anchorage	AK
		Greater Fairbanks Chamber of Commerce		Fairbanks	AK
Nadine	Winters	North Pole Economic Development Corporation		North Pole	AK
Brian	Ochs	Federal Aviation Administration	Alaskan Region	Anchorage	AK
Katherine	Kerr	Advisory Council on Historic Preservation		Washington	DC

DEPARTMENT OF THE AIR FORCE
AIR FORCE CIVIL ENGINEER CENTER
JOINT BASE SAN ANTONIO LACKLAND TEXAS

March 13, 2015

Mr. J. Dale Clark
Air Force NEPA Division (AFCEC/CZN)
2261 Hughes Ave, Suite 155
Lackland AFB, TX 78235-9853

Agency Address Here

Dear Stakeholder Name:

The United States Air Force (Air Force) is preparing an Environmental Impact Statement (EIS) to analyze the potential impacts on the human environment from the proposed basing of two F-35A operational squadrons at Eielson Air Force Base, Alaska. The proposed action includes basing two squadrons (48 Primary Assigned Aircraft and six Backup Assigned Aircraft) at the base, additional military and civilian personnel, existing facility and infrastructure modifications, and new construction. New/increased aircraft operations would occur at the airfield. Existing special use airspace in the region can accommodate F-35A proficiency maintenance and training; no new/expanded airspace is proposed. As required by the NEPA, a No-Action Alternative will also be addressed. The attached F-35 Factsheet provides additional information on the proposal and the EIS process.

The Air Force published a Notice of Intent in the *Federal Register* on Mar 5, 2015 to prepare an EIS, initiating the public involvement process. Public scoping meetings will be held in North Pole on March 24, 2015 at the North Pole Worship Center, 3340 Badger Road; in Fairbanks on March 25, 2015 at the Westmark Hotel and Conference Center, 813 Noble Street; and in Delta Junction on March 26, 2015 at the Alaska Steakhouse & Motel, 265 Richardson Highway. The meetings will be open-house style, from 6:00 – 8:00 pm each night. The purpose of the meetings and the Scoping Period is to solicit comments on the scope of environmental issues to be addressed in the EIS.

We request your participation and solicit your scoping comments on this action. Though comments will be accepted throughout the EIS process, please provide your comments no later than April 17, 2015 to ensure consideration in the Draft EIS. Comments may be submitted on the project web site, www.PACAF-F35Aeis.com, or in writing to: F-35A Pacific Operational Basing EIS, 354 FW/PA, 354 Broadway Avenue, Suite 15A, Eielson AFB, AK 99702. Thank you for your assistance in this matter.

Sincerely,

J. DALE CLARK, PE, GS-14, DAF
Chief, Air Force NEPA Division
Environmental Management Directorate

Attachment:
F-35 Factsheet

Agency Responses during Scoping

United States Department of the Interior

NATIONAL PARK SERVICE
Alaska Region
240 West 5th Avenue, Room 114
Anchorage, Alaska 99501

IN REPLY REFER TO:
1.D (AKRO – EPC))

APR 15 2015

1st Lieutenant Elias Zani
F-35A Pacific Operational Basing EIS
354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Lieutenant Zani:

We appreciate the opportunity to provide scoping comments for the preparation of the Environmental Impact Statement (EIS) for the proposed basing of F-35A aircraft at Eielson Air Force Base (AFB), Alaska, and use of related airspace and ranges. Several units of the National Park Service (NPS) are located proximate to the base or military operating areas (MOA) (Figure 1). These include:

- Denali National Park and Preserve (NPP) approximately 77 miles to the southwest.
- Yukon-Charley Rivers National Preserve (NP) approximately 83 miles to the east.
- Wrangell-St. Elias NPP approximately 155 miles to the southeast.
- Lake Clark NPP approximately 300 miles to the southwest.

Given the proximity of NPS units to Eielson AFB, and because some NPS units in the region are near or below MOAs and Military Training Routes (MTRs), the NPS is concerned that the proposed action has potential to adversely affect NPS-managed public lands.

General Comments

We understand that the U.S. Air Force's (USAF) proposed action is to introduce two new aircraft squadrons (F-35A), potentially phase-out the F-16 and A-10 fleets, and increase use of existing airspace, including increased frequency of daily flights. The Open House Scoping Meeting Materials indicate that the F-35A aircrews would "adhere to all existing military airspace, regulations, avoidance, and seasonal adjustment rules."

To best inform our participation in this EIS process, we encourage the USAF to provide detailed narrative and tabular descriptions of existing uses of the airspace (i.e., No Action Alternative) as well as complete descriptions of how these uses and frequencies would change under each alternative evaluated.

A comprehensive understanding of the existing rules and regulations will be essential to framing our comments on the Draft and Final EISs. We anticipate that the EIS will specifically identify existing airspace rules, regulations, and seasonal adjustment/avoidance windows. Please include complete source/reference information and internet hyperlinks for all pertinent operational sideboards.

The USAF has done an excellent job of conveying highly technical information in plain language in recent environmental documents (e.g., 2012 Joint Pacific Alaska Range Complex [JPARC] EIS and 2007 MTR Environmental Assessment). We offer the following document content and organizational comments in the spirit of further illuminating the differences between alternatives and potential impacts for reviewers without military or aviation backgrounds:

- Please provide at least one set of EIS maps showing the MOA boundaries overlaid on conservation system unit boundaries.

- Please provide a convenient means of comparing alternatives and related impacts. For example, consider ample use of tables throughout the document to present key quantitative differences between alternatives, including the No Action Alternative (e.g., a table comparing the number of flights, aircrafts used, and days per year for each alternative).

Given the increased mission capabilities of the F-35A over existing Eielson-based aircraft and the increased use of existing airspace, the NPS is concerned about potential impacts to the natural soundscape, visitor use and enjoyment of the parks, and subsistence resources and opportunities. The remainder of our comments focus on these concerns.

Potential Impacts to the Natural Soundscape

Natural and cultural sounds are integral components of the suite of resources and values that NPS managers are charged with preserving and restoring. NPS evaluates federal actions which may impact the human and natural environment within our parks with respect to our Organic Act mandates, including "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations." The "scenery" includes the natural soundscape as well as the landscape (NPS Management Policies 2006). NPS Director's Order #47 delegates to parks the responsibility to preserve natural soundscapes and eliminate or mitigate inappropriate noise sources.

The acoustic environment of a national park, like air, water or wildlife, is a valuable resource that can easily be degraded or destroyed by inappropriate sound levels and frequencies. Intrusive sounds are concerning because they can impede management's ability to accomplish the NPS mission of resource protection. National Park visitors come with expectations of seeing, hearing, and experiencing phenomena associated with a specific natural or cultural environment, yet in many cases these environments are increasingly impacted by artificial sounds due to noise associated with aircraft overflights.

Several NPS units – Denali NPP, Wrangell-St. Elias NPP, and Lake Clark NPP – contain designated wilderness areas. The 1964 Wilderness Act directs federal agencies to manage wilderness areas to preserve wilderness character, where qualities of wilderness character include "Natural", "Untrammeled", "Opportunities for Solitude or Primitive and Unconfined Recreation", "Undeveloped", and "Other Features of Value". The addition of human-made noise to a natural soundscape impacts wilderness character by interfering with opportunities for

solitude and primitive recreation. Incorporating these characteristics of human-made noise is crucial when characterizing the acoustic environment in wilderness areas.

For NPS to effectively comment on the soundscape analysis once completed, NPS offers the following comments for consideration as the proposed project moves forward:

1. **Please describe existing and proposed airspace operations over and proximate to NPS units (for all alternatives).** Information of interest to NPS includes the location of flight routes with respect to NPS units, the number of operations, the timing of operations (daily and seasonally), flight elevations above ground level, speed, and type of aircraft.

2. **Please describe and analyze the direct, indirect, connected, and cumulative actions** that would occur as a result of each alternative and the resulting impacts to the acoustic environment at NPS units. Examples of connected actions or indirect effects might include increases in training exercises and aviation traffic at other airports in the vicinity/region, or within Special Use Airspace, MOAs, or on MTRs.

   NPS units under or near MOAs include:

   - Yukon-Charley Rivers NP below the Yukon 4 MOA, Yukon 3 High and Yukon 3A Low MOAs, Yukon 3B MOA, Yukon 1 MOA, and Yukon 2 MOA.
   - Denali NPP below the Susitna MOA.
   - Lake Clark NPP just east of Naknek 2 MOA and just south of Stony A MOA.

   Examples of NPS units under or near MTRs include, but may not be limited to:

   - Yukon-Charley Rivers NP below IR952/VR954, IR953/VR955, IR918/VR936, IR917/VR935.

3. **Please analyze the impact to the acoustic environment at NPS units using appropriate metrics for noise-sensitive areas.** The day-night average sound level (DNL) metric is an energy-based noise averaging metric widely used by the Federal Aviation Administration and the Department of Defense as the primary means for determining noise impacts from aviation activities. However, since DNL is an averaging metric and assumptions regarding impacts from DNL levels are based on community response data, the DNL metric alone is not adequate to capture other characteristics of noise exposure and the impacts to park resources, values, and visitor experience.

   Therefore, NPS strongly recommends the use of audibility-based and "time above" metrics to take into account the duration of aircraft noise events, the number of aircraft noise events, and sound level of events. These metrics correlate better with flight operations than day-night average metrics, which obscure the dynamic range of acoustic events. Other metrics include maximum A-weighted sound levels (L_{max}), sound exposure level (SEL), equivalent sound level (L_{eq}), and number-of-events-above a specified sound level (NA) as described in the Department of Defense Noise Working Group publication *Improving Aviation Noise Planning, Analysis and Public Communication with Supplemental Metrics*[1]. Other analytical

[1] http://www.denix.osd.mil/dnwg/upload/DNWG_Supplemental-Metrics-Report_December-2009.pdf

tools include the incorporation of DNL maps with color shading and flight track maps. These metrics and analyses would also better satisfy the requirements under the National Environmental Policy Act to characterize impacts to the environment in terms of intensity, context and duration (40 CFR 1508.27).

The NPS' Natural Sounds and Night Skies Division (NSNSD) has collected, or is collecting, acoustic monitoring data at several NPS units in the region to characterize existing sound levels, estimate natural ambient sound levels, and identify audible sound sources. A variety of metrics are calculated, including existing and natural ambient sound levels, percent time audible of extrinsic (human-caused) sounds, percent time above key thresholds, hourly exceedance metrics, and dB levels for one-third octave bands. Monitoring data from the following NPS units may be of use in the acoustical analysis and is available upon request:

- Yukon-Charley Rivers NP – 3 sites monitored.
- Denali NPP – 102 deployments in this park (2006 - 2015). 2012 report is publicly available[2].
- Wrangell-St. Elias NPP – 2 sites presently deployed.
- Lake Clark NPP – 1 site monitored in 2009.

4. **Please consider the alternative that most minimizes noise impacts** at NPS units through aircraft technology/design or modifications to flight routes, use of MOAs, altitude, speed, timing, or number of operations.

Potential Impacts to Subsistence

Intrusive sounds may disrupt ecosystems by interfering with the ability of wildlife to communicate, establish territory or find suitable habitat, reproduce, nurture and protect offspring, find prey, and avoid predators. Please evaluate how noise from overflights would impact subsistence resources including, but not limited to, caribou, moose, Dall's sheep, wolves, bears and waterfowl. Additionally, please ensure that the EIS' subsistence analysis uses the most recent community harvest assessment data and subsistence profiles. Since the completion of the 2012 JPARC EIS, updated harvest assessment data has been released for many communities (e.g., Copper Basin communities).

Please analyze the impacts of each alternative on any federally listed species that inhabit NPS units.

Conclusion

The NPS seeks mutually beneficial solutions related to potential impacts associated with the proposed project. We look forward to working with the Air Force during the development of the EIS to develop solutions that respect natural and cultural resource values, healthy ecosystems, cultural landscapes, and public enjoyment of these places, as well as the need to ensure realistic military training and operations.

[2] Betchkal, D. 2013. Acoustic monitoring report, Denali National Park and Preserve – 2012. Natural Resource Data Series NPS/DENA/NRDS—2013/589. National Park Service, Fort Collins, Colorado

We request an informational meeting at your earliest convenience to learn more about the F-35A's capabilities and proposed operations as well as to exchange ideas on preliminary mitigation measures and continuing collaboration. Please contact my office to suggest several dates/times that work well for you and/or your staff.

If you have any questions or if we can be of any further assistance in providing maps, data, or other information, please contact Molly Cobbs, Environmental Protection Specialist, at (907) 644-3535 or molly_cobbs@nps.gov or Dave Rosser, Sr., Northern Hub Aviation Manager, at (907) 455-0646 or david_rosser@nps.gov.

Sincerely,

Herbert C. Frost, Ph.D.
Regional Director

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
ALASKA OPERATIONS OFFICE
Room 537, Federal Building
222 West 7th Avenue, #19
Anchorage, Alaska 99513-7588

April 16, 2015

Eielson AFB Public Affairs Office
354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, Alaska 99702

Dear Sir or Madam:

We have reviewed the Department of the Air Force March 5, 2015 Notice of Intent to prepare an Environmental Impact Statement for United States Air Force F-35A Operational Basing-Pacific (EPA Project #15-022-DOD) in North Pole, Alaska. Our comments (Enclosure 1) are provided pursuant to our authorities under the National Environmental Policy Act, as well as Section 309 of the Clean Air Act. Section 309, independent of NEPA, specifically directs the EPA to review and comment in writing on the environmental impacts associated with all major federal actions. Under our policies and procedures we also evaluate the document's adequacy in meeting NEPA requirements. A copy of EPA's Section 309 Review: The Clean Air Act and NEPA, May 2002 is attached (Enclosure 2).

According to the NOI, the Air Force is proposing to assess the basing of two F-35A squadrons (48 Primary Assigned Aircraft) at Eielson AFB near North Pole, Alaska, as well as the use of related air space and ranges, particularly in the Joint Pacific Alaska Range Complex. This NOI does not identify any potential issues previously identified by the Air Force or stakeholders but does indicate that the scoping process will be used to identify community concerns and local issues to be addressed in the EIS. The NOI also does not indicate what aircraft, if any, would be replaced by the F-35A.

In addition to general information regarding the adequacy of the EIS as required by NEPA and the Council on Environmental Quality regulations, our detailed comments focus on our environmental concerns related primarily to air quality; water quality, including wetlands; hazardous materials and wastes; and management of existing Comprehensive Environmental Response, Compensation and Liability Act Operable Units and potential CERCLA sites. We request that you consider our comments in the development of the Draft EIS.

Thank you for this opportunity to provide comments. If you have any questions, please contact me at (907) 271-6324 or curtis.jennifer@epa.gov.

Sincerely,

Jennifer Curtis, NEPA Reviewer
Environmental Review and Sediment Management Unit

Enclosures

ENCLOSURE 1
DETAILED SCOPING COMMENTS

Purpose and Need
The EIS should include a clear and concise statement of the underlying purpose and need for the proposed project, consistent with the implementing regulations for NEPA.[1] We recommend that this statement be framed broadly to ensure a robust analysis of alternatives.

Alternatives
The EIS should include a range of reasonable alternatives that meet the stated purpose and need for the projects and are responsive to the issues identified during the scoping process. This will ensure that the EIS provides the public and the decision-maker with information that sharply defines the issues and identifies a clear basis for choice among alternatives as required by NEPA. The CEQ recommends that all reasonable alternatives be considered, even if some of them could be outside the capability or the jurisdiction of the agency preparing the EIS for the proposed action[2]. We encourage the development of alternative(s) that will minimize environmental and resource degradation.

Comprehensive Environmental Response, Compensation and Liability Act
Based on our records, Eielson AFB has several identified OUs containing numerous sites, as well as sites not yet assigned to an OU. It is unclear from the NOI if these sites will be affected in any way from the proposed activities. Due to the number of sites, however, as well as the likelihood of undiscovered contaminated soils and/or groundwater in the general project area, we strongly encourage the Air Force to work closely with the Remedial Project Engineer for Eielson AFB (Carolyn Tallant, Air Force Civil Engineering Center, 907-377-1666 or carolyn.tallant@us.af.mil) to ensure that all required steps are taken to comply with the institutional and land use controls prior to any ground disturbance and our Federal Facilities program (Jackie Kramer, EPA Region 10 Remedial Project Manager, 907-271-3541 or kramer.jackie@epa.gov) as results of any sampling become available and if any changes to institutional controls or the CERCLA Records of Decision are contemplated.

Aquatic Resources, Wetlands and Riparian Areas
If the proposed activities will require a Clean Water Act Section 404 permit from the US Army Corps of Engineers, the Clean Water Act Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material require that impacts to aquatic resources be avoided, minimized, and mitigated, in that sequence.[3] In order to effectively coordinate the NEPA process and the Clean Water Act Section 404 permitting process, we recommend that the EIS include information demonstrating compliance with the Guidelines, or how compliance will be achieved, and discussion of least environmentally damaging practicable alternative to aquatic resources.

For unavoidable impacts, compensatory mitigation should be consistent with the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule.[4] The EIS should include a discussion of all mitigation options, including on-site mitigation. For unavoidable losses to aquatic resources, compensatory mitigation should be implemented in advance of the impacts to avoid temporal habitat losses.

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[1] 40 CFR 1502.13
[2] 40 CFR 1502.14
[3] 40 CFR 230
[4] 33 CFR 325 and 332, and 40 CFR 230

To the extent possible, the following information from a draft compensatory mitigation plan should be included in the EIS:

- A description of the resource type and amount that will be provided, the method of compensation, and the manner in which the resource functions of the compensatory mitigation project will address the needs of the ecoregion, physiographic province, or other geographic area of interest.[5]
- A description of the factors considered during the compensatory mitigation project site selection process.[6]
- A description of ecological performance standards that will be used to assess whether the project is achieving its objectives.[7]
- A description of parameters to be monitored in order to determine if the compensatory mitigation project is on track to meet performance standards and if adaptive management is needed.[8]
- Descriptions of the long-term management plan, adaptive management plan, and financial assurances.[9]

To help characterize the affected environment and environmental consequences for aquatic resources, please include the results of any historic or on-going aquatic resource-related survey(s).

Air Quality

To address potential air quality impacts, consider whether project construction, operation, and implementation would result in:

- emission of air pollutants that:
  - cause any adverse impact on air-quality-related values in a federal Class I area or state wilderness area, or
  - create annual emissions greater than the basic Prevention of Significant Deterioration emission thresholds
- any new violation of any state or federal ambient air quality standards;
- interference with the maintenance or attainment of any state or federal ambient air quality standard in the analysis area;
- increases in the frequency or severity of any existing violations of any state or federal ambient air quality standard in the analysis area;
- exposure of nearby populations to increased levels of diesel particulate matter and other air toxics;
- delays in the timely attainment of any standard, interim emission reduction, or other air quality milestone promulgated by the EPA or state air quality agency; or
- exposure of sensitive receptors to substantial pollutant concentrations.

Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, requires each Federal agency to identify and address disproportionately high

[5] 40 CFR 230.94 (c)(2)
[6] 40 CFR 230.94 (c)(3)
[7] 40 CFR 230.95
[8] 40 CFR 230.94 (c)(10)
[9] 40 CFR 230.94 (c)(11-13)

and adverse human health or environmental effects of its programs, policies, and activities on minority populations, low-income populations, and Native American tribes.[10]

To address potential environmental justice concerns, we recommend reviewing CEQ's 1997 "Environmental Justice Guidance under the National Environmental Policy Act."[11] We emphasize addressing the following:

- Develop a Demographic Analysis. Gather geographic and demographic data about the area affected by the proposed action to determine whether minority populations, low-income populations, or Alaska Native tribes[12] are present, and if so whether there may be disproportionately high and adverse human health or environmental effects on these populations.
- Establish baseline conditions. Consult relevant public health data and industry data to establish the potential for multiple or cumulative exposure to human health or environmental hazards in the affected population and historical patterns of exposure to environmental hazards, to the extent such information is reasonably available.[13]
- Characterize/describe the direct, indirect, and cumulative effects of the proposed action within this context. Recognize the interrelated cultural, social, occupational, historical, or economic factors that may amplify the natural and physical environmental effects of the proposed agency action. These factors should include the physical sensitivity of the community or population to particular impacts; the effect of any disruption on the community structure associated with the proposed action; and the nature and degree of impact on the physical and social structure of the community.
- Develop effective public participation strategies. As appropriate, acknowledge and seek to overcome linguistic, cultural, institutional, geographic, and other barriers to meaningful participation, and incorporate active outreach to affected groups. Strategies include: using notices, mailings, fact sheets, briefings, presentations, exhibits, tours, news releases, translations, newsletters, reports, community interviews, surveys, canvassing, telephone hotlines, question and answer sessions, stakeholder meetings, and on-scene information.[14]
- Seek meaningful community representation. Seek to have complete representation of the community as a whole.[15] Recognize that community participation should occur as early as possible if it is to be meaningful. The EIS should describe what was done to inform the communities about the project and the potential impacts it will have on their communities, what input was received from the communities, and how that input was used in the decisions that were made regarding the project.
- Seek tribal representation in the process in a manner that is consistent with the government-to-government relationship between the United States and tribal governments, the federal government's trust responsibility to federally-recognized tribes, and any treaty rights.

We also emphasize CEQ's framework for determining whether environmental effects are disproportionately high and adverse. Consider:

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[10] Executive Order 12898, 3 CFR 859 (1994)

[11] CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act,* December 10, 1997, http://ceq.hss.doe.gov/nepa/regs/ej/justice.pdf.

[12] Includes tribal subsistence and cultural resources/resource usage

[13] Ensure that the resolution of the data used is appropriate for the action. For example, some health disparities may not be visualized at the county level, whereas health planning area, census tract, and/or block group level data may be necessary. Analysis should include data at the highest resolution that still provides statistically significant and valid intercomparisons.

[14] Media and outreach should be conducted in a culturally-appropriate manner. Multiple media will likely be needed if diverse and/or multi-generational communities are affected

[15] For example, diversity of those who participate in meetings should reflect the diversity of the community.

- whether environmental effects are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group; and
- whether the disproportionate impacts occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.[16]

With regard to mitigation, measures for avoidance or minimization of impacts should be considered first. Where avoidance or minimization is not possible, other measures to mitigate impacts should be proposed. Mitigation measures should be developed with input from the affected population.

We recommend including a summary conclusion for the environmental justice analysis, sometimes referred to as an "environmental justice determination." This summary can summarize identified environmental justice concerns and express whether and how impacts have been appropriately avoided, minimized or mitigated. For more information please visit EPA's Environmental Justice Considerations in the NEPA Process webpage, which includes agency guidance, best practices, methodologies, and online tools such as EJ View and NEPAssist.[17]

Children's Health and Safety

Executive Order 13045 on children's health and safety directs that each Federal agency shall make it a high priority to identify and assess environmental health and safety risks that may disproportionately affect children, and shall ensure that its policies, programs, activities, and standards address these risks.[18] Analysis and disclosure of these potential effects is appropriate because some physiological and behavioral traits of children render them more susceptible and vulnerable than adults to health and safety risks. Children may be more highly exposed to contaminants because they generally eat more food, drink more water, and have higher inhalation rates relative to their size. Also, children's normal activities, such as putting their hands in their mouths or playing on the ground, can result in higher exposures to contaminants as compared with adults. Children may be more vulnerable to the toxic effects of contaminants because their bodies and systems are not fully developed and their growing organs are more easily harmed.

Hazardous Materials/Hazardous Waste/Solid Waste

Identify projected hazardous waste types and volumes, and expected storage, disposal, and management plans. Identify any hazardous materials sites within the project's study area and evaluate whether those sites would impact the project in any way.

Cumulative Impacts

Cumulative impacts result when the effects of an action are added to other effects on a resource in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that should be the focus of cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all relevant disturbances since cumulative impacts result from compounding the effects of all

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[16] CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act,* December 10, 1997, http://ceq.hss.doe.gov/nepa/regs/ej/justice.pdf.

[17] EPA, *Environmental Justice Considerations in the NEPA Process,* www.epa.gov/Compliance/nepa/nepaej/index.html

[18] Protection of Children from Environmental Health Risks and Safety Risks, Executive Order 13045, Fed. Reg. 19885-19888, (April 23,1997).

actions over time. The cumulative impacts of an action can be viewed as the total effects on a resource, ecosystem, or human community of that action and all other activities affecting the resource.

Characterize resources, ecosystems and communities in terms of their response to change and capacity to withstand stresses. Focus on resources that are "at risk" or have the potential to be significantly impacted by the proposed project. Delineate and explain the reasoning behind geographic boundary decisions, using natural ecological boundaries to the extent possible. For example, for cumulative aquatic resource impacts, a natural boundary such as a watershed or sub-watershed could be identified for the spatial scope, although an analysis at multiple geographic scales may also be appropriate. Include a determination and explanation for the temporal scope of the analyses.

Trend data, where available, can be used to establish a baseline for the affected resources, project a reasonably foreseeable cumulative baseline for the affected resources, and to predict the environmental effects of the project when added to this baseline.

Mitigation and Monitoring

CEQ's January 14, 2011 guidance on the Appropriate Use of Mitigation and Monitoring addresses establishing, implementing, and monitoring mitigation commitments made during the NEPA process.[19]

Key concepts include:

- Ensuring that mitigation commitments are implemented;
- Monitoring the effectiveness of mitigation commitments;
- Remedying failed mitigation; and
- Involving the public in mitigation planning.

Consider giving special attention to Section II's information on "Monitoring Mitigation Implementation" and "Monitoring the Effectiveness of Mitigation." Inclusion of implementation monitoring information in the EIS, such as identification of responsible parties, mitigation requirements, and enforcement clauses will help to ensure that those commitments are carried through permits or other agreements.

Coordination with Tribal Governments

Executive Order 13175 Consultation and Coordination with Indian Tribal Governments was issued in order to establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, and to strengthen the United States government-to-government relationships with Indian tribes.[20] The EIS should describe the process and outcome of government-to-government consultation between the Air Force and tribal governments, issues that were raised, and how those issues were addressed in the selection of the proposed alternative.

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[19] CEQ, *Memorandum for Heads of Federal Departments and Agencies,* Subject: Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact, January 14, 2011, http://ceq.hss.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf

[20] Consultation and Coordination with Indian Tribal Governments, Executive Order 13175, Fed. Reg. 67249, (November 9, 2000).

ENCLOSURE 2

United States Environmental Protection Agency
Office of Enforcement and Compliance Assurance

July, 1999

EPA's Section 309 Review: The Clean Air Act and NEPA

Office of Federal Activities (2251A)

Quick Reference Brochure

ENVIRONMENTAL REVIEW AND THE CLEAN AIR ACT

The Clean Air Act, a law to prevent pollution of a single environmental medium, contains an unusual provision. That provision is Section 309, which authorizes the Environmental Protection Agency (EPA) to review certain proposed actions of other federal agencies in accordance with the National Environmental Policy Act (NEPA) and to make those reviews public. If the proposing agency (the "lead" agency) does not make sufficient revisions and the project remains environmentally unsatisfactory, EPA may refer the matter to the President's Council on Environmental Quality for mediation. (See **Highlight A**.)

HIGHLIGHT A: Section 309 of the Clean Air Act

(a) The Administrator shall review and comment in writing on the environmental impact of any matter relating to duties and responsibilities granted pursuant to this Act or other provisions of the authority of the Administrator, contained in any (1) legislation proposed by any Federal department or agency, (2) newly authorized Federal projects for construction and any major Federal agency action (other than a project for construction) to which Section 102(2)(C) of Public Law 91-190 [*] applies, and (3) proposed regulations published by any department or agency of the Federal government. Such written comment shall be made public at the conclusion of any such review.

(b) In the event the Administrator determines that any such legislation, action, or regulation is unsatisfactory from the standpoint of public health or welfare or environmental quality, he shall publish his determination and the matter shall be referred to the Council on Environmental Quality.

[*] NEPA (42 *USC* 4332(2)(C) et seq.)

Section 309 originated in 1970, the year in which landmark national legislation created new agencies and new requirements for restoring and protecting the environment. Besides NEPA and its creation of CEQ, the National Oceanic and Atmospheric Administration (NOAA) and EPA were established, and, at the end of 1970, the Clean Air Act was passed. At that time, many issues of environmental consequence were brewing (see **Highlight B**), one of which--the proposed supersonic transport aircraft (SST)--became a crucial test of NEPA. (See **The National Environmental Policy Act** section, below.)

The lead agency for the SST project, the Department of Transportation (DOT), chose not to disclose EPA's comments on the NEPA-required environmental impact statement (EIS) before having issued its final decision, construing NEPA to contain no explicit public disclosure requirements. Although later CEQ regulations under the Act would clarify this ambiguity, the Congress had a vehicle at hand in which to make its point: the draft Clean Air Act. Senator Edmund Muskie, sponsor of Section 309, said to the Senate when submitting the conference report, that as soon as EPA has completed its review of a proposed action, it must make its written comments public, and "not when the environmental impact agency decides the public should be informed." (116 *Cong. Rec.* S-20602, Dec. 18, 1970)

HIGHLIGHT B: When NEPA Was New: 1970-1971 Issues

- o Trans-Alaska oil pipeline and the North Slope-Valdez route
- o Supersonic transport aircraft
- o Cross-Florida Barge Canal
- o Clearcutting "areas of scenic beauty" in national forests
- o Tennessee-Tombigbee Waterway
- o Dredging and filling in wetlands
- o Calvert Cliffs (MD) nuclear power plant

To correct another ambiguity of NEPA, Section 309 places the requirement to review EISs upon EPA because NEPA "does not assure that Federal environmental agencies will effectively participate in the decision-making process. It is essential that mission-oriented Federal agencies have access to environmental expertise in order to give adequate consideration to environmental factors." (*Sen. Rept.* No. 91-1196, 91st Cong., 2d Sess. 43, 1970) Consequently, EPA has reviewed most of the approximately 25,000 draft and final EISs produced since the passage of NEPA.

Section 309 confers upon EPA broad review responsibilities for proposed federal actions. (See **Highlight C.**) The EPA Administrator has delegated responsibility of national program manager to the Office of Federal Activities (OFA), and to the ten EPA Regional Administrators for review of regional specific actions. OFA has developed a set of criteria for rating draft EISs. The rating system provides a basis upon which EPA makes recommendations to the lead agency for improving the draft. If improvements are not made in the final EIS, EPA may refer the final EIS to CEQ. (See sections on **The National Environmental Policy Act** and **Referrals**, below.)

HIGHLIGHT C: Materials Which EPA Reviews Under Section 309 Authority

- o Proposed legislation
- o Proposed regulation
- o Environmental assessment (EA)
- o Environmental impact statement (EIS), draft and final
- o Any proposal that the lead agency maintains does not require an EIS but that EPA believes constitutes a major federal action significantly affecting the environment so as to require an EIS.

Figure 1: EPA's Criteria for Sec. 309 Review of Impact Statements

Rating Environmental Impacts:

LO--Lack of Objections

EC--Environmental Concerns--Impacts identified that should be avoided. Mitigation measures may be required.

EO--Environmental Objections--Significant impacts identified. Corrective measures may require substantial changes to the proposed action or consideration of another alternative, including any that was either previously unaddressed or eliminated from the study, or the no-action alternative). Reasons can include:

- o violation of a federal environmental standard;
- o violation of the federal agency's own environmental standard;
- o violation of an EPA policy declaration;
- o potential for significant environmental degradation; or,
- o precedent-setting for future actions that collectively could result in significant environmental impacts.

EU--Environmentally Unsatisfactory--Impacts identified are so severe that the action must not proceed as proposed. If these deficiencies are not corrected in the final EIS, EPA may refer the EIS to CEQ Reasons, in addition to impacts identified, can include:

- o substantial violation of a federal environmental standard;
- o severity, duration, or geographical extent of impacts that warrants special attention; or,
- o national importance, due to threat to national environmental resources or policies.

Rating Adequacy of the Impact Statement:

1 (Adequate)--No further information is required for review.

2 (Insufficient Information)--Either more information is needed for review, or other alternatives should be evaluated. The identified additional information or analysis should be included in the final EIS.

3 (Inadequate)--Seriously lacking in information or analysis to address potentially significant environmental impacts. The draft EIS does not meet NEPA and/or Section 309 requirements. If not revised or supplemented and provided again as a draft EIS for public comment, EPA may refer the EIS to CEQ.

(See Selected Publications, below: EPA's *Policy and Procedures for the Review of Federal Actions Impacting the Environment.*)

Annually, OFA and its regional counterparts review about 500 EISs and some 2000 other actions (see **Figures 1** and **2**). Among the variety of proposed actions that may be reviewed, besides that for which an agency provides an impact statement, are: legislation proposed by a federal agency; a proposed agency regulation; the renewal of an action originally approved before the enactment of NEPA; a proposal for which an agency has determined that no impact statement is needed, whether or not the agency has published a Finding of No Significant Impact (FONSI); and, an action that is actually a segment of either a program or a reasonably expected succession of actions that could result in a cumulative negative impact on human health or welfare or the environment.

In addition to conducting environmental reviews, OFA develops guidance materials and provides training courses on NEPA and Section 309 requirements for EPA regional staff, and promotes coordination between EPA offices and other federal agencies.

THE NATIONAL ENVIRONMENTAL POLICY ACT AND CEQ

The National Environmental Policy Act (NEPA, 42 *USC* 4321 et seq.) was enacted on January 1, 1970 in recognition of the widening influence on the human and natural environment that individual federal agency actions can exert. With its stated purpose (see **Highlight D**) and with heightened public awareness of environmental quality questions, NEPA makes its goals and policies "supplemental to those set forth in existing authorities of Federal agencies" (NEPA, Section 105). In this way, the agencies' authorizing statutes were amended to include NEPA requirements.

Title I of NEPA requires the federal government to use all practicable means to preserve and maintain conditions under which human beings can coexist with the natural world in productive harmony. Section 102 directs federal agencies to lend appropriate support to initiatives and programs meant to anticipate and prevent degradation of world environmental quality. Further, this section requires federal agencies to incorporate environmental considerations in their decision-making, using a systematic, interdisciplinary approach.

HIGHLIGHT D: The Purposes of NEPA

The purposes of this Act are: To declare a national policy which will encourage productive and enjoyable harmony between man and his environment; to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation; and to establish a Council on Environmental Quality.

(PL 91-190, 42 *USC* 4321 et seq.)

Title II of NEPA establishes the Council on Environmental Quality (CEQ, or the Council). Two months after enactment of NEPA, the President issued Executive Order 11514 authorizing CEQ to guide the Sec. 102 process. Under this order, the Council immediately published guidelines, followed in 1978 by regulations (40 *CFR* Parts 1500-1508) requiring all Federal agencies to issue NEPA regulations consistent with CEQ's. Advisory to the President, CEQ conducts studies, prepares the annual Environmental Quality Report to Congress, and reviews EISs. Moreover, CEQ mediates interagency disputes concerning environmental analyses of matters of national importance. (See Referrals section, below.)

As evidence of compliance with the NEPA Section 102 provisions for a proposed major action that could significantly affect the environment, CEQ requires the lead agency to prepare a detailed written statement addressing NEPA concerns, i.e., an EIS (40 *CFR* Part 1501). The lead agency may first prepare an environmental assessment (EA), which is a concise public document (40 *CFR* Part 1501.3) that determines whether an EIS or a FONSI (40 *CFR* Part 1501.4(e)) should be prepared. An EA is not necessary, however, if the agency has decided at the outset to prepare an EIS.

For review, the lead agency provides the EIS to those federal agencies having statutory jurisdiction or special expertise, as well as to appropriate other federal, state, and local agencies; Indian tribes, when the proposed action might impact tribal lands; and, the interested or affected public (40 *CFR* Part 1503.1). Once the EIS is final, the lead agency must file it formally, simultaneously making it available to the public, together with the reviewers' comments and the lead agency's responses to those comments (40 *CFR* Part 1506.9). The CEQ regulations designate EPA the official recipient of all final EISs, which responsibility the EPA Administrator delegates to OFA.

REFERRALS TO THE COUNCIL ON ENVIRONMENTAL QUALITY

The "predecision referrals" provision (40 *CFR* Part 1504) enables any federal agency under NEPA to refer another agency's final EIS to CEQ during the 30-day waiting period before a lead agency can proceed with the action. On the other hand, Section 309 authorizes EPA to refer to CEQ a broader range of federal activities, not only actions for which EISs are prepared. The CEQ regulations (40 *CFR* 1504.1(b)) implement Section 309 of the Clean Air Act, acknowledging that EPA has been assigned more extensive review and referral authority than the other agencies (see **Highlight C**).

Within 25 days after the lead agency has made the final EIS available to the public, the referring agency must provide early notification to that agency about its intention, and make its referral in writing to CEQ. The lead agency, once it has received written notification from CEQ, is to respond in writing within 25 days. During that same period, other agencies and the public may submit written comments to CEQ. Then CEQ may publish Findings and Recommendations; mediate between the disputing agencies; hold public meetings or hearings; refer irreconcilable disputes to the Executive Office of the President for action; or, conclude either that the issue is not of national importance or that insufficient information has been submitted upon which to base a decision.

In the time since the referral process was formally established in 1973, agencies have referred a total of 24 proposed federal actions to CEQ. Of these, EPA was responsible for 15, of which one was referred jointly with the Department of the Interior (DOI). (See **Figure 2** for EPA regional environmental review offices.) So far, in no case has CEQ made a formal referral to the Office of the President. Most often, CEQ has issued Findings and Recommendations. In a few cases the lead agency has withdrawn the proposal, and in three cases CEQ determined that the issue was not a matter of national importance.

In 1989, CEQ upheld EPA's Section 309 referral authority. At issue was a DOI Bureau of Reclamation proposal to renew longterm water contracts for irrigation operations of the Friant Unit in the Central Valley Project of California. The reason for referral was that no EIS had been prepared on the contract renewals, which individually and in the aggregate were likely to result in unsatisfactory environmental effects. In response, DOI questioned EPA's right to challenge the agency's decision that no EIS was needed. In rejecting that argument, CEQ established a precedent, that is, affirmed that EPA may identify a major federal action significantly affecting the environment, even though the lead agency disagrees.

Figure 2: EPA'S REGIONAL SECTION 309 REVIEWERS

REGION 1 : (617) 918-1051
Office of Environmental Review
JFK Federal Bldg.
Boston, MA 02203-0001

REGION 2 : (212) 637-3504
Envir. Planning & Protection
290 Broadway
New York, NY 10007-1866

REGION 3 : (215) 814-2705
Envir. Programs Branch
1650 Arch Street
Philadelphia, PA 19106

REGION 4 : (404) 562-9611
Office of Envir. Assessment
61 Forsyth Street
Atlanta, GA 30303

REGION 5 : (312) 886-9750
Federal Activities program
77 West Jackson Blvd.
Chicago, IL 60604-3507

REGION 6 : (214) 665-7451
Office - Planning & Coordination
1445 Ross Avenue, Suite 1200
Dallas, TX 75270-2733

REGION 7 : (913) 551-7148
Environmental Review
726 Minnesota Avenue
Kansas City, KS 66101

REGION 8 : (303) 312-6228
Ecosystem Protection Program
999 18th Street, Suite 500
Denver, CO 80202-2466

REGION 9 : (415) 744-1584
Office of Federal Activities
75 Hawthorne Street
San Francisco, CA 94105

REGION 10 : (206) 553-8574
Ecosystems & Communities
1200 Sixth Avenue
Seattle, WA 98101

SELECTED PUBLICATIONS

Caldwell, Lynton K., *Science and the National Environmental Policy Act; Redirecting Policy Through Procedural Reform. University of Alabama Press, c1982.*

Congressional Record, vol. 166, p. S-20602 (Dec. 18, 1970).

Healy, Martin, "The Environmental Protection Agency's Duty to Oversee NEPA's Implementation: Section 309 of the Clean Air Act," *Environmental Law Reporter*, 3 ELR 50071 (1973).

Liroff, Richard, "The Council on Environmental Quality," *Environmental Law Reporter*, 3 ELR 50051 (1973).

Policies and Procedures for the Review of Federal Actions Impacting the Environment. U. S. Environmental Protection Agency, Office of Enforcement, Office of Federal Activities, Pub. No. 1640 (rev. 1984).

Procedures for Implementing the Requirements of the Council on Environmental Quality on the National Environmental Policy Act. U. S. Environmental Protection Agency, 40 *CFR* Part 6.

Rand, Sally and Tawater, Mark Steven, *Environmental Referrals and the Council on Environmental Quality*. Washington, D. C., Environmental Law Institute, 1986.

Regulations For Implementing the Procedural Provisions of the National Environmental Policy Act. U. S. Executive Office of the President, Council on Environmental Quality, 40 *CFR* Parts 1500-1508 (reprint, as of July 1, 1986). Contents include: the National Environmental Policy Act of 1969, as amended in 1975; the Clean Air Act, Section 309; and, Executive Order 11514, as amended by Executive Order 11991.

Senate Report No. 91-1196, 91st Congress, 2nd Session, p. 43 (1970).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

September 17, 2015

Toni Ristau
354th Fighter Wing, Public Affairs Office (354 FW/PA)
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Ms. Ristau:

Thank you for the opportunity to review the United States Air Force F-35A Operational Beddown – Pacific Draft Environmental Impact Statement (EPA Project No. 15-0022-DOD). We have reviewed this Draft EIS in accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act, and the Council on Environmental Quality regulations for implementing NEPA.

Overall we find the Draft EIS to be well-written and clearly organized. We appreciate the numerous colored maps, summary tables and index. We also commend the Air Force for conducting such extensive stakeholder outreach and consultation efforts. Including the actual scoping comments received by the Air Force, instead of a scoping summary report was also helpful.

However, based on our review, we have identified concerns regarding the potential impacts on waters of the U.S., contaminated sites and noise receptors, as well as the limited range of alternatives. Therefore, we have assigned a rating of EC-2 (Environmental Concerns – Insufficient Information) to the Draft EIS. For your reference, a copy of the rating system used in conducting our review is enclosed.

Wetlands Impacts
In our April 16, 2015 scoping letter we recommended that the Draft EIS include information that demonstrates compliance with the Clean Water Act 404(b)(1) guidelines. This information is not contained in the Draft EIS. We recommend that the Final EIS include information regarding the types and functions of wetlands to be impacted by the proposed action. We believe this information is useful, not only for compliance with the 404(b)(1) guidelines but also for full evaluation and disclosure of impacts under NEPA. For facilities that are currently proposed for placement in floodplains and wetlands, we would like to see more information about alternatives considered for more upland placement (e.g., a more northwest placement of the new storage hangar along the South Loop). This information could be included in Appendix D: Detailed Resource Information, in a separate appendix or in the body of the Final EIS document.

Comprehensive Environmental Response, Compensation and Liability Act Sites
As stated in our April 16, 2015 scoping letter, we believe the proposed action has the potential to impact known CERCLA Operable Units as well as sites that may not be identified to date. We continue to recommend precaution in the development of any areas for new construction. We are pleased that the Draft EIS notes that close coordination with the Alaska Department of Environmental Conservation and

the Environmental Protection Agency will occur. Specifically we encourage close coordination with the Remedial Project Engineer for Eielson AFB (Carolyn Tallant, Air Force Civil Engineering Center, carolyn.tallant@us.af.mil or (907) 377-1666) to ensure that all required steps are taken to comply with the institutional and land use controls prior to any ground disturbance as well as the EPA Region 10 Remedial Project Manager, Jackie Kramer (kramer.jackie@epa.gov or (907) 271-3541), on any proposed construction or operational activities that have the potential to impact sites identified in the various CERCLA Records of Decision.

Additionally, we recommend that language on page 3-93 under *Environmental Restoration Program* be revised to more accurately reflect that the State of Alaska does not regulate any contaminated sites under the Resource Conservation and Recovery Act, which sites containing CERCLA contaminants are ERP-sites, and the State-led petroleum sites are Compliance Restoration Program sites. We suggest the following language: "The U. S. EPA and State of Alaska jointly regulate the sites with CERCLA contaminants. Petroleum-contaminated sites are designated as Compliance Restoration Sites and are addressed under State of Alaska regulations."

Also, we believe statements pertaining to remedies that are in place are not accurate. Following the 2013 Five Year Review, most of the remedies were found to be not protective, and Eielson is re-opening the Remedial Investigations for many of these sites. We recommend that wording be changed to reflect the actual effectiveness of existing remedies.

Noise Impacts

Additionally, we are concerned with the increase in occurrence and change in type of noise impacts, particularly to sensitive populations in the Eielson-Moose Creek area. The Draft EIS states there is potential for significant impacts both on-base and off-base, and that noise exposure mitigation measures will be identified through agency and public review and input.

We recommend that the Air Force develop a working group comprised of interested and potentially affected stakeholders to specifically address this issue. This working group should be informed of common mitigation measures successfully employed elsewhere for these types of operations and then be offered the opportunity to provide recommendations for inclusion in the Final EIS. They should also be provided with a summary of Appendix E: Noise Modeling, Methodology and Effects. Because noise impacts have the potential to be significant, we believe clear and measurable mitigation measures need to be included in the Final EIS. We also recommend that such impacts be considered fully in the Environmental Justice and Health Impacts analyses in the Final EIS.

Range of Alternatives

In our April 16, 2015 scoping letter we requested that the Draft EIS evaluate a reasonable range of alternatives, including alternatives that may minimize environmental degradation. The Draft EIS evaluates one action alternative, the Air Force's Proposed Action (stationing of up to 54 F-35A aircraft at Eielson Air Force Base) and the No Action alternative. Additional action alternatives were eliminated based on an "Enterprise-Wide Study"; however, the Draft EIS does not provide detailed explanation as to why other action alternatives were not considered or why some were eliminated. For example, it does not explain whether basing one squadron at a particular location and another at a different location was or was not reasonable.

Because the proposed action will result in substantial changes at Eielson AFB, including an increase of nearly 50% of the installation's current population of service members, family members and contractors, it would seem that additional, reasonable alternatives would exist. If other alternatives were evaluated early in the process, and determined to be not reasonable, it may be that the standards used to rule out such alternatives were restrictive and limiting to the point that they precluded the ability to seriously consider a full range of reasonable alternatives. We recommend that the Final EIS either provide more detailed information concerning other action alternatives or fully evaluate additional, reasonable action alternatives.

Thank you for the opportunity to review and comment on this Draft EIS. If you have questions about our comments, please contact me at (206) 553-1601 or reichgott.christine@epa.gov, or contact Jennifer Curtis of my staff at (907) 271-6324 or curtis.jennifer@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure:
1. US EPA Rating System For Draft Environmental Impact Statements

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

State Historic Preservation Office

SHPO CONSULTATION

In accordance with Section 106 of the National Historic Preservation Act (United States Code of Federal Regulation 800.3), a letter consultation was sent on July 31, 2015 to the Alaska State Historic Preservation Office (SHPO) notifying them that the Air Force planned to base F-35A aircraft at Eielson Air Force Base (AFB), Alaska as well as operate and train in northern Joint Pacific Alaska Range Complex (JPARC) airspace. The letter included information on the basing action, alternatives considered, a summary of impacts, and a request for concurrence of findings in the Area of Potential Effect (APE)—on the base and underlying JPARC airspace. A finding of no direct or indirect effects to the base APE was identified by the Air Force and a finding of no adverse effects was identified for historic properties (including Traditional Cultural Properties) underlying JPARC airspace.

A consultation package was sent on July 31, 2015. An initial finding of no effect (direct or indirect) was identified and concurrence with the finding was requested from the SHPO. On September 1, 2015, the SHPO provided partial concurrence on the no effects conclusion to properties underlying the northern JPARC airspace. However, they requested further information about on-base facility construction and modifications. A revised consultation package was sent to the SHPO on December 3, 2015, with additional information and a request for concurrence with findings of "not eligible" for listing on the National Register of Historic Places for specified Cold War and Post-Cold War facilities on Eielson AFB. On December 30, 2015, the SHPO agreed with most but not all of the findings, but requested that Eielson AFB obtain Alaska Heritage Resources Survey numbers for several existing facilities prior to providing concurrence, and that the base provide an historic assessment of the Small Arms Range Complex. A third consultation package providing the requested information was sent to the SHPO on January 20, 2016. The SHPO provided full concurrence with Air Force findings on January 21, 2016, concluding consultation requirements. The letters, attachments, and responses are provided herein.

DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

JUL 3 1 2015

Lt Col Justin W. Morrison, USAF
Base Civil Engineer
354th Civil Engineer Squadron
2310 Central Avenue Ste 100
Eielson AFB Alaska 99702

Ms. Judith Bittner
SHPO
Alaska Department of Natural Resources
Office of History and Archaeology
550 W. 7th Ave., Suite 1310
Anchorage AK 99501

SUBJECT: Findings of No Adverse Effect and Request for Concurrence Pursuant to 36 CFR Part 800 Regarding Basing of Two F-35A Operational Squadrons at Eielson Air Force Base (AFB), Alaska

Dear Ms. Bittner

We are requesting concurrence from the Alaska State Historic Preservation Officer that the Proposal Action to base two F-35A Operational Squadrons (additive mission) at Eielson AFB will have no effect (no direct or indirect effect) on known or undiscovered/unevaluated archaeological sites or districts and no adverse effect on all other types of historic properties.

On 13 March 2015, the United States Air Force (Air Force) sent a letter indicating that an Environmental Impact Statement (EIS) would be prepared for this Proposed Action. The EIS will assess the potential environmental consequences associated with basing two squadrons (48 Primary Assigned Aircraft and six Backup Assigned Aircraft) at the base, additional military and civilian personnel, existing facility and infrastructure modifications, and new construction. New/increased aircraft operations would occur at the airfield. Existing special use airspace in the region can accommodate F-35A proficiency maintenance and training; no new/expanded airspace is proposed. Under the No-Action Alternative for this EIS, no F-35 beddown would occur and no on-base construction or personnel increases would be implemented. Major flying exercises and routine training would continue to be supported out of Eielson AFB.

The purpose of this letter is to provide you with sufficient information to concur with our determination that this undertaking would result in no effect on known or undiscovered/ unevaluated archaeological sites or districts, and no adverse effect on historic properties, whichever alternative is selected/implemented.

A narrative is provided as an attachment to this letter containing the following information: (1) Description of the Undertaking; (2) Description of Area of Potential Effect;

(3) Identification of Historic Properties (including Traditional Cultural Places) in the Area of Potential Effect; and (4) Determination of Potential Effect.

Pursuant to 36 CFR §800.4(d)(1), the Air Force has determined that this undertaking will have **no effect (direct or indirect effect)** on known or undiscovered/unevaluated archaeological sites or districts.

Regarding direct or indirect effects on other types of historic properties, pursuant to 36 CFR §800.5(b), the Air Force has determined that this undertaking will have **no adverse effect**.

If the No-Action Alternative is implemented, there would be no change to existing facilities, operations, aircraft, or flight patterns and thus no potential for effect.

We appreciate your review of the enclosed information and respectfully request your concurrence with these findings. Please provide your written response within 30 days of your receipt of this request to: Ms. Julene May, Chief, Installation Management Flight, 354 CES/CEI, 2310 Central Avenue, Eielson AFB, (907) 377-4342, julene.may@us.af.mil.

MICHAEL E. LEE, PE, GS-14, DAF
Deputy Base Civil Engineer

S/S July 31, 2015

JUSTIN W. MORRISON, Lt Col, USAF
Commander, 354th Civil Engineer Squadron

Attachment:
Description of Undertaking and Summary of Findings (Attachments 1-7)

cc: Doyon Limited, Aaron Schutt, President
Mendas Cha-Ag Tribe of Healy Lake, JoAnn Polston, Chief
Native Village of Cantwell, Rene Nicklie, President
Native Village of Eagle, Bertha Ulzi, First Chief
Native Village of Venetie, Jean F. Tritt, First Chief
Nenana Traditional Council, Donald Charlie, Tribal Chief
Native Village of Tanana, Curtis Sommer, Chairman
Dot Lake Village Council, Roberta Hamilton, President
Circle Native Community, John Soloman, First Chief
Chalkyitsik Village Council, Stephanie Herbert, First Chief
Native Village of Gakona, Daren Gene, President
Cheesh-Na Tribe Council, Larry Sinyon, President
Advisory Council on Historic Preservation
National Park Service, Alaska Regional Office, Anchorage

ATTACHMENT 1: SUMMARY OF FINDINGS

SECTION I. DESCRIPTION OF THE UNDERTAKING

A. TITLE OF UNDERTAKING: United States (U.S.) Air Force F-35 Operational Basing-Pacific at Eielson Air Force Base (AFB), Alaska

B. PROPOSED START DATE: Fiscal Year 2016 (FY16) – FY21

C. LOCATION: Portions of Eielson AFB and Special Use Airspaces within the northern portion of Joint Pacific Alaska Range Complex (JPARC) (Attachment 2, Location Map Showing Eielson AFB and Airspace Area of Potential Effect).

D. DESCRIPTION OF PROPOSED ACTION:

The 354th Fighter Wing (354 FW) is the host unit at Eielson AFB with the mission to prepare aviation forces for combat, deploy airmen in support of global operations, and enable the staging of forces. To accomplish that mission, the 354 FW implements flying operations, mission support, maintenance, and medical care functions. Located adjacent to the JPARC, the largest over land training complex in the U.S., the 345 FW familiarizes combat-ready forces with the tactics used by potential adversaries.

BRIEF DESCRIPTION OF THE MISSION/REQUIREMENTS – To maintain capable ready forces required for national defense, the U.S. Air Force must integrate the F-35A mission while transitioning from legacy fighter aircraft programs. This beddown action assures availability of combat-ready pilots in the Pacific Air Forces (PACAF) Area of Responsibility (AOR) flying the most advanced fighter aircraft in the world.

BRIEF DESCRIPTION OF THE NEED FOR THIS ACTION **–** The Secretary of the Air Force determined that there was a need to locate F-35A aircraft in the PACAF AOR based on the following priorities:

- Support the Pacific rebalance as directed by the President and the Secretary of Defense to counter the threats arising in the Pacific arena;
- Support the location of robust fifth-generation aircraft capability to offset similar threats in the PACAF AOR;
- Support future significant peacekeeping requirements or conflicts which may occur in the Pacific region; and
- Provide adequate war planning response times in the PACAF AOR.

BRIEF DESCRIPTION OF THE PROPOSED ACTION – There is only one Action alternative under this proposal. This alternative would add two squadrons of F-35As, consisting of 48 Primary Assigned Aircraft (PAA), and 6 Backup Aircraft Inventory (i.e., replacement aircraft when a PAA is not in operation) to the existing missions of the 354 FW at Eielson AFB. Basing of the aircraft would occur beginning in FY19 through FY21. The proposal also includes additional military and civilian personnel, construction and/or modification of facilities, and operation of the aircraft.

Personnel. Basing two F-35A squadrons and associated support and maintenance functions are expected to add 1,563 military and civilian personnel to the base by FY20. This date reflects when both squadrons would be fully operational. This would increase the total authorized active duty military population of the 354 FW to 2,981. Therefore, with the addition of projected military dependents, the total base population would increase by an estimated 2,765 individuals, to 8,184, or grow by about 51 percent from current conditions. Personnel increases would be incremental, happening over 2 to 3 years, typically preceding the scheduled delivery of the aircraft by several months.

Facilities. Under the Proposed Action Alternative, the 18th Aggressor Squadron would move to the former A-10 operations area and F-35A operations and maintenance activities would be centralized in the south loop. Facilities to support F-35A operations are listed in Table 1.

Table 1. Proposed Action Alternative Construction and Modifications

Planned Construction Fiscal Start Date	*Action*
FY16	Alter B-4110: 18 Aggressor Squadron Operations and Aircraft Maintenance Unit
FY16	Construct 6-Bay Flight Simulator Facility
FY16	Construct Temporary South Gate (for construction traffic) and North Gate
FY17	Construct 4-Bay Hangar/Propulsion Maintenance/Corrosion Control Personnel Dispatch
FY17	Construct 4-Bay Hangar/Squadron Operations/Aircraft Maintenance Unit (AMU) (Squadron 2)
FY17	Add/Alter B-4280: Field Training Detachment
FY17	16-Aircraft Weather Shelters (Squadron 1)
FY17	16-Aircraft Weather Shelters (Squadron 2)
FY17	Demolish old and Construct new Missile Maintenance Facility
FY17	Construct 6 Munitions Storage Igloos (Quarry Hill)
FY17	Alter B-1337: F-35 Squadron Operations (Squadron 1)
FY17	Alter B-1307/B-1338: F-35 AMU/Weather Shelter (Squadron 1)
FY18	Alter B-1306 for Aerospace Ground Equipment Shop (AGE)/Covered Storage
FY18	Add/Alter B-1215 for Operations Support Squadron Facility
FY18	Construct South Heat Plant
FY18	Construct South Loop AGE Fill Stand (near B-1308)
FY18	Construct Covered Parking for R-11 Aircraft Refueling Vehicles on South Loop (B-3229)
FY18	Alter B-1353: Alternate Mission Equipment Storage Facility
FY18	Alter B-3213: Vehicle Maintenance (additional space for vehicles)
FY18	Alter B-3462: Munitions Flight (additional space for personnel)
FY18	Alter B-1335: 4-Bay Weather Shelter (fire suppression, floors, lights)
FY18	Alter B-1353: Armament Systems Maintenance Shop
FY18	Alter B-1346: Add Metals Tech in Jet Engine Intermediate Maintenance Facility
FY18	Alter B-3426: Base Supply (enlarge classified storage, larger doors)
FY18	Alter B-1340: Weapons Load Training (add fire suppression in hangar)
FY18	Alter B-1344: Fuel Cell Maintenance Facility (fire suppression)
FY18	Alter B-1341: Egress (larger door opening and ceiling crane for canopies)
FY18	Alter B-1232: Enlarge Wheel & Tire Shop in Nose Dock 7
FY18	Alter B-4370: Joint Mobility Center (mobility bag storage, workstation counter)
FY18	Alter B-1121 for Snow Barn Warm Storage (interior only)
FY18	AGE Covered Storage (near B-1306)
FY19	Construct 200-Person Dormitory
FY19	Construct Flight Kitchen
FY19	Construct Youth Center / School Age Facility
FY19	Combat Arms Training and Maintenance Range

Proposed construction, modification, repair, and infrastructure improvements would occur between FY16 and FY20. Total acreage disturbed, which includes equipment laydown areas, construction clearing/grading, and landscaping, would be approximately 66 acres, of which about 21 acres are newly disturbed (i.e., on areas previously not currently supporting buildings or pavement.

Airfield and Airspace Operations. The Proposed Action Alternative would result in the addition of approximately 8,640 sorties per year (or 26,106 airfield operations) to existing base flight activities. To provide the training needed to ensure combat readiness and meet Ready Aircrew Program (RAP) requirements, F-35A aircrews would conduct operations in two types of environments. The first is the base airfield that includes the runway, taxi areas, and overlying/adjacent airspace. The second is special use airspace.

Due to their predominantly higher altitude missions (10,000 mean sea level [MSL] or higher for 855 of the sorties), advanced electronics, and speed, the F-35As would primarily use the Military Operation Areas (MOAs), Air Traffic Control Assigned Airspace (ATCAAs), and Restricted Areas (RAs) within the northern portion of JPARC, no new airspace is required. The F-35As would occasionally use existing Military Training Routes (MTRs). As is done

currently for aircraft operating in the MTRs, the F-35As would fly according to the parameters outlined in the Finding of No Significant Impacts for the final Military Training Routes (Alaska) Environmental Assessment, whereby an average of eight operational sorties per day (by any aircraft) can fly in any of the MTRs (The F-35As would conduct training from the base in existing airspace. No new airspace would be established as part of the Proposed Action. Pilots of F-35As would adhere to all existing rules, regulations, mitigations (e.g., seasonal adjustments), and avoidance measures associated with military aircraft operations in special use airspace.

To train with the full capabilities of the aircraft, F-35A pilots would employ supersonic flight (i.e., flying at or greater than the speed of sound). All supersonic flight would occur within airspace and at altitudes already authorized (i.e., approved and charted by the Federal Aviation Administration [FAA]) for such activities.

Defensive Countermeasures. Flares are the principal defensive countermeasure dispensed by military aircraft to evade attack by enemy air defense systems. Although the F-35A's stealth features significantly reduce its detectability, pilots must train to employ defensive countermeasures. Flares would only be used in the areas currently approved for its use and, in general, F-35As can be expected to use fewer flares when compared to the F-16s currently using this area.

Ordnance Use. F-35A aircraft would operate in JPARC restricted airspace and ranges that include R-2202 and the underlying Donnelly Training Area, R-2205 and the Yukon Training Area, and R-2211 and the Blair Lake Air Force Range in the Tanana Flats Training Area. Ordnance use would not exceed the authorized amounts for the applicable ranges.

E. DESCRIPTION OF THE NO ACTION ALTERNATIVE:

The other alternative analyzed is the No-Action alternative. Under the No-Action Alternative, the F-35A beddown would not take place at Eielson AFB, and the resulting environmental effects from taking no action are compared to the effects of implementing the Proposed Action. Under the No-Action Alternative for this EIS, no construction or personnel increases would be implemented. Major flying exercises and routine training would continue to be supported out of Eielson AFB.

SECTION II: DESCRIPTION OF AREA OF POTENTIAL EFFECT (APE)

The area of potential effect (APE) for historic, cultural and traditional resources encompasses areas where ground disturbing activities and alterations/modifications to buildings would occur, as well as the land areas underlying the airspace where noise (subsonic and supersonic) is generated by aircraft overflights. The APE is the same for the Proposed Action and the No-Action alternative.

The APE for ground disturbing activities and building alterations/modifications includes areas within the boundaries of Eielson AFB, specifically the land and facilities on the flightline, the area of the proposed munitions storage and dormitory, and the area of the Missile Maintenance Facility (Attachments 3 and 4a-4i), *Area of Potential Effect, Eielson AFB* and *Detailed Maps of Proposed Facility Construction and Improvements*). The areas where direct effects could occur are limited to the areas encompassed by construction, demolition, or modification of structures. The APE for Special Use Airspaces is limited to the MOAs and RAs making up the northern portions of JPARC (Attachment 2, *Area of Potential Effect for the JPARC Airspace)*. The APE encompasses the same training airspace and training ranges analyzed by the USAF in the *Joint Pacific Alaska Range Complex EIS* (June 2013).

SECTION III: IDENTIFICATION OF HISTORIC PROPERTIES AND TRADITIONAL RESOURCES IN THE AREA OF POTENTIAL EFFECT (APE)

"Historic properties" include "… any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion on the National Register (54 U.S. Code [U.S.C.] Section 300308)."

Traditional resources are associated with specific American Indian, Native Alaskan, or Native Hawaiian traditional resources, sacred sites, or areas. These resources are protected under the Archaeological Resource Protection Act (16 U.S.C. Sections 470aa-19 470mm, PL 96-95 and amendments), the Native American Graves Protection and Repatriation Act (PL 101-20 601; 25 U.S.C. Section 3001-3013), and the American Indian Religious Freedom Act (PL 95-341, 42 U.S.C. 21 Sections 1996 and 1996a). The National Historic Preservation Act and Associated

Section 106 compliance also include guidance for American Indian consultation regarding cultural significance of potential religious and sacred artifacts (54 U.S.C. Section 302701).

Per 36 Code of Federal Regulations (CFR) §800.4 (b) (1) and (2), the U.S. Air Force has made a reasonable and good faith effort to carry out appropriate identification efforts, taking into account the magnitude and nature of the undertaking as well as the nature and extent of potential effects on historic properties.

Eielson AFB Historic/Cultural Resources

Based on information contained in the Eielson AFB Integrated Cultural Resources Management Plan (Eielson AFB 2014), surveys of the installation did not identify any archaeological resources on base. The Seattle District Corps of Engineers completed an architectural report entitled *A Contextual Documentation and Inventory of Historic Properties of Eielson AFB* in 2002, which was later revised in 2004 and 2005. The inventory identified a historic district consisting of 19 contributing buildings and one contributing structure (the runway) along the flightline (Table 2); and two additional munitions-related historic districts of 21 contributing buildings at Quarry Hill (Table 3) and eight contributing buildings at Engineer Hill (Table 4). Attachment 3 identifies the location of these historic districts. Additional architectural surveys in 2013 did not identify any other buildings or structures on Eielson AFB eligible for listing in the National Register of Historic Places (NRHP) (Eielson AFB 2014).

Table 2. Eielson AFB Flightline Historic District

Facility Number	*Name of Facility*	*Date of Construction*
Facility 1120	Aircraft Maintenance/Nose Dock	1958
Facility 1121	Aircraft Maintenance/Nose Dock	1958
Facility 1123	Seaweed Storage (Storage Warehouse)	1953
Facility 1124	Seaweed Storage (Storage Warehouse)	1953
Facility 1125	Seaweed Storage (Storage Warehouse)	1953
Facility 1127	Seaweed Storage (Storage Warehouse)	1953
Facility 1128	Seaweed Storage (Storage Warehouse)	1953
Facility 1131	Airfield Runway	1943
Facility 1132	Seaweed Storage (Storage Warehouse)	1953
Facility 1133	Seaweed Storage (Storage Warehouse)	1953
Facility 1134	Seaweed Storage (Storage Warehouse)	1953
Facility 1135	Seaweed Storage (Storage Warehouse)	1953
Facility 1136	Seaweed Storage (Storage Warehouse)	1953
Facility 1138	SAC Avionics Building	1959
Facility 1140	SAC Hangar	1954
Facility 1141	SAC Aircraft Maintenance Shops	1954
Facility 1146	Maintenance Ops/Electrical Power Station	1953
Facility 1183	Squadron Operations Building	1956
Facility 1190	Nose Dock Hangar	1947
Facility 3112	Amber Hall	1952

Note: Facility 1153 was demolished in 2003 after Section 106 consultation and MOA with the Alaska State Historic Preservation Office.

Table 3. Eielson AFB Quarry Hill Munitions Historic District

Facility Number	*Name of Facility*	*Date of Construction*
Facility 6347	Munitions Igloo	1955
Facility 6348	Munitions Igloo	1955
Facility 6349	Munitions Igloo	1955
Facility 6350	Munitions Igloo	1955
Facility 6352	Munitions Igloo	1955
Facility 6354	Munitions Igloo	1955
Facility 6357	Munitions Igloo	1955
Facility 6360	Munitions Igloo	1955
Facility 6361	Munitions Igloo	1955
Facility 6363	Munitions Igloo	1955
Facility 6364	Munitions Igloo	1955
Facility 6365	Munitions Igloo	1955
Facility 6366	Munitions Igloo	1955
Facility 6368	Munitions Igloo	1955
Facility 6369	Munitions Igloo	1955
Facility 6371	Munitions Igloo	1955
Facility 6372	Munitions Igloo	1955
Facility 6373	Munitions Igloo	1955
Facility 6374	Munitions Igloo	1955
Facility 6376	Munitions Igloo	1955
Facility 6377	Munitions Igloo	1955

Table 4. Eielson AFB Engineer Hill Munitions Historic District

Facility Number	*Name of Facility*	*Date of Construction*
Facility 6122	Munitions Inspection Igloo	1957
Facility 6126	Munitions Igloo	1957
Facility 6128	Munitions Igloo	1957
Facility 6132	Munitions Igloo	1957
Facility 6134	Munitions Igloo	1957
Facility 6136	Munitions Igloo	1957
Facility 6162	Munitions Igloo	1957
Facility 6164	Munitions Igloo	1957

Airspace Historic/Cultural Resources:

Through a search of the NRHP database, 19 historic properties were identified as representative properties that may be potentially affected by the Proposed Action (Attachment 5, *Map Showing Representative Historic Properties within the APE* and Attachment 6, *Summary of Representative Historic Properties Potentially Affected*).

Though there are numerous historic properties within the APE, the properties identified in the table entitled *Summary of Representative Historic Properties Potentially Affected* were selected as the most representative based upon their location and character. These properties are listed in the NRHP, and there is sufficient information to formulate findings regarding effects. As other properties in the APE that are similarly situated and with similar

characteristics would experience similar effects from the proposed action, identification of every property is not necessary.

A. HISTORIC PROPERTIES AND TRADITIONAL RESOURCES WITHIN THE APE SUBJECTED TO DIRECT EFFECTS FROM THIS UNDERTAKING:

Eielson AFB APE

New construction on Eielson AFB in support of the F-35 basing would primarily occur on already disturbed ground (Attachment 4a-i). No direct effects are anticipated for the Engineer Hill Munitions Historic District, as none of the identified properties will be modified or demolished. One structure, Building 1121 in the Flightline Historic District, would be modified in the interior to accommodate the aircraft (Attachment 4d). A Memorandum of Agreement mitigating the demolition of this structure was signed in 2013 (Air Force 2013) and the agreed upon HABS architectural recordation was received by the Alaska SHPO on July 7, 2014 (Bittner 2014). As the structure has been thoroughly documented, any interior modifications would not be an adverse effect to the structure or to the district as a whole. Six new munitions igloos are scheduled to be constructed between existing igloos at the Quarry Hill Munitions Historic District in order to support the increase munitions requirements of the F-35 aircraft (Attachment Figure 4f). No demolition of existing munitions storage igloos would occur.

Airspace APE

None; no new ground disturbing activities would occur under the airspace (*Attachment 7, Summary of Effects to Historic Properties*)

B. HISTORIC PROPERTIES AND TRADITIONAL RESOURCES WITHIN THE APE SUBJECTED TO INDIRECT EFFECTS FROM THIS UNDERTAKING:

The facilities in the Flightline Historic District would continue to experience the indirect effect of aircraft noise from the Eielson flight line. However, noise levels in excess of 70 decibel (dB) Day-Night Average Sound Level (DNL) are in keeping with the setting of the district and would not affect the integrity of the district. Noise levels at the other two historic districts would not change.

There would be little change (<3 dB) in subsonic noise levels for the airspace units under the Proposed Action. Noise levels in most areas would not exceed 45 dB Onset-Rate Adjusted Day-Night Average Sound Level (L_{dnmr}), including the location of the Eagle National Historic Landmark. Under the Proposed Action Alternative, the majority of supersonic flight during the busiest month (i.e., during the Major Flying Exercises) in the northern JPARC airspace would continue to be conducted by the F-16s, KC-135s, and HH-60s based at Eielson AFB, the F-22 aircraft based at Joint Base Elmendorf-Richardson, and transient aircraft. The Proposed Action Alternative would create an estimated 118 supersonic F-35A operations per year that would account for approximately 10 percent of total annual supersonic operations. Compared to existing conditions, the Proposed Action Alternative would increase the supersonic noise levels by less than 1 dB. Under the Proposed Action Alternative, the maximum booms per busiest month would increase by two, for a less than 10-percent increase. This would occur in areas already subject to sonic booms and would not be an adverse effect to historic properties.

No other traditional cultural properties or historic properties that could be adversely affected have been identified (Attachment 7, *Summary of Effects to Historic Properties*).

C. HUMAN REMAINS

As there are no ground disturbing activities proposed in previously undisturbed areas, it is not anticipated that human remains would be encountered. In the unlikely event that human remains are inadvertently discovered, activities or work in the vicinity of the discovery would stop and the U.S. Air Force would take measures to secure the remains and any associated context.

SECTION IV: DETERMINATION OF POTENTIAL EFFECT

Pursuant to 36 CFR §800.4 (d) (1), the U.S. Air Force has determined that this undertaking will have **no effect (direct or indirect effect)** on known or undiscovered/unevaluated archaeological sites or districts.

Rationale for finding: No ground-disturbing activities in previously undisturbed or unevaluated areas are contemplated as a part of this undertaking. In the unlikely event archeological deposits are discovered during the implementation of any of the alternatives, as discussed above, activities or work in the vicinity of the discovery will stop and the area will be secured until appropriate measures can be taken.

If the No-Action Alternative were implemented, there would be no change to existing facilities, operations, aircraft, or flight patterns and thus no potential for effect.

Regarding indirect effects, pursuant to 36 CFR §800.5 (b), the U.S. Air Force has determined that this undertaking will have **no adverse effect** on historic properties:

Rationale for finding:

Eielson AFB: Any potential indirect effects to historic properties through implementation of any of the alternatives would be due to increases in noise around the Eielson flight line and would be in keeping with the setting of the Flightline Historic District.

Modifications to Building 1121, which is a contributing structure to the Flightline Historic District, would only occur to the interior of the structure, would not affect the exterior or appearance of the building, and is already covered under a MOA for demolition signed in 2013. Additions of new munitions structures in the Quarry Hill Munitions District would not require demolition of any structures and would be in keeping with the overall appearance of the district. As the district is covered under a Program Comment (ACHP 2006), Section 106 consultation for this resource is complete.

Northern JPARC Airspace: Any potential effects to historic properties would be due to noise generated from overflights. Preliminary analyses of the noise effects of this undertaking indicate that if the Proposed Action is implemented, there would be only a slight increase in subsonic and supersonic noise (including vibration and overpressure effects) to historic properties. Also, as identified in the 11th Air Force Alaska Airspace Handbook (February 2014), the historic resources under the northern JPARC airspaces have been identified as avoidance areas, with specific dimension and altitudes where aircraft are not authorized to operate. These will continue to be adhered to by all aircraft the performing routine training or participating in Major Flying Exercises.

The proposed use of flares would occur in the same manner as currently exists in the airspace. Use of flares would have no effect on cultural resources.

Implementation of the No-Action Alternative would result in the continuation of the current level of effects to historic properties.

REFERENCES

Advisory Council on Historic Preservation (ACHP)
2006 *Program Comment for World War II and Cold War Era (1939-1974) Ammunition Storage Facilities.* August 18.

Air Force
2013 Memorandum of Agreement among the Air Force and the Alaska State Historic Preservation Officer Regarding the Demolition of Building 1121 (FAI-643) Located in the Flightline Historic District (FAI-1584), Eielson AFB, Alaska. February 26.

Bittner, J.
2014 HABS Architectural Recordation of Building 1121, Eielson Air Force Base. July 7.

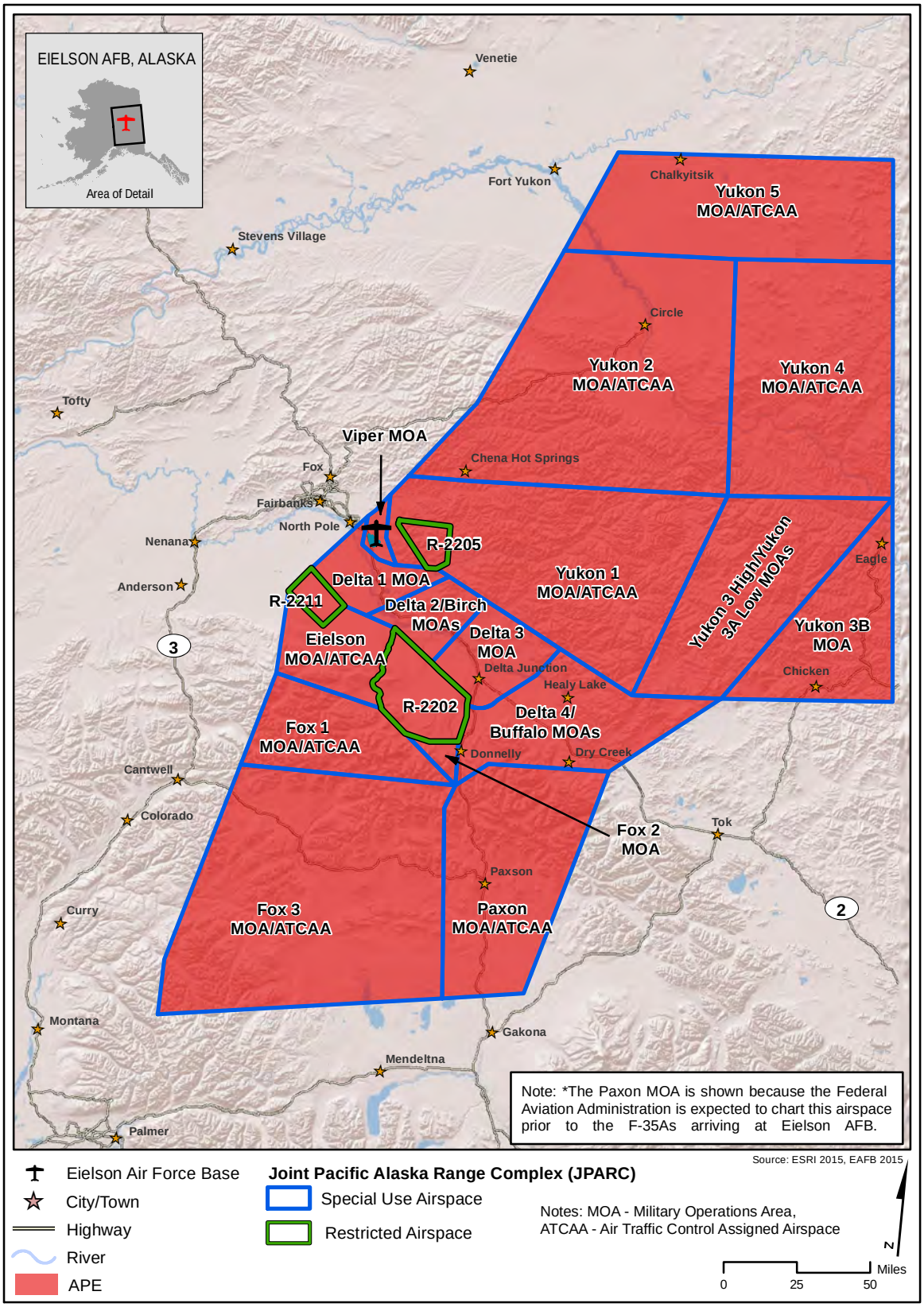
Eielson Air Force Base (AFB)
2014 Integrated Cultural Resources Management Plan, Eielson Air Force Base, Alaska. January.

LIST OF ATTACHMENTS:

Attachment 2: Area of Potential Effect for the Airspace
Attachment 3: Area of Potential Effect for Eielson AFB
Attachment 4: Detailed Map of Proposed Infrastructure Construction and Alterations/Modifications
- 4a. South Loop Construction Area
- 4b. Flight Simulator Construction Area
- 4c. Flight Line Construction Area
- 4d. Dormitory Construction Area
- 4e. Missile Maintenance Facility Construction
- 4f. Munitions Area Construction
- 4g. North Gate Construction
- 4h. Youth Center Construction
- 4i. Combat Arms Training Facility Construction

Attachment 5: Representative Historic Properties in the Airspace Area of Potential Effect
Attachment 6: Summary of Representative Historic Properties Potentially Affected
Attachment 7: Summary of Effects to Historic Properties

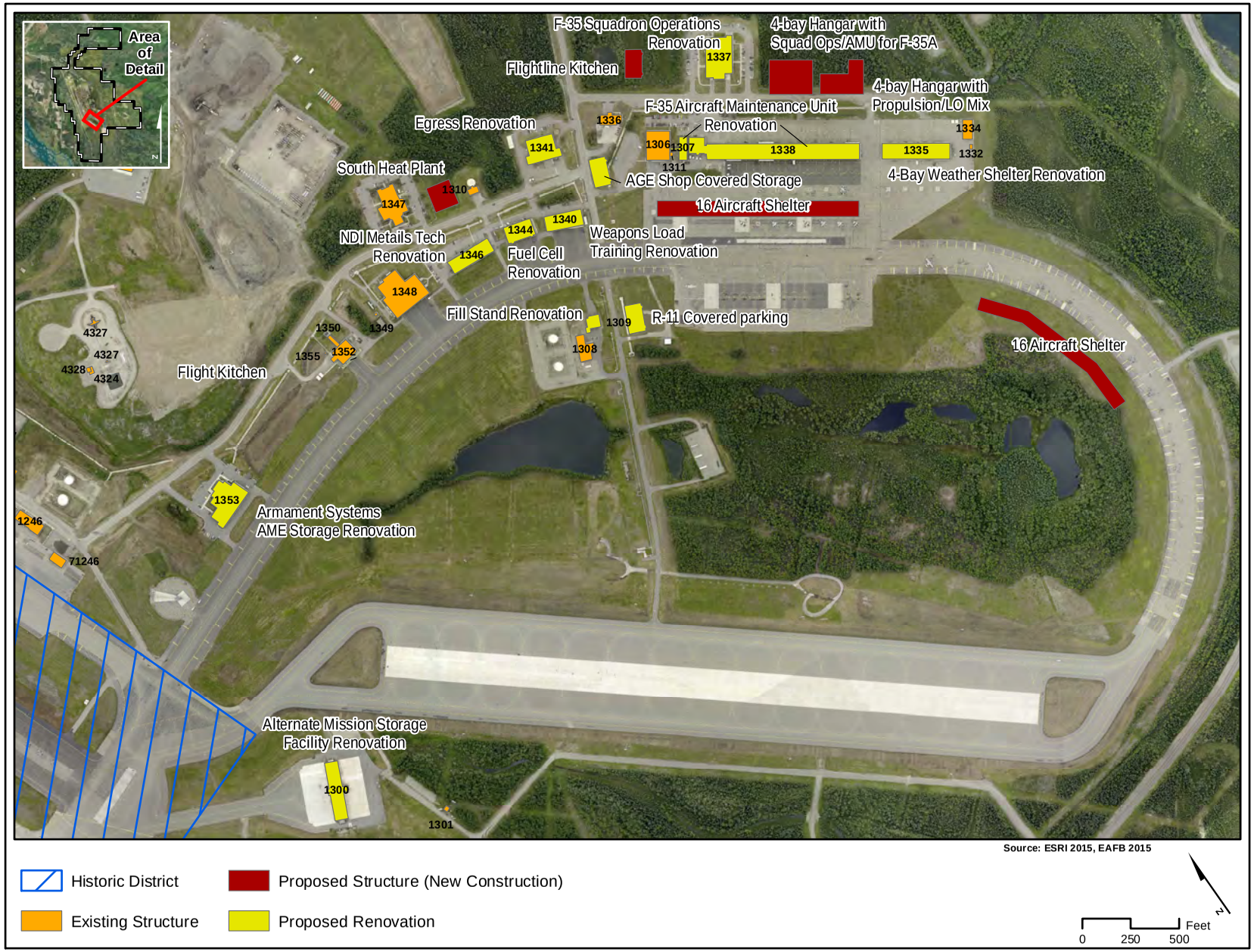
ATTACHMENT 2: AREA OF POTENTIAL EFFECT FOR THE AIRSPACE



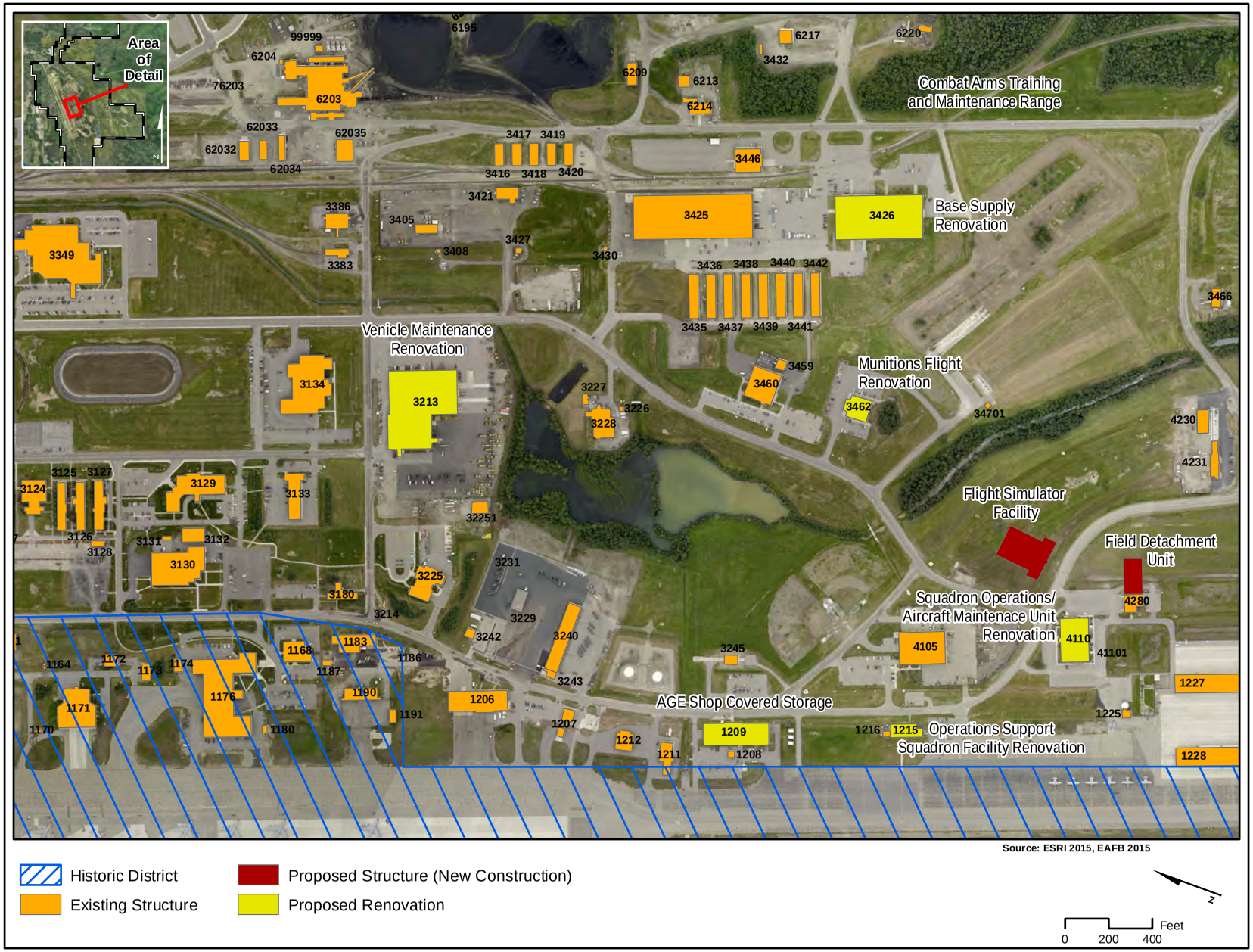
ATTACHMENT 3: AREA OF POTENTIAL EFFECT FOR EIELSON AFB

ATTACHMENT 4: DETAILED MAPS OF PROPOSED INFRASTRUCTURE CONSTRUCTION AND ALTERATIONS/MODIFICATIONS

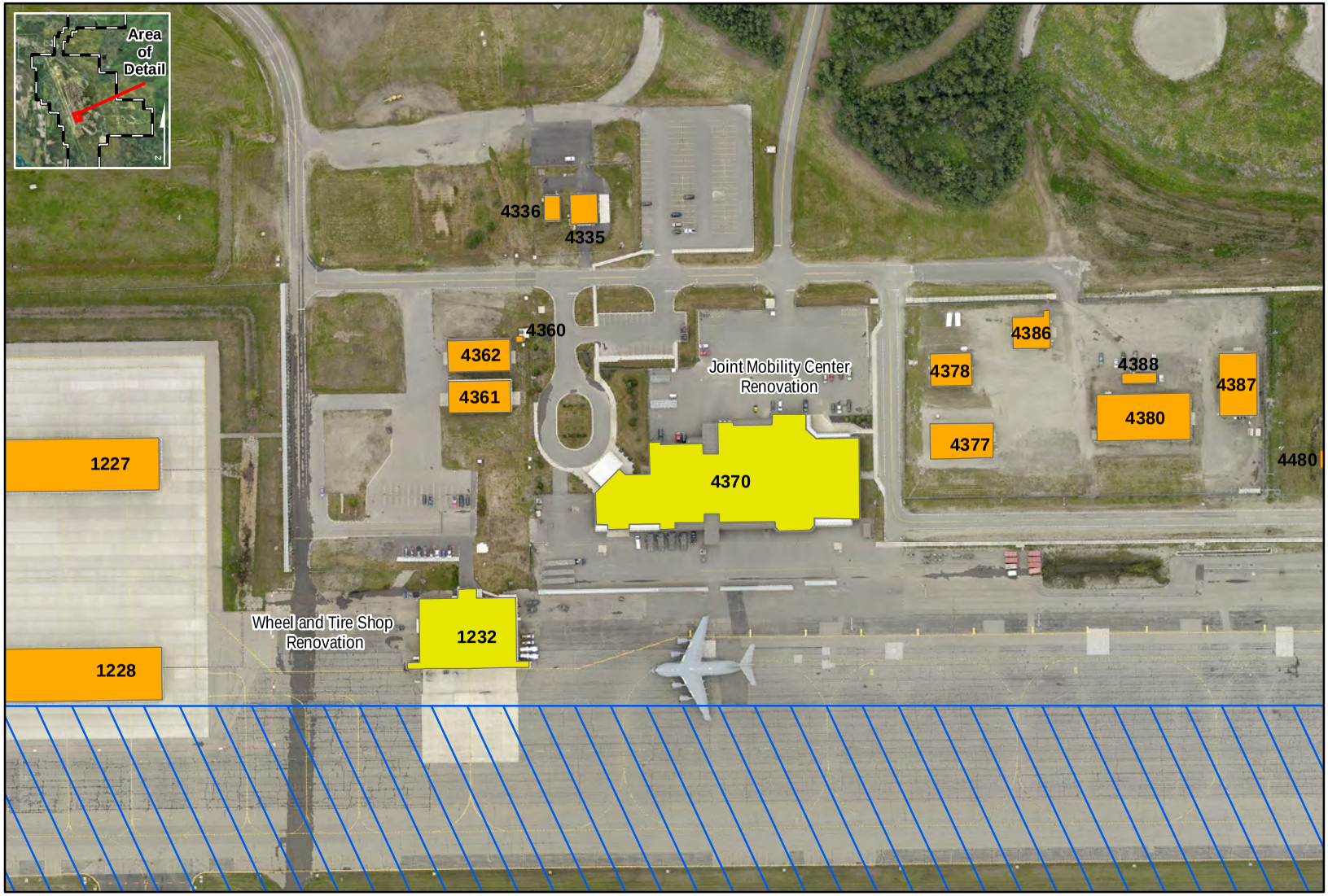
ATTACHMENT 4a: SOUTH LOOP CONSTRUCTION AREA



ATTACHMENT 4b: FLIGHT SIMULATOR CONSTRUCTION AREA



ATTACHMENT 4c: FLIGHT LINE CONSTRUCTION AREA



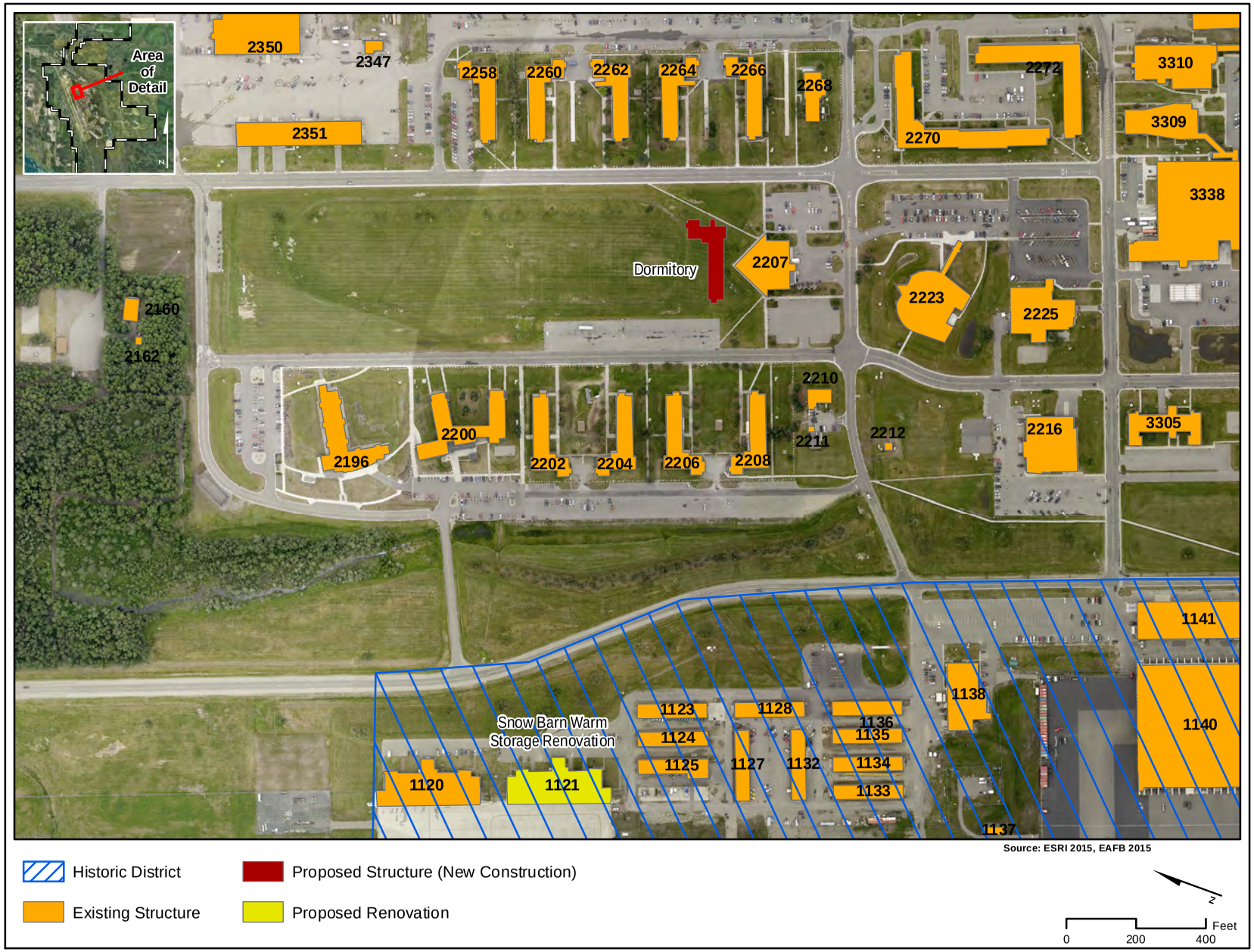
Source: ESRI 2015, EAFB 2015

Historic District
Existing Structure
Proposed Structure (New Construction)
Proposed Renovation

N

0 100 200 Feet

ATTACHMENT 4d: DORMITORY CONSTRUCTION AREA



ATTACHMENT 4e: MISSILE MAINTENANCE FACILITY CONSTRUCTION

Source: ESRI 2015, EAFB 2015

Existing Structure
Proposed Structure (New Construction)
Existing Fence
Proposed Fence

N

0 100 200 Feet

ATTACHMENT 4f: MUNITIONS AREA CONSTRUCTION

Source: ESRI 2015, EAFB 2015

Historic District

Existing Structure

Proposed Earth Covered Munitions Magazine (New Construction)

0 100 200 Feet

ATTACHMENT 4g: NORTH GATE CONSTRUCTION

Main Gate

Existing Structure

Proposed North Gate (New Construction)

Source: ESRI 2015, EAFB 2015

N

0 250 500 Feet

ATTACHMENT 4h: YOUTH CENTER CONSTRUCTION

ATTACHMENT 4i: COMBAT ARMS TRAINING FACILITY CONSTRUCTION

Source: ESRI 2015, EAFB 2015

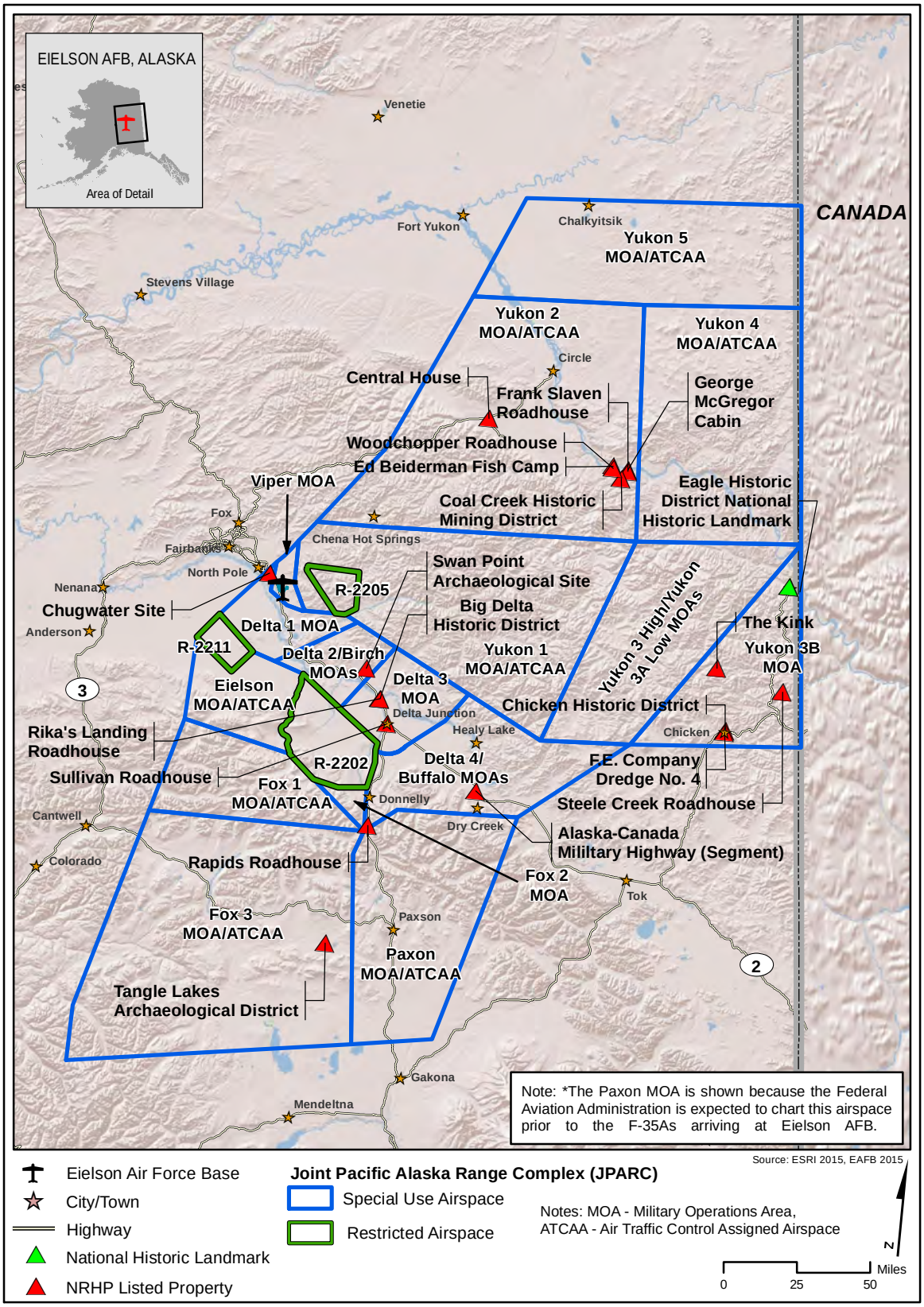
Existing Structure

Proposed Structure (New Construction)

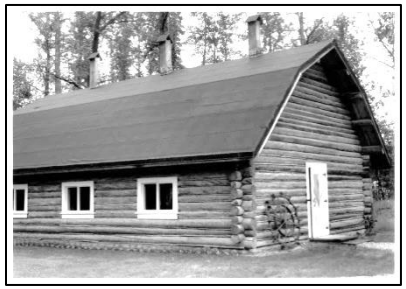
N

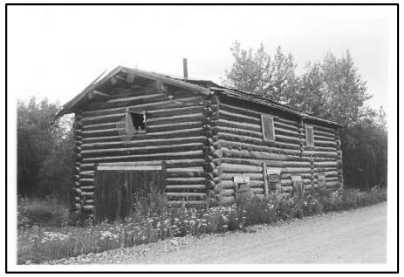
0 200 400 Feet

ATTACHMENT 5: REPRESENTATIVE HISTORIC PROPERTIES IN THE AIRSPACE AREA OF POTENTIAL EFFECT



Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Alaska--Canada Military Highway (Segment)	Southeast Fairbanks/ Delta Junction	West of Alaska Hwy. approximately 37 miles southeast of Delta Junction	Structure	13000543	Delta 4 MOA	After the bombing of Pearl Harbor, both American and Canadian military and civilian workers built this 1,603 mile military access pioneer road between British Columbia and Alaska. It was built in less than 9 months. This was the first overland connection for people in southcentral and interior Alaska with the continental U.S. This road linked a series of newly constructed airfields between Edmonton, Alberta and Fairbanks, Alaska. The section near Delta Junction that is nominated is one of the few sections of the road in Alaska virtually unchanged. It is an unpaved road, with ditches alongside in some places and forest alongside in others.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Ed Biederman Fish Camp	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1/2 mile down across from the Kandick River	Buildings/ Structures	87001204	Yukon 2 MOA	This fishing camp is comprised of the main cabin, bunkhouse, an upriver cabin, cache, greenhouse, meat cellar, doghouses, fishwheels, boats, and drying racks. The main cabin was built in 1916. Ed Biederman ran the mail by dogsled from Circle to Eagle for over 20 years.	Main Cabin at the Ed Biederman Fish Camp
Big Delta Historic District	Southeast Fairbanks/ Delta Junction	Richardson Hwy., Mile 274.5 at junction of Tanana and Delta Rivers	Historic District	91000252	Delta 3 MOA	This historic district includes 18 contributing resources. The prominent features include Rika's Roadhouse (listed to the NRHP separately), the barn, the McCarty Telegraph Station Storehouse, and the Alaska Road Commission ferryman's cabin. Big Delta was important as a crossroads for travel, communications, and commerce in interior Alaska beginning in 1904 and continuing until WWII.	 Building within the Big Delta Historic District

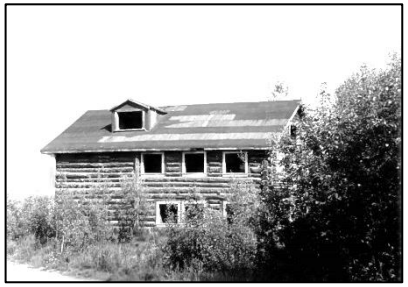
Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Central House	Yukon-Koyukuk / Central	Mile 128, Steese Hwy.	Building	78003431	Yukon 2 MOA	The Central House was originally built in 1894 and was rebuilt in 1926 after a fire. The house was constructed of spruce logs with saddle corner construction and has a gable roof, insulated with dirt and then covered with heavy gauge galvanized roofing. This house served as the social center for the gold miners of the Birch River drainage creeks.	
Chicken Historic District	Southeast Fairbanks/Eagle	Mile 66.5 Taylor Hwy.	Historic District	1001053	Yukon 3B MOA	The Chicken Historic District consists of 15 historic buildings and 1 structure in a small remote village in the Fortymile Mining District of Interior Alaska. The community of Chicken was founded in 1901 by gold miners. The extant buildings show the transformation of the village from a local supply center and social gathering spot for small scale gold miners to a company camp for the F.E. Company.	F.E. Company Residence within the Chicken Historic District
Chugwater Site	Fairbanks North Star/North Pole	Address/location restricted	Archaeological Site	79003754	Delta 1 MOA	Chugwater Archaeological Site contains typological evidence for occupation during much of the Holocene Period based on radiocarbon dating.	No photograph available.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Coal Creek Historic Mining District	Yukon-Koyukuk / Circle	Along the Yukon River, Southeast of Circle, in Yukon--Charley Rivers NP	Historic District	95000573	Yukon 2 MOA	The Coal Creek Historic Mining District includes buildings, structures, a dredge, water system, and tailings piles. Most of these were building between 1934 and 1940. There are 41 contributing resources to the historic district. The mining camp has been moved twice from the original location. The Slaven Roadhouse is within this Mining District and was listed to the NRHP separately.	Bunkhouses within the Coal Creek Historic Mining District

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Eagle Historic District	Southeast Fairbanks/Eagle	Mile 0, Taylor Hwy.	Historic District/ National Historic Landmark	70000919	Yukon 3B MOA	Eagle City first emerged as a transportation, communications, and military center due to the Klondike Gold Rush in 1898. There are a total of 74 contributing resources and 67 non-contributing resources to the Eagle Historic District. Due to its location on the Yukon River, the port of Eagle has always been the major community of the Forty Mile River drainage. The United States Army built Fort Egbert adjacent to Eagle City and late became the headquarters for the Military District of North Alaska. The Army with cooperation with civilians built the Trans-Alaska Military Road, which was the first major trail in Alaska. This later established the Washington-to-Alaska Military Cable and Telegraph System.	Northern Commercial Company Store within the Eagle Historic District/National Historic Landmark

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
F.E. Company Dredge No. 4	Southeast Fairbanks/Chicken	0.25 mile Chicken Airport Rd., Mile 66.4 Taylor Hwy.	Structure	6000435	Yukon 3B MOA	Dredge No. 4 was built by the Yuba Manufacturing Company in San Francisco in 1938. The F.E. Company had it shipped in pieces and was assembled on Pedro Creek. This dredge is a self-contained diesel electric powered gold processing and recovery machine. It is located within the community of Chicken which is listed in the NRHP separately as a historic district.	
The Kink	Southeast Fairbanks/ Fairbanks	Address/location restricted	Archaeological Site	75002161	Yukon 3B MOA	The Kink is an artificial river channel that was created using powder charges to blast thru a rock ridge and draining part of the North Fork River in 1904.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
George McGregor Cabin	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 2 miles down from Coal Creek	Building	87001199	Yukon 2 MOA	The George McGregor Cabin was built in 1938 located on a river terrace. The cabin was built from unpeeled logs with an average of 7 inch diameter, hewn slightly on the interior, and saddle notched. The joints were chinked with moss. It is representative of cabins built by solitary trappers.	
Rapids Roadhouse	Southeast Fairbanks/ Delta	Mile 227.4 Richardson Hwy.	Building	1000021	Buffalo and Delta 4 MOAs	The Rapids Roadhouse opened in 1904 to serve travelers on the Valdez-Fairbanks Trail, which was the principal travel corridor at the time. The original roadhouse was a two-story log building made of unpeeled spruce logs. The roof was originally covered with sod.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Rika's Landing Roadhouse	Southeast Fairbanks/ Big Delta	Mile 252, Richardson Hwy.	Building	76000364	Delta 3 MOA	Rika's Landing Roadhouse was built in 1909 along the Valdez-Fairbanks Trail. This roadhouse was larger in size than most roadhouses built around 1904. The walls were constructed of logs horizontally, the southernmost corners were joined saddle-cornered while the other corners were made in a V-plate type joint. The roadhouse consisted of a large dining room and kitchen, a parlor, 11 private rooms, large dormitory-like sleeping areas on each floor, and a sleeping loft in the attic.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Frank Slaven Roadhouse	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1/4 mile from the mouth of Coal Creek	Buildings/ Structures	87001202	Yukon 2 MOA	Frank Slaven Roadhouse was built in 1930 near the mouth of the Coal Creek. It was built on a mud flat with a ramp which enabled barges to unload. By 1938, the site consisted of the large roadhouse, outbuildings which included a shed, greenhouse, smokehouse, outhouse, and a cache. Slaven is credited with discovering gold on Coal Creek and later sold his claim to Gold Placers, Inc. in 1934. The Frank Slaven Roadhouse is located within the Coal Creek Historic Mining District.	
Steele Creek Roadhouse	Southeast Fairbanks/Eagle	Fortymile River	Building	80004576	Yukon 3B MOA	Steele Creek Roadhouse was built in 1898 with a second story added in approximately 1910. It was constructed of spruce logs between 9 and 12 inches in diameter using notch and saddle fashion. This roadhouse served as the post office in the Fortymile District between 1907 and 1951. It is the only two story and largest log structure in the Fortymile district.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Sullivan Roadhouse	Southeast Fairbanks/ Delta Junction	Mile 266, Richardson Hwy.	Buildings/ Structures	79003756	Delta 3 MOA	Sullivan Roadhouse was built in 1908 and operated until 1928 as a sled-stage resting facility along the Donnelly-Washburn Cut-Off which was the winter short cut from the Valdez-Fairbanks Trail. Along with the Roadhouse, a barn, a smithy, a cold cellar, and an outhouse were also present. These buildings were constructed using solid hand-hewn White Spruce, unpeeled, round-log, using the notched-corner technique. The roadhouse could accommodate 40 people.	
Swan Point Archaeological Site	Southeast Fairbanks/ Big Delta	Address/location restricted	Archaeological Site	8000929	Delta 3 MOA	The Swan Point Archaeological Site has yielded the oldest evidence of human habitation in Alaska. There is also evidence of megafauna including elk, bison, and mammoth that were located alongside human artifacts. Based on radiocarbon dates, the site was occupied around 12,000 B.C.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Airspace*	*Features*	*Photographs*
Tangle Lakes Archeological District	Matanuska-Susitna/ Glennallen	Address/location restricted	Archaeological Site	93000713	Fox 3 MOA/ Paxson ATCAA	The Tangle Lakes Archaeological District is 226,660 acres in size. This is the largest Archaeological District in the North American subarctic and contains over 600 documented prehistoric sites in Alaska.	
Woodchopper Roadhouse	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1 mile up from Woodchopper Creek	Building	87001201	Yukon 2 MOA	Woodchopper Roadhouse was built in 1910 along Woodchopper Creek. In order to create more dry land for cabins, drainage ditches were dug around the site. The associated buildings include a gable roof shed, a residential cabin, dog barns, and a shed. The roadhouse is two-stories and was constructed of 10 inch diameter wall logs, peeled but not hewn, and joined at the corners with saddlenotches. The joints were first chinked with moss then covered with mortar.	

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Alaska--Canada Military Highway (Segment)	Southeast Fairbanks/ Delta Junction	West of Alaska Hwy. approximately 37 miles southeast of Delta Junction	Structure	13000543	After the bombing of Pearl Harbor, both American and Canadian military and civilian workers built this 1,603 mile military access pioneer road between British Columbia and Alaska. It was built in less than 9 months. This was the first overland connection for people in southcentral and interior Alaska with the continental U.S. This road linked a series of newly constructed airfields between Edmonton, Alberta and Fairbanks, Alaska. The section near Delta Junction that is nominated is one of the few sections of the road in Alaska virtually unchanged. It is an unpaved road, with ditches alongside in some places and forest alongside in others.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Ed Biederman Fish Camp	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1/2 mile down across from the Kandick River	Buildings/ Structures	87001204	This fishing camp is comprised of the main cabin, bunkhouse, an upriver cabin, cache, greenhouse, meat cellar, doghouses, fishwheels, boats, and drying racks. The main cabin was built in 1916. Ed Biederman ran the mail by dogsled from Circle to Eagle for over 20 years.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Big Delta Historic District	Southeast Fairbanks/ Delta Junction	Richardson Hwy., Mile 274.5 at junction of Tanana and Delta Rivers	Historic District	91000252	This historic district includes 18 contributing resources. The prominent features include Rika's Roadhouse (listed to the NRHP separately), the barn, the McCarty Telegraph Station Storehouse, and the Alaska Road Commission ferryman's cabin. Big Delta was important as a crossroads for travel, communications, and commerce in interior Alaska beginning in 1904 and continuing until WWII.	This district would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Central House	Yukon-Koyukuk / Central	Mile 128, Steese Hwy.	Building	78003431	The Central House was originally built in 1894 and was rebuilt in 1926 after a fire. The house was constructed of spruce logs with saddle corner construction and has a gable roof, insulated with dirt and then covered with heavy gauge galvanized roofing. This house served as the social center for the gold miners of the Birch River drainage creeks.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Chicken Historic District	Southeast Fairbanks/E agle	Mile 66.5 Taylor Hwy.	Historic District	1001053	The Chicken Historic District consists of 15 historic buildings and 1 structure in a small remote village in the Fortymile Mining District of Interior Alaska. The community of Chicken was founded in 1901 by gold miners. The extant buildings show the transformation of the village from a local supply center and social gathering spot for small scale gold miners to a company camp for the F.E. Company.	This district would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Chugwater Site	Fairbanks North Star/North Pole	Address/location restricted	Archaeological Site	79003754	Chugwater Archaeological Site contains typological evidence for occupation during much of the Holocene Period based on radiocarbon dating.	This site would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Coal Creek Historic Mining District	Yukon-Koyukuk / Circle	Along the Yukon River, Southeast of Circle, in Yukon--Charley Rivers NP	Historic District	95000573	The Coal Creek Historic Mining District includes buildings, structures, a dredge, water system, and tailings piles. Most of these were building between 1934 and 1940. There are 41 contributing resources to the historic district. The mining camp has been moved twice from the original location. The Slaven Roadhouse is within this Mining District and was listed to the NRHP separately.	This district would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Eagle Historic District	Southeast Fairbanks/Eagle	Mile 0, Taylor Hwy.	Historic District/ National Historic Landmark	70000919	Eagle City first emerged as a transportation, communications, and military center due to the Klondike Gold Rush in 1898. There are a total of 74 contributing resources and 67 non-contributing resources to the Eagle Historic District. Due to its location on the Yukon River, the port of Eagle has always been the major community of the Forty Mile River drainage. The United States Army built Fort Egbert adjacent to Eagle City and late became the headquarters for the Military District of North Alaska. The Army with cooperation with civilians built the Trans-Alaska Military Road, which was the first major trail in Alaska. This later established the Washington-to-Alaska Military Cable and Telegraph System.	This National Historic Landmark would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Noise levels would remain below 45 dB. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
F.E. Company Dredge No. 4	Southeast Fairbanks/Chicken	0.25 mile Chicken Airport Rd., Mile 66.4 Taylor Hwy.	Structure	6000435	Dredge No. 4 was built by the Yuba Manufacturing Company in San Francisco in 1938. The F.E. Company had it shipped in pieces and was assembled on Pedro Creek. This dredge is a self-contained diesel electric powered gold processing and recovery machine. It is located within the community of Chicken which is listed in the NRHP separately as a historic district.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
The Kink	Southeast Fairbanks/ Fairbanks	Address/location restricted	Archaeological Site	75002161	The Kink is an artificial river channel that was created using powder charges to blast thru a rock ridge and draining part of the North Fork River in 1904.	This site would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
George McGregor Cabin	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 2 miles down from Coal Creek	Building	87001199	The George McGregor Cabin was built in 1938 located on a river terrace. The cabin was built from unpeeled logs with an average of 7 inch diameter, hewn slightly on the interior, and saddle notched. The joints were chinked with moss. It is representative of cabins built by solitary trappers.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Rapids Roadhouse	Southeast Fairbanks/ Delta	Mile 227.4 Richardson Hwy.	Building	1000021	The Rapids Roadhouse opened in 1904 to serve travelers on the Valdez-Fairbanks Trail, which was the principal travel corridor at the time. The original roadhouse was a two-story log building made of unpeeled spruce logs. The roof was originally covered with sod.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Rika's Landing Roadhouse	Southeast Fairbanks/ Big Delta	Mile 252, Richardson Hwy.	Building	76000364	Rika's Landing Roadhouse was built in 1909 along the Valdez-Fairbanks Trail. This roadhouse was larger in size than most roadhouses built around 1904. The walls were constructed of logs horizontally, the southernmost corners were joined saddle-cornered while the other corners were made in a V-plate type joint. The roadhouse consisted of a large dining room and kitchen, a parlor, 11 private rooms, large dormitory-like sleeping areas on each floor, and a sleeping loft in the attic.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Frank Slaven Roadhouse	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1/4 mile from the mouth of Coal Creek	Buildings/ Structures	87001202	Frank Slaven Roadhouse was built in 1930 near the mouth of the Coal Creek. It was built on a mud flat with a ramp which enabled barges to unload. By 1938, the site consisted of the large roadhouse, outbuildings which included a shed, greenhouse, smokehouse, outhouse, and a cache. Slaven is credited with discovering gold on Coal Creek and later sold his claim to Gold Placers, Inc. in 1934. The Frank Slaven Roadhouse is located within the Coal Creek Historic Mining District.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Steele Creek Roadhouse	Southeast Fairbanks/E agle	Fortymile River	Building	80004576	Steele Creek Roadhouse was built in 1898 with a second story added in approximately 1910. It was constructed of spruce logs between 9 and 12 inches in diameter using notch and saddle fashion. This roadhouse served as the post office in the Fortymile District between 1907 and 1951. It is the only two story and largest log structure in the Fortymile district.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Sullivan Roadhouse	Southeast Fairbanks/ Delta Junction	Mile 266, Richardson Hwy.	Buildings/ Structures	79003756	Sullivan Roadhouse was built in 1908 and operated until 1928 has a sled-stage resting facility along the Donnelly-Washburn Cut-Off which was the winter short cut from the Valdez-Fairbanks Trail. Along with the Roadhouse, a barn, a smithy, a cold cellar, and an outhouse were also present. These buildings were constructed using solid hand-hewn White Spruce, unpeeled, round-log, using the notched-corner technique. The roadhouse could accommodate 40 people.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Swan Point Archaeological Site	Southeast Fairbanks/ Big Delta	Address/location restricted	Archaeological Site	8000929	The Swan Point Archaeological Site has yielded the oldest evidence of human habitation in Alaska. There is also evidence of megafauna including elk, bison, and mammoth that were located alongside human artifacts. Based on radiocarbon dates, the site was occupied around 12,000 B.C.	This site would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.
Tangle Lakes Archeological District	Matanuska-Susitna/ Glennallen	Address/location restricted	Archaeological Site	93000713	The Tangle Lakes Archaeological District is 226,660 acres in size. This is the largest Archaeological District in the North American subarctic and contains over 600 documented prehistoric sites in Alaska.	These sites would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

Property Name	*County/ City*	*Address*	*Type*	*National Register Number*	*Features*	*Summary of Effects and Factors/ Restrictions Minimizing Effects*
Woodchopper Roadhouse	Yukon-Koyukuk / Eagle	Left bank of the Yukon River 1 mile up from Woodchopper Creek	Building	87001201	Woodchopper Roadhouse was built in 1910 along Woodchopper Creek. In order to create more dry land for cabins, drainage ditches were dug around the site. The associated buildings include a gable roof shed, a residential cabin, dog barns, and a shed. The roadhouse is two-stories and was constructed of 10 inch diameter wall logs, peeled but not hewn, and joined at the corners with saddlenotches. The joints were first chinked with moss then covered with mortar.	This property would not be affected by the proposed action. F-35 training activities would operate in the same airspace as is currently used by F-16s and other aircraft. Although there would be slightly more operations, there would be minimal change to noise levels when compared to the No Action Alternative. Sonic booms in the area would be the same as under the No Action Alternative. No effects are anticipated from the Proposed Action.

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Natural Resources
DIVISION OF PARKS AND OUTDOOR RECREATION
OFFICE OF HISTORY AND ARCHAEOLOGY
550 West 7th Avenue, Suite 1310
Anchorage AK 99501-3565
Main: 907.269.8721
Fax: 907.269.8908

September 1, 2015

File No.: 3130-1R Air Force
2015-01380

Ms. Julene May, Chief
Installation Management Flight
354 CES/CEI
2310 Central Avenue
Eielson AFB 99702

Subject: Basing of Two F-35A Operational Squadrons at Eielson Air Force Base (AFB), Alaska

Dear Chief May:

The Alaska State Historic Preservation Office (AK SHPO) received the correspondence from Lt. Col. Justin W. Morrison (signed for Lt. Col. Morrison by Michael E. Lee) (dated July 31, 2015) on August 5, 2015. Following our review of the documentation provided, we offer the following comments:

- We concur that a finding of **no historic properties affected** is appropriate for the No Action Alternative.
- Given the extensive survey and identification efforts completed thus far at Eielson Air Force Base (AFB), we concur that a finding of **no historic properties affected** is appropriate with respect to the potential for direct/indirect effects to archaeological sites and/or districts, regardless of the alternative selected.
- We concur that a finding of **no adverse effect** is appropriate with respect to the proposed stationing of two squadrons of F-35As at Eielson AFB, adding military and civilian personnel, and operation of the aircraft.
- We are unable to concur at this time that a finding of 'no adverse effect' is appropriate for the proposed construction and/or modification of facilities at Eielson AFB. Before we are able to provide our concurrence, we offer the following specific comments:
    - The documentation provided does not provide corresponding Alaska Heritage Resource Survey (AHRS) site numbers (e.g., the Quarry Hill Historic District is designated XBD-00334). The absence of AHRS numbers throughout complicates and delays our review and suggests that the AHRS was not utilized while compiling this documentation (page 5 states that the NRHP database was searched, but does not mention the AHRS database). As a critical resource for baseline research and analysis, we want to ensure that the AHRS was accessed and that its information is incorporated appropriately into this analysis.
    - Table 1 on page 2 of the documentation provided lists a significant amount of new construction, however, the assessment of effects provided in the remainder of the documentation seems to focus only on the effects to known historic districts. At a minimum, the documentation should provide the age (date of construction), an AHRS number for each building proposed for renovation (shown in Attachments 4a – 4i), and a brief description of its current eligibility status. Our records indicate that most, if not all of the buildings and

structures on Eielson AFB have been assigned AHRS numbers. Many of them have been assessed for NRHP-eligibility in the past and many have not. If a building has not previously been evaluated for its eligibility for listing in the National Register of Historic Places, then a determination of eligibility should be completed. It is important to note that some resources may gain significance over time and that a re-evaluation of NRHP-eligibility is sometimes warranted. If any properties are found to be potentially eligible (either individually or as part of a historic district), the criteria of adverse effect (per 36 CFR 800.5[a][1]) should be applied to determine if any of the proposed renovations will result in adverse effects to historic properties. If they are not eligible, no additional consultation regarding the effects of this proposed undertaking is necessary.

- Please provide a figure or map that shows the boundary of the Engineer Hill Munitions Historic District (FAI-01766), as well as a depiction of the activities proposed within or adjacent to the district.
- Please provide additional justification as to why the construction of six new munitions igloos within the Quarry Hill Munitions Historic District (XBD-00334) will not result in an adverse effect to that district (per 36 CFR 800.5[a][1]). While the Program Comment entitled, *Program comment for World War II and Cold War Era (1939 – 1974) Army Ammunition Production Facilities and Plants* does appear to apply to the Quarry Hill Munitions Historic District, please provide additional information as to why, under section III. Applicability, the third exception does not apply. It states, *"Facilities and Plants listed or eligible National Register of Historic Places districts where the ammunition production facility is a contributing element of the district and the proposed undertaking has a potential to adversely affect such historic district. This third exclusion does not apply to ammunition production-related historic districts that are entirely within the boundaries of an ammunition production plant. In those cases the Program Comment would be applicable to such districts."*
- We recommend that the Air Force develop a more robust Discovery Plan for this undertaking that also includes more detailed information on how the discovery of human remains will be handled. Perhaps the Eielson Integrated Cultural Resource Management Plan (ICRMP) has this information and can be cited. If these critical protocols are not addressed in the ICRMP, they should be developed more fully for this undertaking.

Please note that as stipulated in 36 CFR 800.3, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations. Receipt of our comment letter does not end the 30-day review period provided to other consulting parties.

Thank you for the opportunity to comment. We look forward to continued consultation on the subject undertaking. Please contact Sylvia Elliott at 269-8724 or sylvia.elliott2@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner

Judith E. Bittner
State Historic Preservation Officer

JEB:sad

DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

DEC 03 2015

Justin W. Morrison, Lt Col, USAF
Base Civil Engineer
354 CES/CC
2310 Central Avenue Ste 100
Eielson AFB, Alaska 99702

Ms. Judith Bittner
Alaska Department of Natural Resources
Office of History and Archaeology
550 W. 7th Ave., Suite 1310
Anchorage, AK 99501

Re: Supplemental Information to Support a Finding of No Adverse Effect for Proposed Construction and/or Modification of Facilities Associated with the Basing of Two F-35A Operational Squadrons at Eielson Air Force Base (AFB), Alaska

Dear Ms. Bittner,

We thank you for your letter of 1 Sep 15 in which you requested additional information in support of our request for concurrence with a finding of "no adverse effect" regarding the proposed new construction and/or modification of facilities at Eielson AFB. Attachment 1 contains the detailed supplemental information summarized below.

The Alaska Heritage Resource Survey (AHRS) site numbers have been incorporated into a tabular presentation of new construction and facilities modifications presented in Table 1 of Attachment 1. The table identifies all of the facilities currently proposed for construction as well as those facilities scheduled to be modified. The figures contained in Attachment 1 show the location and relationship of these facilities to one another. The AHRS database was consulted during the preparation of this information. In addition to the AHRS numbers and corresponding facility numbers, information is also provided on the current function of each facility and the fiscal year in which a facility would be modified. Information provided in the last column identifies the date of construction for these facilities.

Due to changes in facility requirements identified in the Draft EIS, there are now no plans to perform any interior renovations of Nose Dock 2 (B-1121, FAI-659) as part of the F-35 Beddown. However, interior renovations will be required in the Maintenance Operations Center (B-1141, FAI-659) to accommodate additional personnel (Attachment 1, Figure 6). This facility is a contributing element to the Flightline Historic District. Previous consultations with your office identified the exterior appearance and functional and spatial relationships of the

the facility or the Flightline Historic District as a whole. Your concurrence with this finding is respectfully requested.

One additional eligible facility (B-1306, FAI-536), the Aerospace Ground Equipment Shop/Covered Storage, is currently scheduled to receive interior renovations to accommodate additional personnel (Figure 3). These renovations will involve upgrades to the existing office/work spaces, as well as upgrades to the facility restrooms. The AHRS information card for this facility identifies its historic significance as being related to events significant in the Cold War (Criterion A) and because it embodies distinctive characteristics (Criterion C). Responses to previous historic consultations with your office indicate that the exterior appearance of eligible facilities is the significant architectural feature under Criterion C for historic properties on Eielson AFB. As no exterior renovations to the facility are planned, the Air Force finds that the planned renovations will have no adverse effect on this facility's historic significance or integrity. The facility's exterior appearance would not be changed and would remain consistent with its Cold War function. The facility will continue to be used for Aerospace Ground Equipment maintenance/repair and storage, with the scheduled upgrades to the existing office/work spaces and the facility restrooms improving its functionality. Your concurrence with this finding of no adverse effect is therefore respectfully requested.

As we have identified in Table 1, there are a number of facilities for which formal Determinations of Eligibility have not been provided to your office for review. The information on which Eielson bases its determinations of Not Eligible for the facilities impacted by the F-35 Beddown is provided in Attachments 2, 3, and 4. There are three facilities currently scheduled for demolition with discussion and justification provided in Attachment 2. One facility (FAI-1156, Youth Center) was determined not eligible, with concurrence from your office (Ltr 18 Mar 2005). However, the other two do not have determinations of eligibility (FAI-794, Child Development Center and FAI-701, Missile Maintenance Shop). We request your concurrence with our determination of Not Eligible for these two facilities, based on the information provided.

Information on Cold War Period facilities is provided in Attachment 3. All of these facilities were evaluated by Mr. Colt Denfield in a 1997 Historic Facilities Survey, with findings of no significance to the Cold War Period. We request your concurrence with our determinations of Not Eligible for the identified Cold War facilities (Table 1). Eligibility information is provided in Attachment 4 for Post-Cold War facilities identified for interior or exterior modification under the F-35 Beddown proposal. For the Post-Cold War facilities identified, we request your concurrence with our determinations of Not Eligible, with the understanding that these facilities will be reevaluated when they approach 50 years of age.

As you have requested, we have provided a map showing the locations of the Engineer Hill Munitions Historic District (FAI-01766) in relationship to the new F-35 construction along

the Eielson Flightline (Attachment 1, Figure 1). At the present time, no new construction or renovations are planned for the Engineer Hill Munitions Storage Area. As can be seen in Figure 1, the three historic districts are geographically isolated from one another so that construction activities planned for Quarry Hill Munitions Historic District (XBD-00334) would have no effect on the Flightline Historic District or the Engineer Hill Munitions Historic District. None of the construction at Quarry Hill would be visible from either of the other two historic districts.

In regard to the construction of the six new storage igloos in the Quarry Hill Munitions Storage Area, our position remains that the Program Comment titled *Program Comment for World War II and Cold War Era (1939 – 1974) Ammunition Storage Facilities* applies to this action. Section III. A.1(3), Applicability, states that the Program Comment does not apply to *"ammunition storage facilities in listed or eligible National Register of Historic Places districts where the ammunition storage facility is a contributing element of the district and the proposed undertaking has the potential to adversely affect such historic district. This third exclusion does not apply to historic districts that are made up solely of ammunition storage facility properties. In those cases the Program Comment would be applicable to such districts."* Both Engineer Hill Munitions and Quarry Hill Munitions Historic Districts fall within the latter category, as the contributing elements of each district consist solely of ammunition storage facilities. As the Air Force has met its specific mitigations requirements, as well as the DoD-wide Mitigations, the following actions are authorized under Section V. Effect of the Program Comment: *"ongoing operations, maintenance and repair, rehabilitation, renovation, mothballing, cessation of maintenance, new construction, demolition, deconstruction and salvage, remediation activities, and transfer, sale, lease and closure of such facilities. Accordingly, DoD installations are no longer required to follow the case-by-case Section 106 review process for such effects."* However, in the future, Eielson AFB will continue to notify your office of actions being taken under this Program Comment.

At your request the Air Force will incorporate a more robust Discovery Plan into the Final EIS, as contained in the Eielson Integrated Cultural Resources Management Plan (2014) and provided as Attachment 5 to this letter. Local governments have been notified of the undertaking being analyzed in the F-35 EIS, and the 354 Fighter Wing Commander has initiated Government-to-Government consultation on the undertaking with Alaska Native Tribes residing under the Airspace Affected Environment.

We appreciate your review of the enclosed information and respectfully request your concurrence with these findings and determinations. Please provide your written response within 30 days of your receipt of this request to: Ms. Julene May, Chief, Installation Management Flight, 354 CES/CEI, 2310 Central Avenue, Eielson AFB, (907) 377-4342, julene.may@us.af.mil.

receipt of this request to: Ms. Julene May, Chief, Installation Management Flight, 354 CES/CEI, 2310 Central Avenue, Eielson AFB, (907) 377-4342, julene.may@us.af.mil.

JUSTIN W. MORRISON, Lt Col, USAF
Commander, 354th Civil Engineer Squadron

Attachments:
1- Proposed Construction and Modifications
2- Demolitions
3- Cold War Facilities
4- Post-Cold War Facilities
5- Discovery Plan

Table 1. NRHP Eligibility Status of Facilities Proposed for Construction or Modifications

AHRS #	*Facility #*	*Facility Function/Action*	*Date of Construction*	*NRHP Eligibility*
Proposed New Construction				
NA	NA	Construct 6-Bay Flight Simulator Facility	2016	NA
NA	NA	Reopen/Expand South Gate Vehicle Parking for construction traffic (No buildings located nearby)	2016	NA
NA	NA	Construct 4-Bay Hangar/Propulsion Maintenance/Corrosion Control Personnel Dispatch (Squadron1) (South Loop)	2017	NA
NA	NA	Construct 4-Bay Hangar/Squadron Operations/Aircraft Maintenance Unit (Squadron 2) (South Loop)	2017	NA
NA	NA	Construct 8-Bay, 16-Aircraft Weather Shelter (South Loop)	2017	NA
NA	NA	Construct 8-Bay, 16-Aircraft Weather Shelter (South Loop)	2017	NA
NA	NA	Construct 6 Munitions Storage Igloos (Quarry Hill)	2017	NA
NA	NA	Construct New Missile Maintenance Facility (South Loop)	2017	NA
NA	NA	Construct 4 – Bay R-11 Refueling Truck Garage (South Loop)	2018	NA
NA	NA	Construct South Heat Plant (South Loop)	2018	NA
NA	NA	Construct South Loop Aerospace Ground Equipment Fill Stand (South Loop)	2018	NA
NA	NA	Construct New Munitions Flight Facility	2018	NA
NA	NA	Construct New AME (South Loop)	2018	NA
NA	NA	Construct 200-Person Dormitory	2019	NA
NA	NA	Construct Flight Kitchen (South Loop)	2019	NA
NA	NA	Construct School Age Facility	2019	NA
NA	NA	Construct Combat Arms Training and Maintenance Range	2019	NA
NA	NA	Construct New Snow Removal Equipment Warm Storage	2019	NA
Buildings near proposed new Flight Simulator (Figure 2)				
FAI-684	1209	Aerospace Ground Equipment (AGE) Covered Storage Facility (Renovate interior, 2018)	1984	NE
FAI-686	1215	Operations Support Squadron Facility (Add/Alter, 2018)	1975	NE
FAI-692	1232	Nose Dock 7 – (Renovate interior: Enlarge Wheel & Tire Shop, 2018)	1966	NE
NA	3134	Security Forces Facility (Renovate Interior, 2019)	2006	NE
FAI-821	3426	Base Supply (Renovate interior: Enlarge classified storage, larger doors, 2018)	1992	NE
NA	3462	Munitions Flight (Interior Renovation for personnel, 2018)	2000	NE
NA	4110	18 Aggressor Squadron Operations and Aircraft Maintenance Unit (Renovate interior, 2016)	2000	NE
FAI-839	4280	Field Training Detachment (Alter/Add, 2017)	1984	NE
Buildings near proposed new Hangars and Aircraft Shelters (Figure 3)				
FAI-536	1306	AGE Shop/Covered Storage (Add/Alter, 2018)	1965	Eligible
FAI-703	1307	Aircraft Maintenance Unit (AMU)/Weather Shelter (Renovate Interior, 2017)	1965	NE

Table 1. NRHP Eligibility Status of Facilities Proposed for Construction or Modifications

FAI-715	1335	Aircraft Maintenance Hangar (Interior/Exterior, add Fuel Cell, 2018)	1988	NE
FAI-717	1337	Squad Operations (Renovate interior, 2017)	1990	NE
FAI-718	1338	Aircraft Maintenance Hangar (Interior/Exterior Renovations, 2018)	1986	NE
FAI-720	1340	Weapons Load Training Shop (Renovate interior, 2018)	1985	NE
FAI-721	1341	Egress Maintenance Shop (Renovate interior, 2018)	1987	NE
FAI-722	1344	Fuel Cell (Renovate interior, 2018)	1987	NE
FAI-723	1346	Jet Engine Shop (Renovate interior, 2018)	1987	NE
FAI-724	1347	Maintenance Group (Add/Alter, 2018)	1989	NE
NA	1353	Armament Systems Maintenance Shop (Renovate, 2018)	2001	NE
Buildings Near Proposed Missile Maintenance Facility (Figure 4)				
FAI-701	1303	Missile Maintenance Shop (Demolish, 2017)	1962	NE
FAI-711	1324	Munitions Inspection Shop (Add/Alter, 2017)	1994	NE
FAI-712	1326	Munitions Line Delivery (Renovate Interior, 2017)	1995	NE
Buildings in Quarry Hill Munitions Storage District (XBD-00334) Schedule for Modification (Figure 5)				
NA	6385	Munitions Inspection Shop (Add/Alter, 2018)	1999	NE
XBD-202	6347	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-203	6348	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-204	6349	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-205	6350	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-206	6352	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-207	6353	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-208	6354	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-209	6357	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-210	6360	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-211	6361	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-212	6363	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-213	6364	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-214	6365	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-215	6366	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-216	6368	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-217	6369	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-219	6371	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-220	6372	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-221	6373	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-222	6374	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-224	6376	Munitions Storage Igloo (No Modification)	1955	Eligible
XBD-225	6377	Munitions Storage Igloo (No Modification)	1955	Eligible

Table 1. NRHP Eligibility Status of Facilities Proposed for Construction or Modifications

Buildings Impacted by Proposed New Dormitory (Figure 6)				
FAI-659	1141	Maintenance Operations Center (Renovate Interior, 2018)	1954	Eligible
Buildings Impacted by Proposed School Age Facility (Figure 7)				
FAI-794	3303	Child Development Center (Demolish, 2019)	1973	NE
FAI-540	3349	Medical Clinic (Add/Alter, 2019)	1986	NE
FAI-1156	5313	Youth Center (Demolish, 2019)	1955	NE
Buildings Near Proposed Combat Arms Training & Maintenance Range (Figure 8)				
NA	6389	Outdoor Arms Range, 19 Firing Points (Add 2 Firing Points, 2018)	1964	NE

ELIGIBLE: Eligible for listing on the NRHP, as documented in the AHRS database
NE - Not Eligible for listing on the NRHP, with concurrence from the Alaska SHPO (Ltr: 18 Mar 2005)
NE – Not Eligible, as determined by Eielson AFB

Attachment 1
Summary of Proposed Construction and Modifications

Table 1 presents the list of new construction and facility modifications identified to support the F-35 Beddown at Eielson AFB. The attached figures identify the locations of new construction and facilities scheduled for modification.

Figure 1: Relationship of Historic Districts with Proposed Construction and Modifications

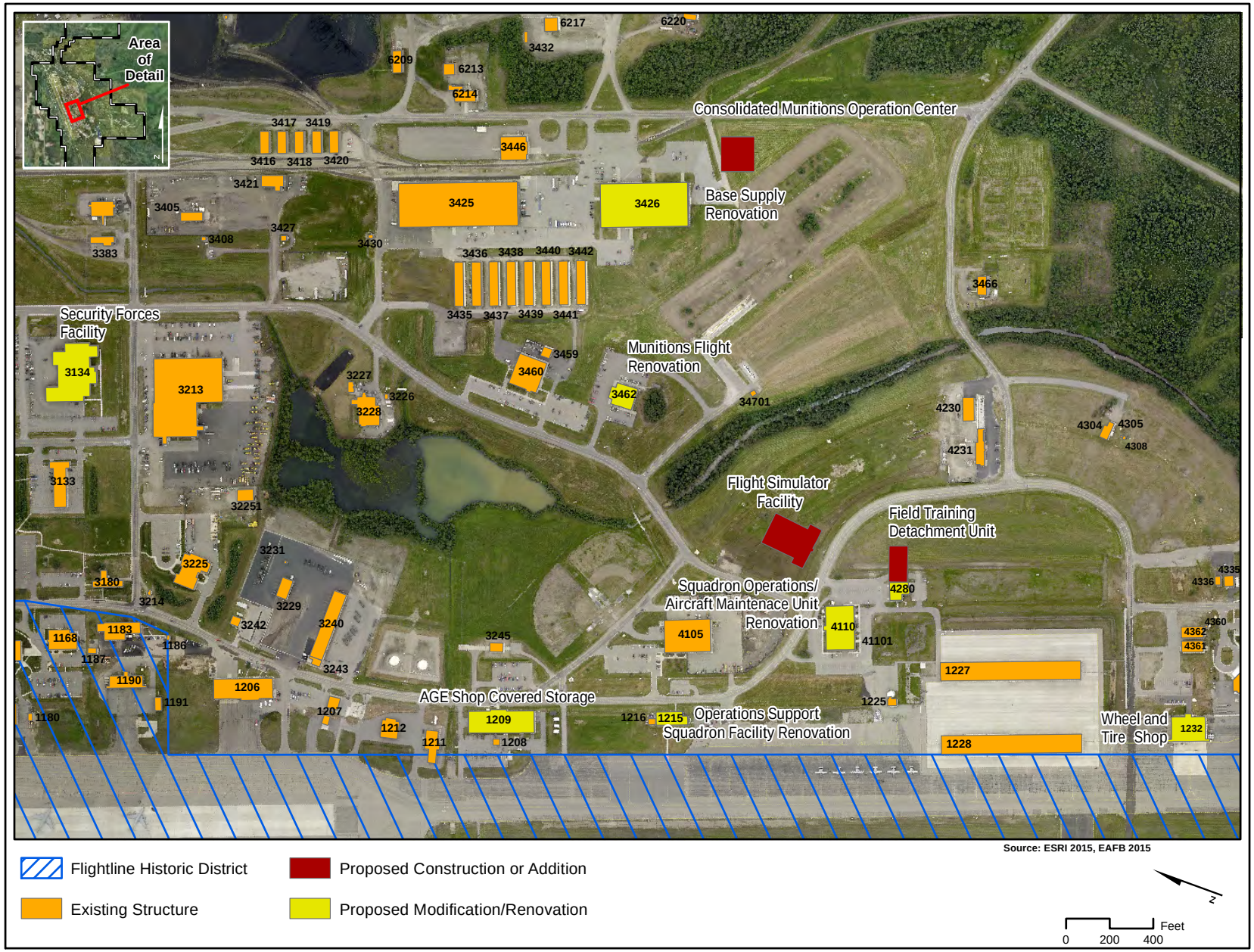


Figure 2: Construction and Modification\Renovation near the Proposed Flight Simulator Facility

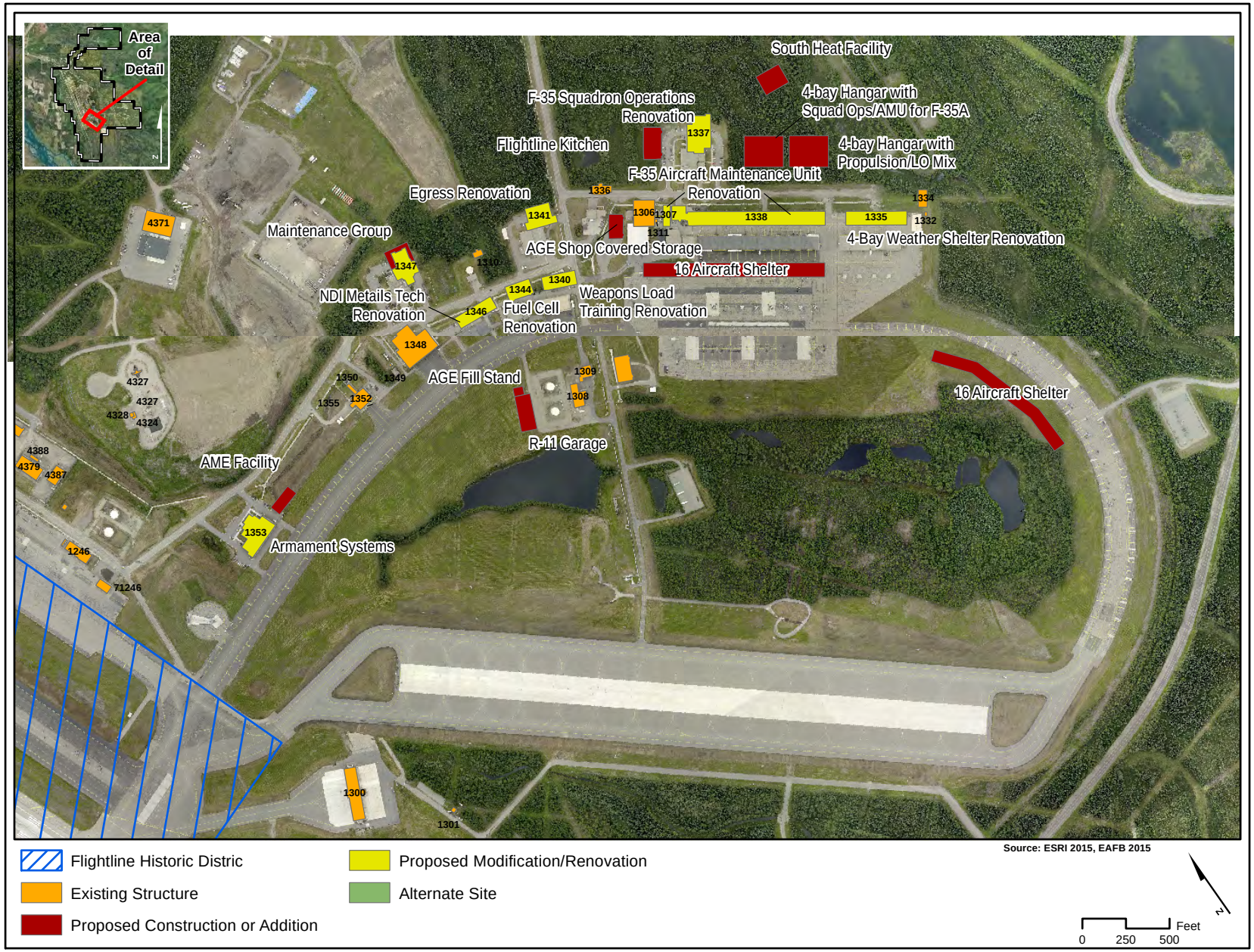


Figure 3: Facility Construction and Modification/Renovation in the South Loop Area

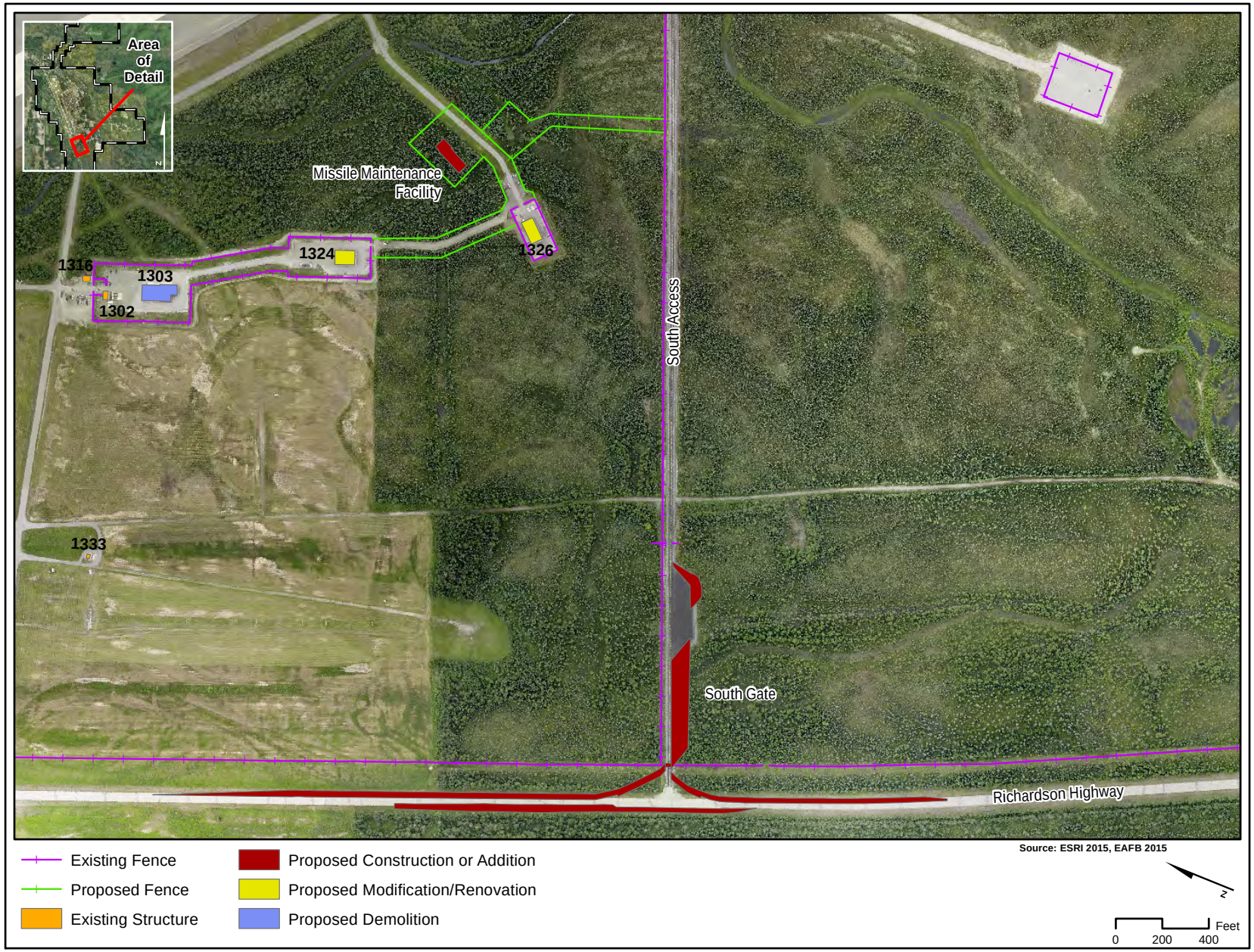


Figure 4: Construction, Modification/Renovation, and Demolition in the South Access Area

C-108

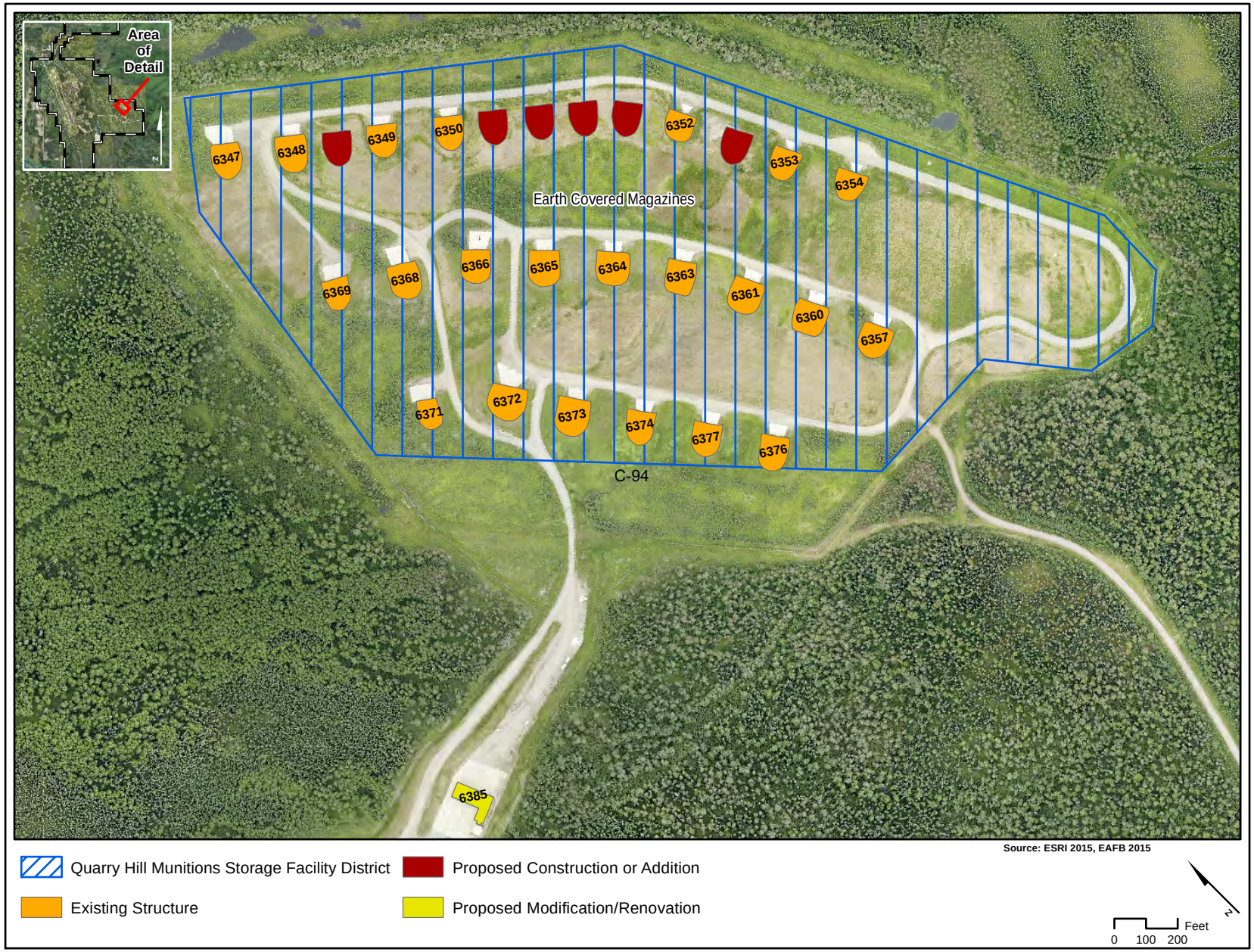


Figure 5: Construction and Modifications in the Quarry Hill Munitions Storage Facility District

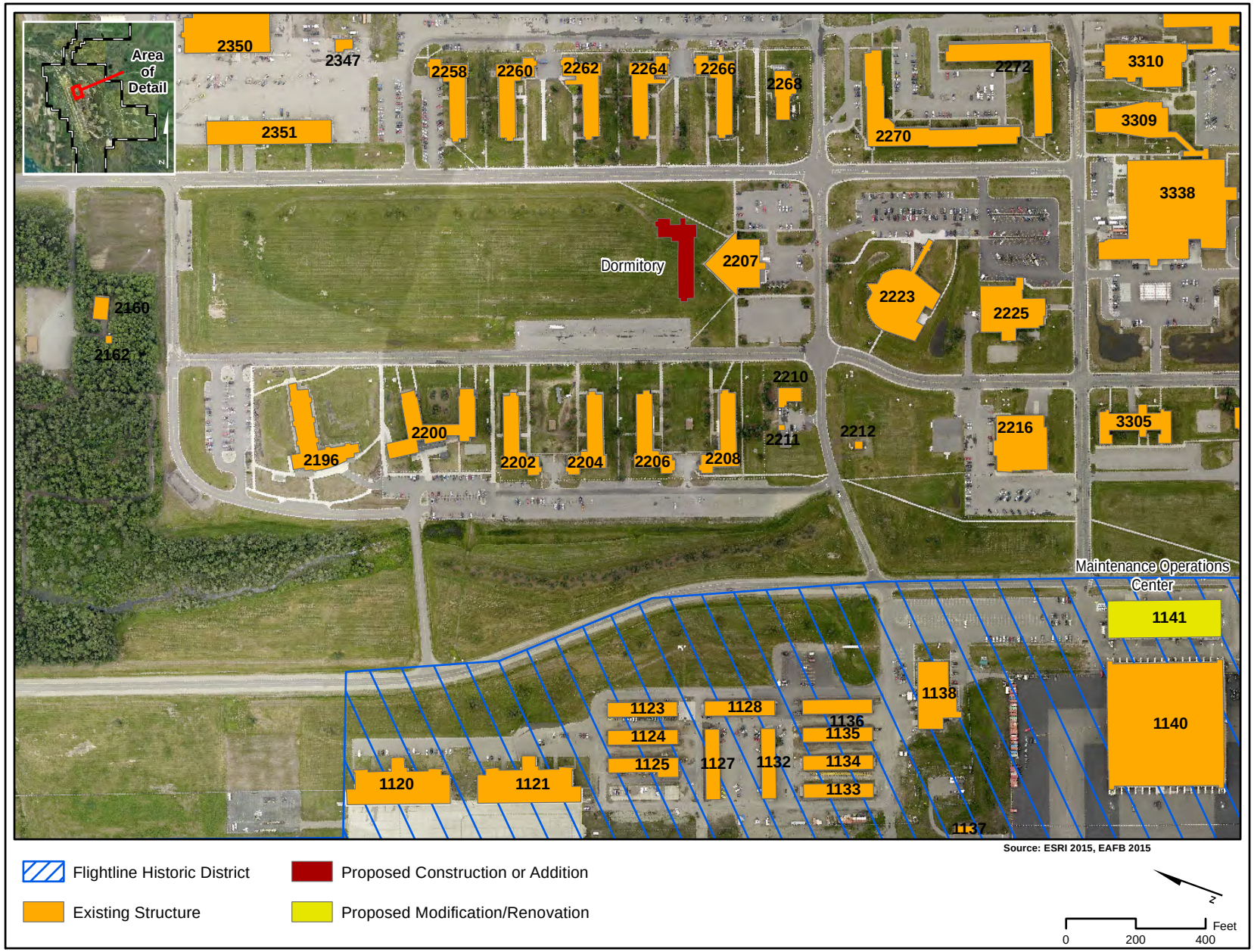


Figure 6: Construction and Modification/Renovation around the New Dormitory

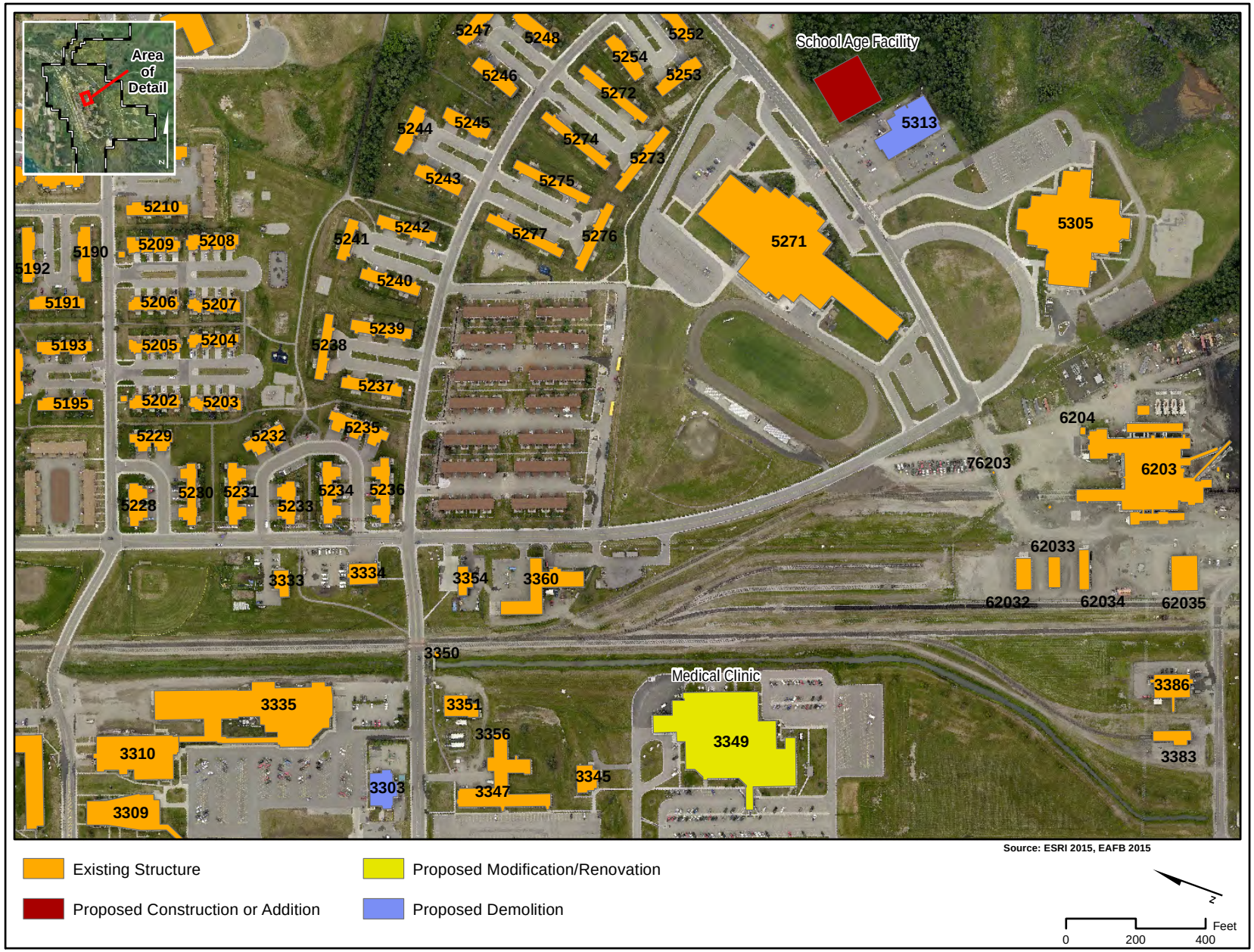


Figure 7: Construction, Modification/Renovation, and Demolition near the School Age Facility

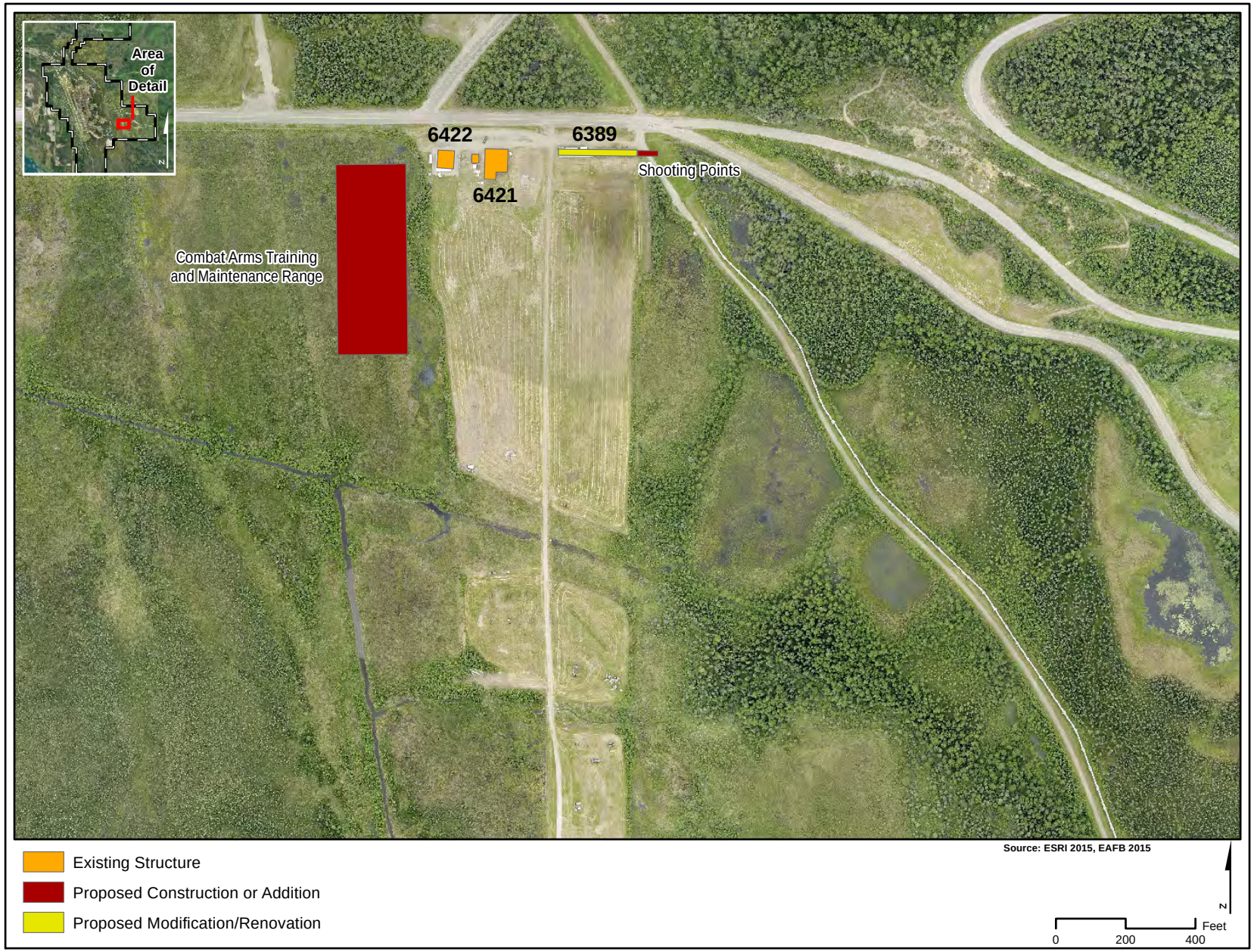


Figure 8: Construction and Modification/Renovation near Arms Training Area

Attachment 2

F-35 Facility Demolitions

There are three facilities at Eielson AFB scheduled for demolition under the F-35 Beddown proposal: B-1303 (FAI-701, Missile Maintenance Shop), B-3303 (FAI-794, Child Development Center)), and B-5313 (FAI-1156, Youth Center). The Alaska SHPO concurred with a determination of Not Eligible for the Youth Center (Ltr, 18 Mar 05), but no formal NRHP eligibility determinations have been made for the Child Development Center or the Missile Maintenance Shop. The attached Level II Recordation Forms prepared by Mr. Colt Denfield, 1996, are submitted as documentation for findings of Not Eligible determinations for B-1303 and B-3303. Both facilities were found to have no significance in relation to activities on Eielson AFB during the Cold War Period.

The Missile Maintenance Shop has been extensively modified since its original construction in 1962. Several changes were made in the roof on the north end and middle of the building, to include addition of a roof over the loading area in the center of the facility. A metal sided addition on the right end of the building, which is a different type of construction from the concrete of the original facility. As identified in the attached survey document, Mr Denfield determined that it did meet any of the significance criteria for the Cold War. Its function as a missile maintenance facility relates to the tactical role of Eielson AFB, rather than the strategic Cold War mission associated with the Flightline Historic District. This facility is also located in an area of the flight line that requires a waiver for continued occupancy, and it is Air Force policy to reduce the number of waivers issued.

The Child Development Center was also determined by Mr. Denfield to be not eligible for the NRHP, as it did not meet any of the significance criteria for the Cold War period.

The Air Force requests your concurrence with our finding of Not Eligible determinations for the Missile Maintenance Shop and the Child Development Center.

LEVEL 2

ARCHITECTURAL RECORDATION FORM

Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1303

SECONDARY OR COMMON NAMES OF PROPERTY: Missile Maintenance Shop and Cubical Munitions Storage

AHRS NO.: 701

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area, 284 Cargain Road

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1962
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** one-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,708 SF, 135' x 68'

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3303

SECONDARY OR COMMON NAMES OF PROPERTY: Child Care Center

AHRS NO.: 794

COMPLETE ADDRESS (or PHYSICAL LOCATION): Broadway and Central Avenue

STYLE: Cold War, box, plain

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1973
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** CMU
- **C. Siding:** CMU
- **D. Roofing:** Concrete/single-shingle
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete/Tile

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Dimensions are 93’ x 36’; 2-wings are 9’4’’x 26’8’’ and 12’8’’x42’8’’.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS: B-3303

Attachment 3

Cold War Facilities

The attached Architectural Recordation Forms contained are provided to support the Air Force findings of Not Eligible Determinations for following Cold War Period facilities scheduled for interior or exterior modifications as part of the F-35 Beddown at Eielson AFB:

AHRS #	Building #	Nomenclature
FAI-684	B-1209	Aerospace Ground Equipment Covered Storage Facility
FAI-686	B-1215	Operations Support Squadron Facility
FAI-692	B-1232	Nose Dock 7
FAI-703	B-1307	Aircraft Maintenance Unit
FAI-715	B-1335	Aircraft Maintenance Hangar
FAI-718	B-1338	Aircraft Maintenance Hangar
FAI-720	B-1340	Weapons Load Training Shop
FAI-721	B-1341	Egress Maintenance Shop
FAI-722	B-1344	Fuel Cell Maintenance Facility
FAI-723	B-1346	Jet Engine Maintenance shop
FAI-724	B-1347	Maintenance Group
FAI-540	B-3349	Medical Clinic
FAI-839	B-4280	Field Training Detachment
NA	B-6389	Outdoor Small Arms Range

LEVEL II
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1209

SECONDARY OR COMMON NAMES OF PROPERTY: Aerospace Ground Equipment (AGE) Maintenance and Storage Facility

AHRS NO.: 684

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2767 Fighter Line Ave

STYLE: Standard box

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1984
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** CMU/Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** Concrete
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 29,550 S.F. Dimensions are 106 x 325

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1215

SECONDARY OR COMMON NAMES OF PROPERTY: Base Operations, Control Tower

AHRS NO.: 686

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2827 Flight Line Ave

STYLE: Plain, box shape, with tower

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1975
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Concrete
- **D. Roofing:** Steel
- **E. Floor Structure**: Concrete
- **F. Roof Structure:** Control tower on operations building
- **G. Flooring:** Carpet on concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Dimensions: 150' x 60'; S.F. Dimensions are 144 x 40'

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1232

SECONDARY OR COMMON NAMES OF PROPERTY: Aerospace Ground Equipment Storage

AHRS NO.: 692

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2931 Flight Line Ave

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1966
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** concrete
- **B. Framing:** concrete
- **C. Siding:** Sheet Metal
- **D. Roofing:** Metal
- **E. Floor Structure:** Two-story
- **F. Roof Structure**: Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Rectangular, 111' x 150'; 20,106 SF,

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1307

SECONDARY OR COMMON NAMES OF PROPERTY: 18th Aircraft Maintenance Unit

AHRS NO.: 703

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop area; 682 Loop Circle

STYLE:

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1965
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Aluminum
- **D. Roofing:** Aluminum
- **E. Floor Structure:** Concrete
- **F. Roof Structure:** Steel
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 4,800 S.F. Dimensions are 120 x 40.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1335

SECONDARY OR COMMON NAMES OF PROPERTY: 4 Bay Maintenance Hangar

AHRS NO.: 715

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area; 744 Loop Circle

STYLE: Standard box design

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1988
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

Supplemental Information: This facility was constructed to support fighter training operations, housing F-16 aircraft. This mission did not play a significant role in the Cold War.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** concrete
- **B. Framing**: concrete
- **C. Siding:**
- **D. Roofing:**
- **E. Floor Structure:** one-story
- **F. Roof Structure:**
- **G. Flooring**: none, concrete pad

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 81' x 351'

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1338

SECONDARY OR COMMON NAMES OF PROPERTY: Maintenance hangar

AHRS NO.: 718

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area, 690 Loop Circle

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1986
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

Constructed towards the end of the Cold War Period, B-1338 was designed as a fighter aircraft maintenance facility, providing covered heated space. Since construction, this has been the only use of the facility. It currently supports maintenance of F-16 aircraft assigned to the 18th Aggressor Squadron.

PART III. MATERIALS OF CONSTRUCTION:

A. Foundation: Concrete
B. Framing: Concrete
C. Siding: CMU

D. Roofing: Concrete
E. Floor Structure: Hangar
F. Roof Structure: Concrete
G. Flooring: none, on concrete pad

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 56,335 S.F. Dimensions are 81 x 695'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1340

SECONDARY OR COMMON NAMES OF PROPERTY: Maintenance Hangar

AHRS NO.: 720

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area; 628 Loop Access Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1985
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

Constructed towards the end of the Cold War Period, B-1340 was designed as a fighter aircraft maintenance facility, providing covered, heated space to house aircraft. Since construction, this has been the primary use of the facility. It currently supports maintenance of F-16 aircraft assigned to the 18th Aggressor Squadron, also serves as the Munitions Load Crew Training Shop.

PART III. MATERIALS OF CONSTRUCTION:

A. Foundation: Concrete
B. Framing: Steel

C. **Siding:** Steel
D. **Roofing:** Steel
E. **Floor Structure:** 2 Stories
F. **Roof Structure:** Flat
G. **Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 13,000 S.F.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1341

SECONDARY OR COMMON NAMES OF PROPERTY: Shop – Avionics Egress Maintenance Facility

AHRS NO.: 721

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area; 629 Loop Access Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1987
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air

samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** 1 Story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 17,732 S.F. Dimensions are 100' x 300'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1344

SECONDARY OR COMMON NAMES OF PROPERTY: Aircraft Maintenance Shop

AHRS NO.: 722

COMPLETE ADDRESS (or PHYSICAL LOCATION): 588 Loop Access Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1987
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:**
- **D. Roofing:** Concrete
- **E. Floor Structure:** one-story
- **F. Roof Structure:**
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 12,564 SF, 81' x 150'

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1346

SECONDARY OR COMMON NAMES OF PROPERTY: Jet Engine Maintenance Shop

AHRS NO.: 723

COMPLETE ADDRESS (or PHYSICAL LOCATION): 570 Loop Access Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1987
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:**
- **D. Roofing:** Concrete
- **E. Floor Structure:** one-story
- **F. Roof Structure:**
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 17,733 SF, 177' x 74'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1347

SECONDARY OR COMMON NAMES OF PROPERTY: Weapons System/Management Facility

AHRS NO.: 724

COMPLETE ADDRESS (or PHYSICAL LOCATION): Loop Area

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of erection:** 1989
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Concrete
- **D. Roofing:** Steel
- **E. Floor Structure:** 1-story
- **F. Roof Structure:**
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,600 S.F. Dimensions are 160 x 140.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3349

SECONDARY OR COMMON NAMES OF PROPERTY: Medical/Dental Centers

AHRS NO.: 540

COMPLETE ADDRESS (or PHYSICAL LOCATION): Central Avenue, between Broadway and Division

STYLE: Plain, box

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of erection:** 1986
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Metal
- **D. Roofing:** Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 69,000 S.F. Dimensions are 316x304.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 4280

SECONDARY OR COMMON NAMES OF PROPERTY: Flight Simulator, F-16

AHRS NO.: 839

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2871 Flight Line Ave

STYLE: Plain, box

PART I. SIGNIFICANCE:

Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1984
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter

from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** one-story
- F. **Roof Structure**: built-up
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,300 S.F. Dimensions are 100' x 100'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS: On file Natural Resources Office

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6389

SECONDARY OR COMMON NAMES OF PROPERTY: Outdoor, Small Arms Firing Range

AHRS NO.:

COMPLETE ADDRESS (or PHYSICAL LOCATION): Quarry Hill Road

STYLE: Post and beam

PART I. SIGNIFICANCE:

Building has never been recorded in previous facility inventories. Although it retains integrity of location and setting, it has been extensively modified since construction. Modifications were required to maintain functionality of the facility for fire arms training. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era for outdoor firing ranges. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

B. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1964
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar.

In 1949 when it was suspected that the Soviet's were building an atomic bomb these fights along Siberia had another mission. They carried filters which collected dust from air

samples. At Eielson the filters were placed in a lead cylinder with a Geiger counter. A filter from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson was a forward deployment base for intercontinental bombers.

PART III. MATERIALS OF CONSTRUCTION:

- **H. Foundation:** Concrete
- **I. Framing:** Wood
- **J. Siding:** None
- **K. Roofing:** Sheet Metal
- **L. Floor Structure:** one-story
- M. **Roof Structure**: Lean-To
- **N. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,300 S.F. Dimensions are 100' x 100'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE: This facility has been extensively modified since originally constructed. It started as the open-sided structure in the foreground of the attached photo, with the addition of a sheet metal storage shed. A recent addition at the far end of the structure provided climate-controlled firing points to allow all weather fire arms training.

COMPILER: COLT DENFELD, ALASKA DISTRICT CORPS OF ENGINEERS

DATE: July 1997

PHOTOGRAPHS:

Attachment 4

Post-Cold War Facilities

The attached Level II Architectural Recordation Forms are provided to support the Air Force findings of Not Eligible Determinations for the Post-Cold War facilities proposed for interior or exterior modifications as part of the F-35 Beddown at Eielson AFB:

AHRS #	Building #	Nomenclature
NA	B-3134	Security Forces Facility
FAI-821	B-3426	Base Supply
NA	B-3462	Munitions Flight
NA	B-4110	18 Aggressor Squadron Operations
FAI-717	B-1337	Squadron Operations Unit
NA	B-1353	Armament Systems Maintenance Shop
FAI-711	B-1324	Munitions Inspection Shop
FAI-712	B-1326	Munitions Line Delivery Shop
NA	B-6385	Munitions Inspection Shop

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1324

SECONDARY OR COMMON NAMES OF PROPERTY: Storage, Rocket Assembly

AHRS NO.: 711

COMPLETE ADDRESS (or PHYSICAL LOCATION): 300 Cargain Road

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building constructed since end of Cold War.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1994
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational; however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** one-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,000 S.F.

PART V. EXTERIOR FEATURES OF NOTE: None, post-Cold War

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1326

SECONDARY OR COMMON NAMES OF PROPERTY: Storage, rockets

AHRS NO.: 712

COMPLETE ADDRESS (or PHYSICAL LOCATION): 330 Mullins Pit Road

STYLE: Standard box, post-Cold War construction

PART I. SIGNIFICANCE:

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of erection:** 1995
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational; however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete Masonry
- **D. Roofing:** Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 5,000 S.F.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2

ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1337

SECONDARY OR COMMON NAMES OF PROPERTY: Squadron Operations

AHRS NO.: 717

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop Area; 713 Loop Circle

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building constructed since end of Cold War. Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1990
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational;

however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete
- **D. Roofing:** Concrete
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Concrete
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 24,840 S.F., 138' x 180'

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1353

SECONDARY OR COMMON NAMES OF PROPERTY: Armament Systems Maintenance Shop

AHRS NO.: NA

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of erection:** 2001
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational;

however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** CMU
- **D. Roofing:** Concrete
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 30,266 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3134

SECONDARY OR COMMON NAMES OF PROPERTY: Security Forces Facility

AHRS NO.: NA

COMPLETE ADDRESS (or PHYSICAL LOCATION): 451 Division Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 2006
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational; however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force

Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** CMU
- **D. Roofing:** Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 10,322 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3426

SECONDARY OR COMMON NAMES OF PROPERTY: Base Supply & Equipment Warehouse

AHRS NO.: 821

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2811 Industrial Drive

STYLE: Plain, box

PART I. SIGNIFICANCE:

A modern warehouse constructed after the Cold War Period. Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1993
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

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BRAC program. It was eventually decided that Eielson AFB would remain operational; however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Sheet Metal
- **D. Roofing:** Sheet Metal
- E. **Floor Structure**: one-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 79,700 S.F., 199' x 399'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS: Filed in Real Property Record

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3462

SECONDARY OR COMMON NAMES OF PROPERTY: Munitions Administration Facility

AHRS NO.:

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2808 Central Avenue

STYLE: Plain, box

PART I. SIGNIFICANCE:

A modern warehouse constructed after the Cold War Period. Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1999
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the

BRAC program. It was eventually decided that Eielson AFB would remain operational; however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Stucco
- **D. Roofing:** Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete/Tile

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 10,322 S.F., 110' x 100'.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

2808

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 4110

SECONDARY OR COMMON NAMES OF PROPERTY: 18th Aggressor Squadron Operations and Aircraft Maintenance Unit

AHRS NO.: NA

COMPLETE ADDRESS (or PHYSICAL LOCATION): Flight Line Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of erection:** 2000
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the BRAC program. It was eventually decided that Eielson AFB would remain operational;

however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron trains in the same manner as the aggressors at Nellis AFB, learning the flying styles and abilities of foreign air forces to train USAF pilots.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Stucco
- **D. Roofing:** Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 25,058 S.F.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6385

SECONDARY OR COMMON NAMES OF PROPERTY: Munitions Maintenance Shop

AHRS NO.: NA

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1370 Munitions Road, Quarry Hill Munitions Storage Area

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of erection:** 1999
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** EAFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

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however, the 354th Wing's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23d Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355 FS was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

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PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete Masonry
- **D. Roofing:** Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Rectangular, 7,659 S.F.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER:

DATE: OCTOBER 2015

PHOTOGRAPHS:

1270

Attachment 5
Discovery Plan

The following will be incorporated into the F-35 EIS as a Discovery Plan during ground disturbing activities associated with proposed F-35 construction activities. The plan is excerpted from the 2013 - 2018 Eielson Integrated Cultural Resources Management Plan.

4.2 ARCHAEOLOGICAL RESOURCES

No standard operating procedures are required because the survey documented in the *1996 Archaeological and Prehistoric Cultural Resource Survey* report found no evidence of significant prehistoric or non-military historic land use by Athabaskans or Euroamericans. However should any archaeological sites be identified in the future, Eielson AFB would follow these procedures to protect archaeological resources.

4.2.1 Ground Disturbance near Archaeological Sites

Any activity that could affect an archaeological site that is on or eligible for the National Register, or is potentially eligible for the National Register, but not yet formally evaluated, will be reviewed by the 354 CES/CEIEA CRM.
Any project that will disturb the ground in any way, or alter the landscape in any way, has the potential to affect archaeological resources. Examples of such activities would include (but are not limited to):

- Any excavation (associated with installing a cable for example).
- Moving heavy equipment over an archaeological site (i.e. a heavy backhoe), since pressure from the wheels could disturb the ground.
- Changing the landscape near an archaeological site such that the site might be exposed to erosion.

Any such plans must first be reviewed by the 354 CES/CEIEA CRM according to the procedures outlined in Chapter 3. If the 354 CES/CEIEA CRM determines that a National Register eligible or potentially eligible site is located in the APE, then the 354 CES/CEIEA CRM will initiate AKSHPO consultation.

4.2.2 Inadvertent Discoveries of Archaeological Remains

The following SOPs will be used for inadvertent discoveries of archaeological resources:

1. In accordance with 36 CFR Section §800.13 (b), if previously undetected archaeological resources are discovered during project activities, the individual responsible for implementing the work (e.g., the noncommissioned officer in charge [NCOIC] or job foreman) will immediately notify the 354 CES/CEIEA CRM, and steps will be taken to avoid, minimize, or mitigate impact to the resource.
2. The 354 CES/CEIEA CRM will notify the AKSHPO by phone and in writing to solicit their comments. The 354 CES/CEIEA CRM will notify the Departmental Consulting Archeologist (DCA) of the NPS, Archaeological Assistance Division in writing of the find, pursuant to the requirements of the AHPA, (16 U.S.C. 469).
3. Stoppage of work is not required by 36 CFR §800.13; however, the 354 CES/CEIEA CRM should see that reasonable precautions are taken to avoid unnecessary impact to the identified resource.
4. Pursuant to the requirements of the AHPA, the 354 CES/CEIEA CRM may direct that this work be undertaken by a qualified archeologist for the Air Force. After notification,

the NPS may undertake the recordation of information it feels is significant, and in danger of being lost after notifying Eielson AFB in writing of its decision to do so.

4.2.3 Discovery of Human Remains

If bones are discovered in the course of excavation on the base, the work resulting in the discovery should stop, and the individual responsible for implementing the work (e.g., the noncommissioned officer in charge [NCOIC] or job foreman) will immediately notify the 354 CES/CEIEA, CRM of the find. The 354 CES/CEIEA CRM will then ensure that the following procedures are implemented:

1. The Commander of Security Forces should be notified.
2. Security Forces will establish security for the remains, and contact the 354 CES/CEIEA CRM.
3. The 354 CES/CEIEA CRM will determine (with the aide of a coroner, or a physical or forensic anthropologist) if the remains are human, and whether or not they are associated with an archaeological deposit.
4. If the remains are not human, and not associated with an archaeological deposit, work may continue.
5. If the remains are human, Security Forces should notify the Alaska State Troopers, State's Attorney office, and coroner who will visit the site in the company of the 354 CES/CEIEA CRM to determine if the remains are recent or ancient (with the aide of a forensic anthropologist).
6. If the human remains are modern, the matter becomes the responsibility of law enforcement officials who will determine when project activities may resume.
7. If the human remains are not modern, and not Alaskan Native, the provisions described above for inadvertently discovered archaeological remains are to be followed. Any treatment or removal of human remains must be conducted in consultation with the AKSHPO and in compliance with state or local cemetery law. Removal of human remains and interment in a different cemetery requires the permission of the State's Attorney and the Borough Health officer or the State Health Department.
8. If the human remains have been determined to be Alaskan Native, the provisions of NAGPRA apply, and the regulations outlined in 43 CFR parts 10 should be followed.
9. Immediately upon notification that Alaskan Native human remains have been found on Eielson AFB, the 354 CES/CEIEA CRM will ensure that police protection of the site will continue, and notify by phone, or in writing within one working day, the AFCEC Alaska Installation Support Team, and all potentially related Alaskan Native groups identified in consultation with the AKSHPO. The 354 CES/CEIEA CRM will initiate the consultation process outlined in 43 CFR Part 10.
10. The project may proceed 30 days after the relevant tribes certify receipt of notification, or at any time after a written, binding agreement has been executed by Eielson AFB and the Alaskan Native groups that includes a recovery plan for the removal, treatment, and disposition of the human remains, and any associated cultural objects.

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Natural Resources

DIVISION OF PARKS
Office of History & Archaeology

550 West 7th Ave., Suite 1310
Anchorage, Alaska 99501-3565
Main: 907.269.8721
E-mail: oha@alaska.net

December 30, 2015

File No.: 3130-1R Air Force
2015-01856

Justin W. Morrison, Lt Col, USAF
Base Civil Engineer
354 CES/CC
2310 Central Avenue, Suite 100
Eielson AFB 99702

Subject: Supplemental Information to support a Finding of No Adverse Effect for proposed construction and/or modification of facilities associated with the basing of Two F-35A Operational Squadrons at Eielson Air Force Base (AFB), Alaska

Dear Lieutenant Colonel Morrison:

The Alaska State Historic Preservation Office (AK SHPO) received your recent correspondence and attachments on December 7, 2015, in response to our September 1, 2015, letter requesting additional information on the subject project. Following our review of the documentation provided, we offer the following comments:

- On December 23, we received an e-mail from Ronald L. Gunderson, Chief, Natural/Cultural Resources, Eielson AFB, with a revised Table 1 attached as a replacement for the original Table 1 (Attachment 1).
- Thank you for providing maps (Figures 1-8) that show the relationship of the proposed construction and renovation projects to the Flightline Historic District (FAI-01584), the Quarry Hill Munitions Storage Facility Historic District (XBD-00334), and the Engineer Hill Munitions Storage Historic District (FAI-01766).
- Regarding the *Discovery Plan for Archaeological Resources* submitted as Attachment 5, we find the revised Plan acceptable.
- While we appreciate the photographs provided on the Architectural Recordation (AR) Forms submitted as Attachments 2, 3, and 4, the Alaska Heritage Resources Survey (AHRS) numbers are incomplete: the first three characters of the designation, the "identifying region" letters, are missing. *For your records*, ***FAI-*** should be added to each AHRS number on these forms (e.g., FAI-00684).
- We **concur** with your finding that the proposed interior renovations of Building 1141, Aircraft Maintenance Operations Center (FAI-00659), and Building 1306, Aerospace Ground Equipment Covered Storage (FAI-00536), contributing properties within the Flightline Historic District, will have **no adverse effect on historic properties**. We also **concur** with your finding that Building 1307 (FAI-00703) the 18th Aircraft Maintenance Unit /Weather Shelter (1965), is **not eligible** for the National Register of Historic Places (National Register), and that the proposed interior renovation of this building will have **no effect on historic properties.**
- We **concur** with your finding that Building 3303, Child Development Center (FAI-00794) (1973) (Attachment 2) is **not eligible** for the National Register under *Criterion G: Properties Less Than 50 Years Old That Have Achieved Exceptional Importance,* and that Building 1303, the Missile Maintenance Shop (FAI-00701) (1962) is **not eligible** for the National Register due to extensive modifications.

We also **concur** with your finding that the demolition of Building 3303, Building 1303, and Building 5313, Youth Center (FAI-01156) (1955) (determined not eligible March 2005) will have **no effect on historic properties**.

- Regarding National Register-eligibility findings for the Cold War-Era Properties (Attachment 3), we **concur** that the following properties, constructed less than 50 years ago, are **not eligible** for the National Register under *Criterion G:*
    - Building 1209 (FAI-00684) Aerospace Ground Equipment (AGE) Maintenance & Storage Facility (1984)
    - Building 1215 (FAI-00686) Operations Support Squadron Facility/Base Operations Control Tower (1975)
    - Building 1232 (FAI-00692) Aerospace Ground Equipment Storage/Nose Dock 7 (1966)
    - Building 1335 (FAI-00715) 4-Bay Aircraft Maintenance Hangar (1988)
    - Building 1338 (FAI-00718) Aircraft Maintenance Hangar (690 Loop Circle) (1986)
    - Building 1340 (FAI-00720) Aircraft Maintenance Hangar (628 Loop Access St.) (1985)
    - Building 1341 (FAI-00721) Shop—Avionics Egress Maintenance Facility (1987)
    - Building 1344 (FAI-00722) Aircraft Maintenance Shop (1987)
    - Building 1346 (FAI-00723) Jet Engine Maintenance Shop (1987)
    - Building 1347 (FAI-00724) Weapons System/Management Facility (1989)
    - Building 3349 (FAI-00540) Medical/Dental Centers (1986)
    - Building 4280 (FAI-00839) Flight Simulator, F-16 (1984)

  However, we are **not able to concur at this time** with the "not eligible" finding for the Outdoor Small Arms Firing Range, Building 6389, because *the information submitted does not describe the actual firing range and does not have an AHRS number.* The property description should be of the *Firing Range itself;* Building 6389 is a *contributing feature* of the Firing Range. Please call Jeff Weinberger, AHRS Manager, at (907) 269-8718, to request an AHRS number for the Firing Range and an AHRS number for Building 6389. If there are any other features within the Firing Range besides Building 6389 (i.e., any other buildings, structures, objects, or sites), each of these features should also be assigned an AHRS number.

  After you have determined GIS coordinates for the Firing Range, show the location of the Firing Range, its contributing features, and the two additional proposed firing points on a map. Then provide a description of the Firing Range, Building 6389, and any other existing features of the Firing Range. *After we receive this information and the AHRS numbers, we will be able to make a determination of National Register eligibility for the Firing Range and for Building 6389.*

- Regarding National Register-eligibility findings for the Post-Cold War-Era Properties (Attachment 4), we **concur** with your finding that the following properties, constructed less than 50 years ago, are **not eligible** for the National Register under *Criterion G:*
    - Building 3426 (FAI-00821) Base Supply Building (1993)
    - Building 1337 (FAI-00717) Squadron Operations Unit (1990)
    - Building 1324 (FAI-00711) Munitions Inspection Shop/Storage, Rocket Assembly (1994)
    - Building 1326 (FAI-00712) Munitions Line Delivery Shop (1995)

  However, we are **not able to concur at this time** with your "not eligible" findings for the following properties *because they do not have AHRS numbers*:
    - Building 3134, Security Forces Facility (2006)
    - Building 3462, Munitions Flight/Munitions Administration Facility (1999)
    - Building 4110, 18th Aggressor Squadron Operations and Aircraft Maintenance Unit (2000)
    - Building 1353, Armament Systems Maintenance Shop (2001)
    - Building 6385, Munitions Inspection Shop (1999)

Please call Jeff Weinberger, (907) 269-8718, to request AHRS numbers for Buildings 3134, 3462, 4110, 1353, and 6385. Then submit revised AR Forms with an AHRS number for each building, along with your findings of National Register-eligibility. *After we receive this information, we will be able evaluate these properties for National Register eligibility.*

When you submit the revised descriptions and AHRS numbers for the Cold War-Era and Post-Cold War-Era properties, we would also appreciate a revised copy of Table 1 that lists their AHRS numbers.

As we requested, you provided additional justification for the proposed construction of six new storage igloos within the Quarry Hill Munitions Historic District (XBD-00334). Section III.A.1(3) of the *Program Comment for World War II and Cold War-Era (1939-1974) Ammunition Storage Facilities* (Advisory Council on Historic Preservation, August 2006) is applicable to the proposed construction. We concur that "the third exclusion does not apply to historic districts that are made up solely of ammunition storage facility properties. In those cases, the Program Comment would be applicable to such districts."

Please note that as stipulated in 36 CFR 800.3, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations. Receipt of our comment letter does not end the 30-day review period provided to other consulting parties.

Thank you for the opportunity to comment. We look forward to continued consultation on the subject undertaking. Please contact Sylvia Elliott at 269-8724 or sylvia.elliott2@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner

Judith E. Bittner
State Historic Preservation Officer
JEB:she

JAN 2 0 2016

Justin W. Morrison, Lt Col, USAF
Base Civil Engineer
354 CES/CC
2310 Central Avenue Ste 100
Eielson AFB, Alaska 99702

Ms. Judith Bittner
State Historic Preservation Officer
Alaska Department of Natural Resources
Office of History and Archaeology
550 W. 7th Ave., Suite 1310
Anchorage, AK 99501

Re: Supplemental Information Per Letter Request Dated 30 December 2015

Dear Ms. Bittner,

Thank you for your letter of 30 December 2015, and your concurrence with a majority of our findings on facility eligibility, as well as effects due to the proposed actions identified in the F-35A Operational Bed-down–Pacific Interim Environmental Impact Statement.

In your letter, you requested additional information for two groups of Eielson Air Force Base (AFB) properties: five Post-Cold War facilities and the six properties that comprise the Small Arms Range Complex. We have included this information in Attachments 2 and 3 to this letter.

Also per your request, Table 1 (Attachment 1) has been revised to include Alaska Heritage Resources Survey (AHRS) numbers for the five Post-Cold War facilities for which you could not provide concurrence because they did not have AHRS numbers.

Post-Cold War Facilities

We have also revised the recordation forms for the five Post-Cold War facilities (Attachment 2). We again respectfully request your concurrence with our determination that the following facilities are not eligible for the National Register, either individually or as contributing properties in a historic district, and with our original finding of "No Adverse Effect" to these facilities from proposed modification:

- B-1353, FAI-02431, Armament Systems Maintenance Shop
- B-3134, FAI-02428, Security Forces Facility
- B-3462, FAI-02429, Munitions Administration Flight
- B-4110, FAI-02430, 18th Aggressor Squadron Operations and Aircraft Maintenance Unit
- B-6385, FAI-02432, Munitions Maintenance Shop

Small Arms Range Complex:

Additionally, we have obtained AHRS numbers and have completed recordation forms for the Small Arms Range and its associated facilities/elements:

- F-91310, FAI-02433, Small Arms Range Complex
- B-6389, FAI-02434, Firing Line Facility (35 Firing Points)
- B-6420, FAI-02435, Vehicle Operations Heated Parking Shed
- B-6421, FAI-02436, Small Arms Training and Maintenance Facility
- B-6422, FAI-02437, Small Arms Indoor Range (8 Firing Points)
- B-76389, FAI-02438, Machine Gun Firing Point (2 Firing Points)

The Air Force has performed an evaluation of the eligibility of the Small Arms Range Complex (including both the range itself and associated elements/features) for listing in the National Register, per your request (Attachment 3). The evaluation provides a description of the range complex and includes Architectural Recordation Forms for the associated existing facilities, as well as for the range complex as a whole.

Eielson AFB Real Property records and aerial photos were used to determine the long-term use and history of the range complex (use of the area as a range continues to the present). An aerial photo from 1959 clearly shows that an older firing range pre-dated construction of the covered firing points in 1964, although no documentation of its existence is found in the Real Property records. An aerial photo from 1968 shows the original firing range was still in use after construction of the new facility and range. Since that time, features of the original firing range have been obliterated by subsequent expansion of the present-day range, including ground leveling and vegetation clearing activities, with the exception of the old target lane access road, which is discernible down the center of the current range (Architectural Recordation Form F-91310, FAI-02433).

The existing firing range is typical of those found at military bases (and elsewhere) throughout the US, and has no distinguishing design features or characteristics that would indicate eligibility for listing in the National Register. There is no known association with persons or events important to understanding the history of Eielson AFB or of the military in Alaska.

As discussed in the evaluation, the oldest structure associated with the range is the firing point facility (B-6389, FAI-02433). However, this facility has been modified over time. In 2010, the Air Force demolished 24 of the original 38 firing points and replaced them with 21 fully-enclosed firing points. The replacement/addition is constructed of concrete block and sheet metal, in contrast to the original structure, which was constructed of wood, thus impairing the historic integrity of this facility.

The other facilities identified in Attachment 3 were all constructed since 1992. An analysis of their elements/features, as well as their historical use, indicates that they do not meet the National Register criteria for eligibility (36 CFR § 60.4).

In summary, based on this evaluation, the Air Force has determined that the Small Arms Range Complex and its associated facilities are not eligible for the National Register either

individually or as contributing facilities in a historic district,, and again respectfully request your concurrence with our determination of National Register eligibility and our finding of "No Adverse Effect" from proposed modification.

Please provide your written response as soon as possible (but not more than 30 days from date of receipt) to: Ms. Julene May, Chief, Installation Management Flight, 354 CES/CEI, 2310 Central Avenue, Eielson AFB, (907) 377-4342, julene.may@us.af.mil.

JUSTIN W. MORRISON, Lt Col, USAF
Commander, 354th Civil Engineer Squadron

Attachments:
1. NRHP Eligibility Determinations/Status (Table)
2. Post-Cold War Facilities
3. Eielson Small Arms Range Complex

Attachment 1: Listing of NRHP eligibility determinations completed and pending for the F-35 Beddown EIS

Facility #	*AHRS #*	*Facility Function/Action*	*Date of Construction*	*NRHP Eligibility*
Proposed New Construction				
NA	NA	Construct 6-Bay Flight Simulator Facility	2016	NA
NA	NA	Reopen/Expand South Gate Vehicle Parking for construction traffic (No buildings located nearby)	2016	NA
NA	NA	Construct 4-Bay Hangar/Propulsion Maintenance/Corrosion Control Personnel Dispatch (Squadron1) (South Loop)	2017	NA
NA	NA	Construct 4-Bay Hangar/Squadron Operations/Aircraft Maintenance Unit (Squadron 2) (South Loop)	2017	NA
NA	NA	Construct 8-Bay, 16-Aircraft Weather Shelter (South Loop)	2017	NA
NA	NA	Construct 8-Bay, 16-Aircraft Weather Shelter (South Loop)	2017	NA
NA	NA	Construct 6 Munitions Storage Igloos (Quarry Hill)	2017	NA
NA	NA	Construct New Missile Maintenance Facility (South Loop)	2017	NA
NA	NA	Construct 4 – Bay R-11 Refueling Truck Garage (South Loop)	2018	NA
NA	NA	Construct South Heat Plant (South Loop)	2018	NA
NA	NA	Construct New Munitions Flight Facility	2018	NA
NA	NA	Construct New AME (South Loop)	2018	NA
NA	NA	Construct 200-Person Dormitory	2019	NA
NA	NA	Construct Flight Kitchen (South Loop)	2019	NA
NA	NA	Construct School Age Facility	2019	NA
NA	NA	Construct Combat Arms Training and Maintenance Range	2019	NA
NA	NA	Construct New Snow Removal Equipment Warm Storage	2019	NA
Buildings near proposed new Flight Simulator				
1209	FAI-684	Aerospace Ground Equipment (AGE) Covered Storage Facility (Renovate interior, 2018)	1984	NE
1215	FAI-686	Operations Support Squadron Facility (Add/Alter, 2018)	1975	NE
1232	FAI-692	Nose Dock 7 – (Renovate interior: Enlarge Wheel & Tire Shop, 2018)	1966	NE
3134	FAI-02428	Security Forces Facility (Renovate interior, 2019)	2006	NE
3426	FAI-821	Base Supply (Renovate interior: Enlarge classified storage, larger doors, 2018)	1992	NE
3462	FAI-02429	Munitions Administration Flight (Renovate interior for personnel, 2018)	2000	NE
4110	FAI-02430	18 Aggressor Squadron Operations and Aircraft Maintenance Unit (Renovate interior, 2016)	2000	NE
4280	FAI-839	Field Training Detachment (Add/Alter, 2017)	1984	NE
Buildings near proposed new Hangars and Aircraft Shelters				
1306	FAI-536	AGE Shop/Covered Storage (Add/Alter, 2018)	1965	Eligible
1307	FAI-703	Aircraft Maintenance Unit (AMU)/Weather Shelter (Renovate interior, 2017)	1965	NE
1335	FAI-715	Aircraft Maintenance Hangar (Renovate interior/exterior, add Fuel Cell, 2018)	1988	NE
1337	FAI-717	Squad Operations (Renovate interior, 2017)	1990	NE
1338	FAI-718	Aircraft Maintenance Hangar (Renovate interior/exterior, 2018)	1986	NE
1340	FAI-720	Weapons Load Training Shop (Renovate interior, 2018)	1985	NE
1341	FAI-721	Egress Maintenance Shop (Renovate interior, 2018)	1987	NE

1344	FAI-722	Fuel Cell (Renovate interior, 2018)	1987	NE
1346	FAI-723	Jet Engine Shop (Renovate interior, 2018)	1987	NE
1347	FAI-724	Maintenance Group (Add/Alter, 2018)	1989	NE
1353	FAI-02431	Armament Systems Maintenance Shop (Renovate interior, 2018)	2001	NE
Buildings Near Proposed Missile Maintenance Facility				
1303	FAI-701	Missile Maintenance Shop (Demolish, 2017)	1962	NE
1324	FAI-711	Munitions Inspection Shop (Add/Alter, 2017)	1994	NE
1326	FAI-712	Munitions Line Delivery (Renovate interior, 2017)	1995	NE
Buildings in Quarry Hill Munitions Storage District (XBD-00334) Schedule for Modification				
6385	FAI-02432	Munitions Maintenance Shop (Add/Alter, 2018)	1999	NE
6347	XBD-202	Munitions Storage Igloo (No Modification)	1955	Eligible
6348	XBD-203	Munitions Storage Igloo (No Modification)	1955	Eligible
6349	XBD-204	Munitions Storage Igloo (No Modification)	1955	Eligible
6350	XBD-205	Munitions Storage Igloo (No Modification)	1955	Eligible
6352	XBD-206	Munitions Storage Igloo (No Modification)	1955	Eligible
6353	XBD-207	Munitions Storage Igloo (No Modification)	1955	Eligible
6354	XBD-208	Munitions Storage Igloo (No Modification)	1955	Eligible
6357	XBD-209	Munitions Storage Igloo (No Modification)	1955	Eligible
6360	XBD-210	Munitions Storage Igloo (No Modification)	1955	Eligible
6361	XBD-211	Munitions Storage Igloo (No Modification)	1955	Eligible
6363	XBD-212	Munitions Storage Igloo (No Modification)	1955	Eligible
6364	XBD-213	Munitions Storage Igloo (No Modification)	1955	Eligible
6365	XBD-214	Munitions Storage Igloo (No Modification)	1955	Eligible
6366	XBD-215	Munitions Storage Igloo (No Modification)	1955	Eligible
6368	XBD-216	Munitions Storage Igloo (No Modification)	1955	Eligible
6369	XBD-217	Munitions Storage Igloo (No Modification)	1955	Eligible
6371	XBD-219	Munitions Storage Igloo (No Modification)	1955	Eligible
6372	XBD-220	Munitions Storage Igloo (No Modification)	1955	Eligible
6373	XBD-221	Munitions Storage Igloo (No Modification)	1955	Eligible
6374	XBD-222	Munitions Storage Igloo (No Modification)	1955	Eligible
6376	XBD-224	Munitions Storage Igloo (No Modification)	1955	Eligible
6377	XBD-225	Munitions Storage Igloo (No Modification)	1955	Eligible
Buildings Impacted by Proposed New Dormitory				
1141	FAI-659	Maintenance Operations Center (Renovate interior, 2018)	1954	Eligible
3303	FAI-794	Child Development Center (Demolish, 2019)	1973	NE
3349	FAI-540	Medical Clinic (Add/Alter, 2019)	1986	NE
5313	FAI-1156	Youth Center (Demolish, 2019)	1955	NE
Buildings Near Proposed Combat Arms Training & Maintenance Facility				
91310	FAI-02433	Small Arms Range Complex	1964	NE
6389	FAI-02434	Firing Line Facility (35 Firing Points)	1964	NE

Attachment 1: Listing of NRHP eligibility determinations completed and pending for the F-35 Beddown EIS

6420	FAI-02435	Vehicle Operations Heated Parking Shed	1992	NE
6421	FAI-02436	Combat Arms Training and Maintenance Facility	1992	NE
6422	FAI-02437	Small Arms Indoor Range (8 Firing Points)	2009	NE
76389	FAI-02438	Machine Gun Firing Point (2 Firing Points)	2014	NE

ELIGIBLE: Eligible for listing on the NRHP, as documented in the AHRS database
NE - Not Eligible for listing on the NRHP, with concurrence from the Alaska SHPO (Ltr: 18 Mar 2005, and 30 Dec 2015)
NE – Not Eligible, as determined by Eielson AFB
FAI – Facilities with new AHRS numbers, pending eligibility determinations

Post-Cold War Facilities

The attached Level II Architectural Recordation Forms are provided to support the Air Force findings of Not Eligible determinations for the Post-Cold War facilities proposed for interior or exterior modifications as part of the F-35 Beddown at Eielson AFB. Per request from the State Historic Preservation Office (SHPO), Alaska Heritage Resource Survey (AHRS) numbers have been obtained for these facilities (in order of the building number identified in Table 1, Attachment 1):

BUILDING #	AHRS #	NOMENCLATURE
B-1353	FAI-02431	Armament Systems Maintenance Shop
B-3134	FAI-02428	Security Forces Facility
B-3462	FAI-02429	Munitions Administration Flight
B-4110	FAI-02430	18th Aggressor Squadron Operations and Aircraft Maintenance Unit
B-6385	FAI-02432	Munitions Maintenance Shop

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 1353

SECONDARY OR COMMON NAMES OF PROPERTY: Armament Systems Maintenance Shop

AHRS NO.: FAI-02431

COMPLETE ADDRESS (or PHYSICAL LOCATION): South Loop

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of Construction:** 2001
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was

part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Concrete Block
- **D. Roofing:** Concrete
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 30,266 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3134

SECONDARY OR COMMON NAMES OF PROPERTY: Security Forces Facility

AHRS NO.: FAI-02428

COMPLETE ADDRESS (or PHYSICAL LOCATION): 451 Division Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of Construction:** 2006
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was

part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Concrete Block
- **D. Roofing:** Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 10,322 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 3462

SECONDARY OR COMMON NAMES OF PROPERTY: Munitions Administration Flight

AHRS NO.: FAI-02429

COMPLETE ADDRESS (or PHYSICAL LOCATION): 2808 Central Avenue

STYLE: Plain, box

PART I. SIGNIFICANCE:

A modern warehouse constructed after the Cold War Period. Building was recorded in a July 1996 historic building inventory. Although this building retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of Construction:** 1999
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's

23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Stucco
- **D. Roofing:** Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete/Tile

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 10,322 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 4110

SECONDARY OR COMMON NAMES OF PROPERTY: 18th Aggressor Squadron Operations and Aircraft Maintenance Unit

AHRS NO.: FAI-02430

COMPLETE ADDRESS (or PHYSICAL LOCATION): Flight Line Street

STYLE: Plain, box shape

PART I. SIGNIFICANCE:

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of Construction:** 2000
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's

23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Stucco
- **D. Roofing:** Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Peaked
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 25,058 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6385

SECONDARY OR COMMON NAMES OF PROPERTY: Munitions Maintenance Shop

AHRS NO.: FAI-02432

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1370 Munitions Road, Quarry Hill Munitions Storage Area

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

Building was constructed after the Cold War Period. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of Construction:** 1999
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

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23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Concrete
- **C. Siding:** Concrete Block
- **D. Roofing:** Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Flat
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 7,659 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

EIELSON AFB SMALL ARMS RANGE COMPLEX

Description:

The following discussion is based on analysis of property records, ground surveys, and historic records for the Eielson Small Arms Range Complex. AHRS numbers were obtained for all permanent facilities within the range complex.

The Eielson AFB Small Arms Range Complex (F-91310, FAI-02433) is located in the eastern portion of Eielson AFB, bounded on the north by Quarry Hill Road and the east by the right-of-way for the Alyeska Trans-Alaska Pipeline, as shown in Photo 1-1 on the attached Architectural Recordation (AR) Form for this facility. The range area includes the designated danger zones associated with the weapons being fired, with the cleared and leveled portion of the range covering 26 acres. The cleared portion of the range is mowed on a regular basis to control vegetation height, with the rest of the range left undisturbed. GIS coordinates of the Range Complex are also provided on Photo 1-1.

The earliest documentation for the Small Arms Range Complex in the Real Property records for Eielson AFB occurred with the 1964 construction of the covered firing points (B-6389). However, aerial photos from 1959 (Photo 1-2) shows the presence of a earlier firing range, consisting of an impact berm on the south end, firing points on the north along Quarry Hill Road, and three target lanes in between, accessed by a road. A photo from 1968 (Photo 1-3) showing the location of the covered firing points constructed in 1964 indicates there was continued use of the old range at that time. Since 1964, the complex has expanded to its present configuration as shown in Photo 1-1 of the AR Form. There is no documentation of when use of the old range was discontinued, or when it was obliterated by later ground leveling and clearing of the 26 acres covered by the current range. Photo 1-4 shows the current layout of facilities at the Small Arms Range Complex.

The rifle targets used on the current range are supported by temporary wooden structures, while machine guns fire at both wooden targets and metal vehicles positioned on the range. Both types of targets are routinely replaced as they deteriorate. No berms are used as back stops for targets on the range; however, a 100-yard long berm was constructed in 1996 at the east end of B-6389, as shown in Photo 1-2. It was constructed to provide ricochet protection for the Alaska Pipeline right-of way, during and after construction. Although the pipeline is underground along the east boundary of the range, the access road is still used for pipeline surveillance and maintenance, requiring continued protection.

The range complex is typical of firing ranges found at military bases throughout the US, and has no distinguishing design features or characteristics that would indicate eligibility for listing in the National Register. Although the location remains the same, it no longer retains integrity of design, materials, or workmanship, due to the different architectural styles and materials used in the additions to the range facilities since 1992. The Air Force considers the Small Arms Range Complex to be “not eligible” for the National Resister, because it is not associated with any

noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era and Post-Cold War period. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

The Firing Line Facility (B-6389, FAI-02434) was constructed in 1964 as an open air structure, consisting of 38 firing points under a 200-foot long post and beam supported, pitched roof, on a concrete slab base. In 2010, 24 of the original firing points were demolished and replaced by 21, fully enclosed, firing points, for a new total of 35 firing points. This change was required due to the deterioration of the original concrete slab and wooden structure, with the goal of allowing weapons training under all weather conditions. The new portion of the facility was constructed of concrete block, with individual doors at each firing point, and is topped by a sloping metal roof. Of the 14 remaining firing points of the original structure, all continue to be maintained for use, with one point being occupied by a range control observation enclosure. This enclosure is sheathed with T1-11 siding and has an aluminum frame window on the front and side elevations. A frame lean-to, also sheathed with T1-11 siding was constructed behind several of the original firing points, though the date of construction was not annotated in the property records. Photos of the original and current structure are available in the attached AR Form for this facility. The Air Force considers this facility to be not eligible for the National Register of Historic Places, because it lacks significance to the Cold War period and has lost its integrity due to the substantial modifications conducted in 2010.

The Vehicle Operations Heated Parking Shed (B-6420, FAI-02435) was constructed in 1992 to provide protected parking of government vehicles used by personnel staffing the Range Complex. It is a one-story, prefabricated, sheet metal structure on a concrete slab foundation, with a front gable roof. Openings to the building consist of an overhead door on the north façade and a metal personnel door at the north end of the west elevation. Photos of the structure are available in the attached AR Form for this facility. This is a Post-Cold War facility, which the Air Force considers to be not eligible for the National Register of Historic Places. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era.

The Combat Arms Training and Maintenance Facility (B-6421, FAI-02436) was originally constructed in 1992 to provide classroom space for weapons training. It is a one-story, prefabricated, sheet metal, front gable roofed structure on a concrete foundation. In 1996, it was enlarged by 513 square feet (SF) (southwest corner) to provide a weapons storage vault at the range. Photos of the structure are available in the attached AR Form for this facility. This is a Post-Cold War facility, which the Air Force considers to be not eligible for the National Register of Historic Places. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era.

The Small Arms Indoor Range (B-6422, FAI-02437) was constructed in 2009 and consists of eight firing points to provide a year-round capability for small arms weapons training. It is a one-story, prefabricated, sheet metal, gable roofed structure on a concrete foundation. Photos of the structure are available in the attached AR Form for this facility. This is a Post-Cold War facility, which the Air Force considers to be not eligible for the National Register of Historic Places. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era.

The Machine Gun Firing Point (B-76389, FAI-02438) was constructed in 2014 and consists of two firing points: one vehicle mounted firing point and one un-mounted firing point. The vehicle mounted firing point consists of a three-sided, concrete revetment, covered by shed-roof sheathed in sheet metal. The roof is supported by bracketed wood posts and lateral braces that rest on top of the revetment. The un-mounted firing point consists of a wooden platform on which the machine gun is placed. This facility was constructed to provide a developed location for this type of weapons training, which previously was conducted at various undeveloped locations on the range. Photos of the structure are available in the attached AR Form for this facility. This is a Post-Cold War facility, which the Air Force considers to be not eligible for the National Register of Historic Places. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era.

Summary:

Based on the information contained in the above discussion and the attached AR Forms, the Air Force finds that the Eielson AFB Small Arms Range Complex (F-91310, FAI-02433) does not meet the criteria for eligibility for listing on the National Register of Historic Places, either in whole or in part. Likewise, none of the five facilities comprising the Small Arms Range Complex are individually eligible for listing on the National Register of Historic Places.

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 91310

SECONDARY OR COMMON NAMES OF PROPERTY: Small Arms Range Complex

AHRS NO.: FAI-02433

COMPLETE ADDRESS (or PHYSICAL LOCATION): Quarry Hill Road

STYLE: Facilities and acreage

PART I. SIGNIFICANCE: None

This complex was originally constructed during the Cold War Period as an outdoor small arms weapons training range. Although the location remains the same, it no longer retains integrity of design, materials, or workmanship. It does not meet the National Resister criteria as a historic property, because it is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans and materials prevalent in the Cold War era and Post-Cold War period. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. Physical History:

1. **Date(s) of Construction:** 1964, 1992, 2009, 2010, and 2014
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** Multiple

B. HISTORICAL CONTEXT.

Cold War Era: The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar. In 1949, when it was suspected that the Soviet's were building an atomic bomb, these flights along the edge Siberia had another mission. They carried filters which collected dust from air samples. At Eielson AFB the filters were placed in a lead cylinder with a Geiger counter. A filter from a September 1, 1949 flight set off the Geiger counter, identifying the first

Soviet atomic explosion. Eielson AFB became a forward deployment base for intercontinental bombers during the Cold War.

Post- Cold War Period: In 1991, F-16s were assigned to the base. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Various
- **C. Siding:** Various
- **D. Roofing:** Various
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Various
- **G. Flooring:** Various

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: 567 Acres (Photo 1-1)

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

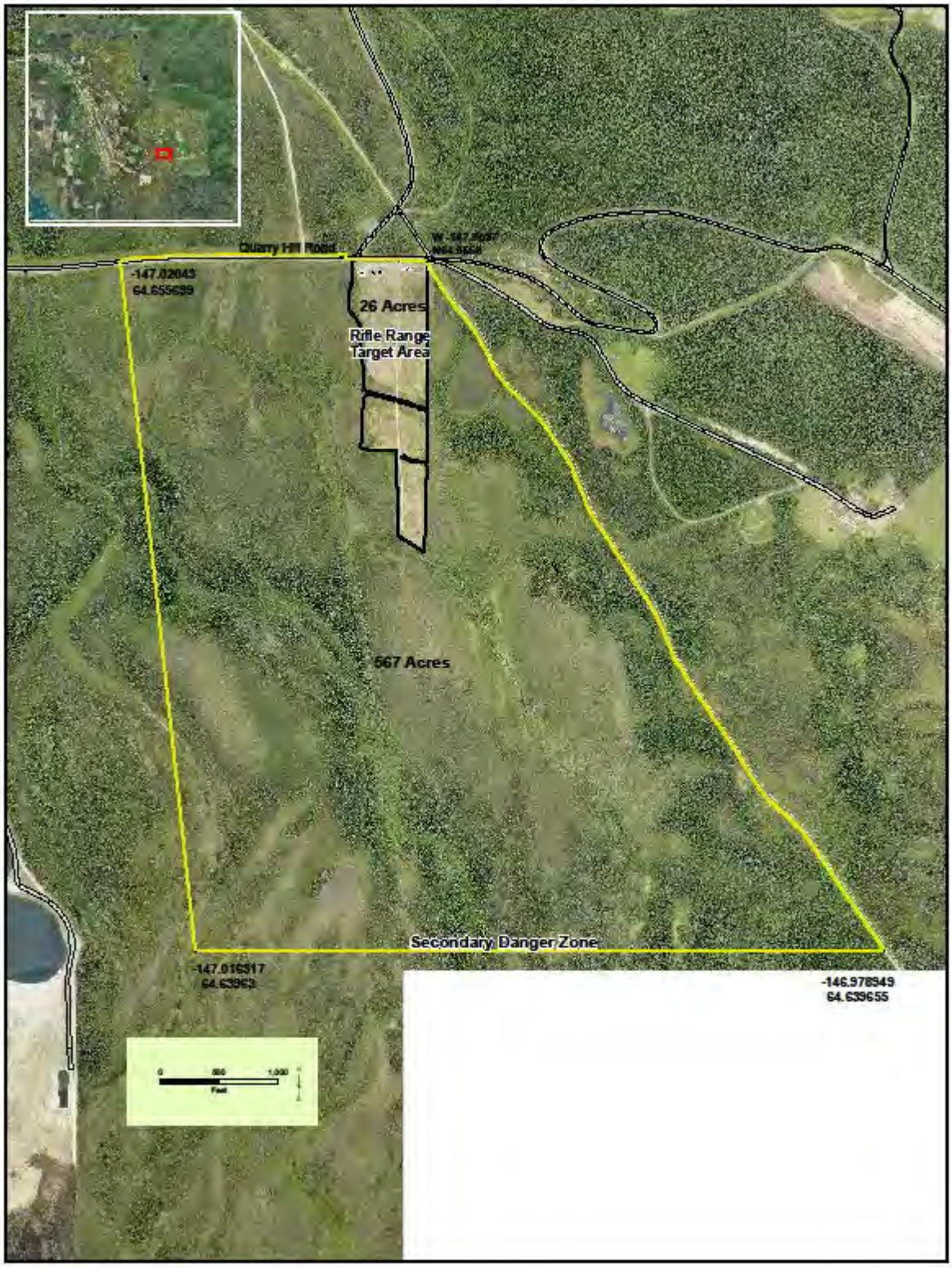


Photo 1-1: Extent of the existing Eielson AFB Small Arms Range Complex

Photo 1-2 (1959): Original Eielson AFB firing range, consisting of open firing points on the north along Quarry Hill Road, an impact berm on the south, and three target lanes in between, with a target lane access road on the right.

Photo 1-3 (1968): Location of the covered firing line and range constructed in 1964, adjacent to the old firing range.

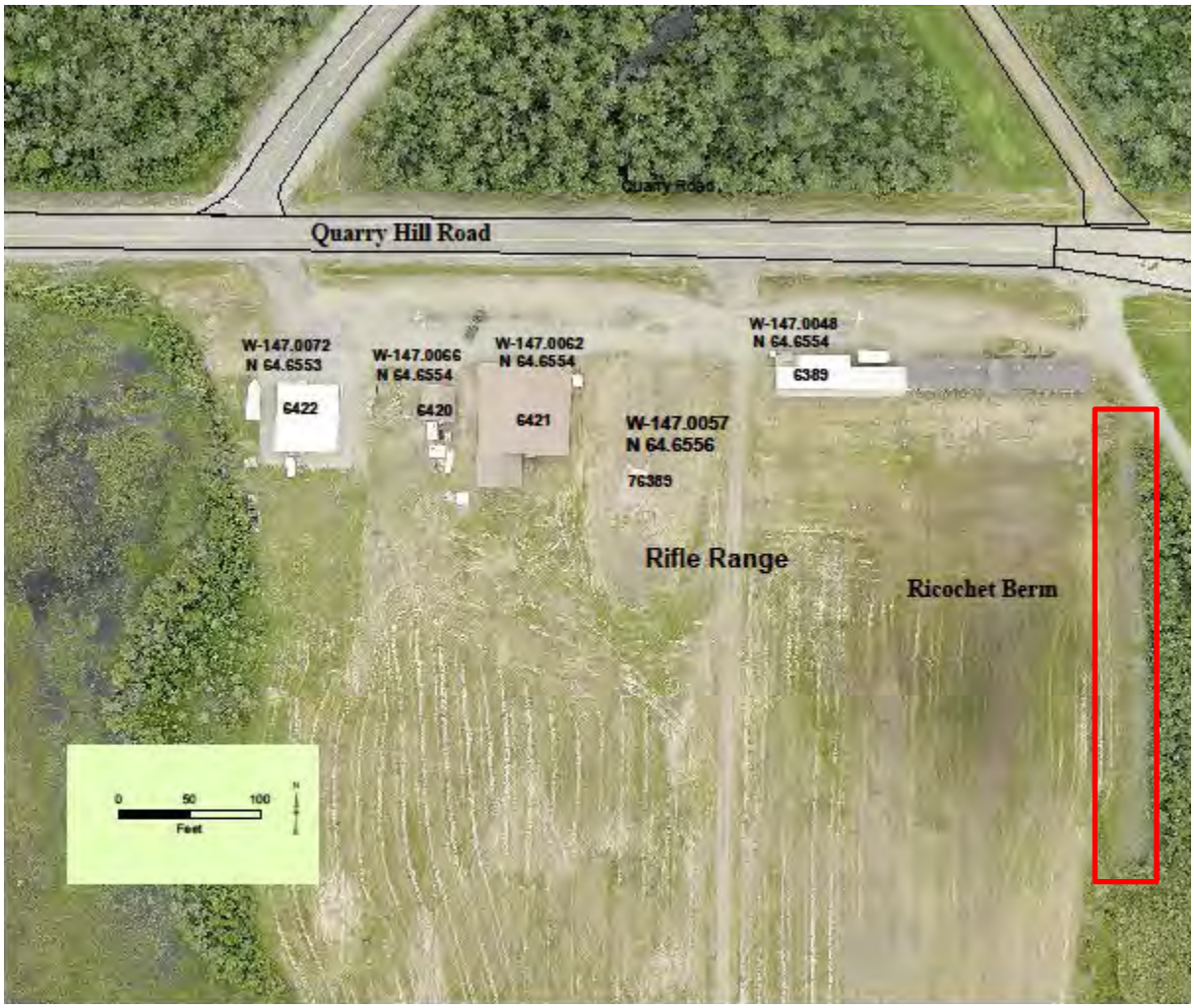


Photo 1-4: Facility Layout at the Eielson AFB Small Arms Range Complex, with Alaska Pipeline Ricochet Protection Berm Outlined in Red

LEVEL 2

ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6389

SECONDARY OR COMMON NAMES OF PROPERTY: Firing Line Facility

AHRS NO.: FAI-02434

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1214 Quarry Hill Road

STYLE: Original Structure - Post and beam; Replacement/Addition – Concrete Block

PART I. SIGNIFICANCE:

The original building was constructed in 1964 during the Cold War era. Although it retains integrity of location and setting, in 2010 it was extensively modified. Modifications were required to maintain functionality of the facility for small arms weapons training and qualification. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Cold War era for outdoor firing ranges. It contains no equipment or records that provide an understanding of either broad Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

A. PHYSICAL HISTORY:

1. **Date(s) of Construction:** 1964, 2010
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** Demolition of 24 firing points and construction of 21 new firing points (2010)

B. HISTORICAL CONTEXT.

Cold War Era: The predecessor of Eielson AFB was Mile 26 Airfield, a storage area for excess lend-lease plans from Ladd Field, Fairbanks. Mile 26 was rarely used and did not have a significant mission in World War II.

During the Cold War, Mile 26 (renamed Eielson in 1948), became critical in the Intelligence gathering mission. WB-29's (weather versions) flew from the base to the edge of Siberia to locate and evaluate Soviet radar. In 1949, when it was suspected that the Soviet's were building an atomic bomb, these flights along the edge Siberia had another mission. They carried filters which collected dust from air samples. At Eielson AFB the filters were placed in a lead cylinder with a Geiger

counter. A filter from a September 1, 1949 flight set off the Geiger counter, identifying the first Soviet atomic explosion. Eielson AFB became a forward deployment base for intercontinental bombers during the Cold War.

Post- Cold War Period: In 1991, F-16s were assigned to the base. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

	Original	**2010 Modification**
A. Foundation:	Concrete	Concrete
B. Framing:	Wood	Concrete Block
C. Siding:	None	Concrete Block/Sheet Metal
D. Roofing:	Asphalt Shingle	Sheet Metal
E. Floor Structure:	One-story	One-story
F. **Roof Structure**:	Shed	Shed
G. Flooring:	Concrete	Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Rectangular, 5,625 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE: This facility has been extensively modified since originally constructed. It started as the open-sided structure on the left side of attached Photo 1-1, with the addition of a T1-11 plywood storage shed, and replacement of the original asphalt shingle roof with sheet metal roofing material (to the right in Photo 1-1). Only 14 of

the original firing points remain after the 2010 demolition of 24 firing points and their replacement with 21 enclosed, climate-controlled firing points that allow all weather weapons training. This replacement/addition can be seen on the east end of the facility. Photo 1-2 shows the rear of the B-6389 and Photo 1-3 provides a close-up of the construction materials and configuration of this addition.

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

Photo 1-1: West End front of B-6389, showing configuration of the original firing points, and replacement firing points constructed in 2010.

Photo 1-2: West end, rear of B-6389

Photo 1-3: Front and side view of new portion of B-6389.

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6420

SECONDARY OR COMMON NAMES OF PROPERTY: Vehicle Operations Heated Parking Shed

AHRS NO.: FAI-02435

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1214 Quarry Hill Road

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

This building is a pre-fabricated, ribbed sheet metal structure constructed after the Cold War Period as a warm storage facility for the government vehicles used to support weapons training personnel. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

B. Physical History:

1. **Date(s) of Construction:** 1992
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain

operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The 18th Fighter Squadron and it F-16s, as well as the Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Ribbed Sheet Metal
- **D. Roofing:** Ribbed Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Gable
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 494 SF.

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

Photo of north end of B-6420, Vehicle Operations Perking Shed

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6421

SECONDARY OR COMMON NAMES OF PROPERTY: Combat Arms Training and Maintenance Facility

AHRS NO.: FAI-02436

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1214 Quarry Hill Road

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

This building is a pre-fabricated, ribbed sheet metal structure with a gable sheet metal roof, constructed after the Cold War Period as a training classroom and weapons maintenance facility. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

C. Physical History:

1. **Date(s) of Construction:** 1992
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** 513 SF addition (1996)

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be

redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The 18th Fighter Squadron and it F-16s, as well as the Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Ribbed Sheet Metal
- **D. Roofing:** Ribbed Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Gable
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 4,113 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

Photo of north end of B-6421, Combat Arms Training Facility

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 6422

SECONDARY OR COMMON NAMES OF PROPERTY: Small Arms Indoor Range (8 Firing Points)

AHRS NO.: FAI-02437

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1214 Quarry Hill Road

STYLE: Plain, box shape

PART I. SIGNIFICANCE: None

This building is pre-fabricated, ribbed sheet metal structure, with a gable sheet metal roof, constructed after the Cold War Period to provide indoor weapons firing capability during periods when this training is not possible outside. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

D. Physical History:

1. **Date(s) of Construction:** 2009
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain

operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The 18th Fighter Squadron and it F-16s, as well as the Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Steel
- **C. Siding:** Ribbed Sheet Metal
- **D. Roofing:** Ribbed Sheet Metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Gable
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 1,600 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

Photo of north end of B-6422, Indoor Firing Range

LEVEL 2
ARCHITECTURAL RECORDATION FORM
Alaska Historic Building Survey

HISTORIC NAME OF BUILDING: 76389

SECONDARY OR COMMON NAMES OF PROPERTY: Machine Gun Firing Point

AHRS NO.: FAI-02438

COMPLETE ADDRESS (or PHYSICAL LOCATION): 1214 Quarry Hill Road

STYLE: Roofed open structure

PART I. SIGNIFICANCE: None

This structure was constructed after the Cold War Period to provide a single developed location for machine gun training. It consists of a three-side concrete revetment covered by a sloping shed roof, supported by wooden posts. Although it retains integrity of location, design, setting, and materials, it does not meet the National Resister criteria as a historic property. It is not associated with any noteworthy events or persons significant to history, and is stylistically and architecturally common, using construction methods, plans, and materials prevalent in the Post-Cold War era. It contains no equipment or records that provide an understanding of either broad Post-Cold War history or the operation of Eielson AFB.

PART II. HISTORICAL INFORMATION:

E. Physical History:

1. **Date(s) of erection:** 2014
2. **Architect:** Unknown
3. **Original and Subsequent owners:** U.S. Air Force
4. **Builder, contractor, supplier:** Unknown
5. **Original plans and construction:** Eielson AFB
6. **Alterations and additions:** None

B. HISTORICAL CONTEXT.

In 1991, F-16s were assigned to the base. The 6th Strategic Wing departed in 1992. In 1992, the Pacific Air Force premier flying training exercises, RED FLAG-Alaska, relocated to Eielson AFB from Clark AFB, in the Philippines. Many facilities were constructed for the RED FLAG-Alaska mission. Today the 354th Fighter Wing flies Block 30 F-16C's and operates RED FLAG-Alaska and three ranges. The 168th Air Refueling Wing flies KC-135Rs.

The first decade of the twenty-first century was marked by periods of expansion and reduction at Eielson AFB. On 13 May 2005, the DoD proposed a major realignment of the base as part of the

Base Realignment and Closure program. It was eventually decided that Eielson AFB would remain operational; however, the 355th Fighter Squadron's A-10 Thunderbolt II aircraft would be redistributed to the Air Force Reserve Command's 917th Wing at Barksdale AFB, LA; the Air Combat Command's 23rd Wing at Moody AFB, GA; and to backup inventory at Davis-Monthan AFB, AZ. This action was part of a larger effort to consolidate the A-10 fleet. The 355th Fighter Squadron was inactivated on 15 August 2007 when the last A-10 departed Eielson. The 18th Fighter Squadron and it F-16s, as well as the Alaska Air National Guard's 168th Air Refueling Wing and its KC-135 Stratotanker aircraft remained at Eielson AFB.

The 18th Fighter Squadron converted to the 18th Aggressor Squadron on 24 August 2007. This squadron provides training to Air Force and allied air forces pilots through aerial combat exercises, using the flying styles and abilities employed by foreign air forces.

PART III. MATERIALS OF CONSTRUCTION:

- **A. Foundation:** Concrete
- **B. Framing:** Wood
- **C. Siding:** Poured concrete
- **D. Roofing:** Wood and sheet metal
- **E. Floor Structure:** 1-story
- **F. Roof Structure:** Shed
- **G. Flooring:** Concrete

PART IV. SHAPE AND DIMENSIONS OF STRUCTURE/BUILDING: Square, 300 SF

PART V. EXTERIOR FEATURES OF NOTE: None

PART VI. INTERIOR FEATURES OF NOTE: None

PART VII. PRESENT CONDITION AND USE: IN USE, GOOD CONDITION

PART VIII. OTHER INFORMATION AS APPROPRIATE:

COMPILER: MS. LORI THURSBY, ARCHITECTURAL HISTORIAN, CARDNO-GS

DATE: JANUARY 2016

PHOTOGRAPHS:

Photo of north side of B-76389, Machine Gun Firing Point

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Natural Resources

DIVISION OF PARKS
Office of History & Archaeology

550 West 7th Ave., Suite 1310
Anchorage, Alaska 99501-3565
Main: 907.269.8721
E-mail: oha@alaska.net

January 21, 2016

File No.: 3130-1R Air Force
2016-00045

Ms. Julene May, Chief
Installation Management Flight
354 CES/CEI
2310 Central Avenue
Eielson AFB 99702

Subject: Supplemental information, F-35A Operational Bed-Down, Eielson Air Force Base

Dear Chief May:

The Alaska State Historic Preservation Office (AK SHPO) received a letter (via e-mail) from Lieutenant Colonel Justin W. Morrison on January 20, 2016, in response to our December 30, 2015 request for additional information on the subject project. Following our review of the documentation provided—Alaska Heritage Resource Survey (AHRS) numbers, architectural recordation forms, photographs, historic context, maps, and determinations of eligibility for the National Register of Historic Places (National Register)—we offer the following comments:

- We **concur** that the five *Post-Cold War properties* on Eielson Air Force Base are **not eligible** for the National Register because they are less than 50 years old and do not possess exceptional significance :
    - FAI-02431, Building 1353-Armament Systems Maintenance Shop (2001)
    - FAI-02428, Building 3134, Security Forces Facility (2006)
    - FAI-02429, Building 3462, Munitions Administration Flight (2000)
    - FAI-02430, Building 4110, 18th Aggressor Squadron Operations and Aircraft Maintenance Unit (2000)
    - FAI-02432, Building 6385, Munitions Maintenance Shop (1999)

  We therefore **concur** with your finding that the proposed interior and exterior renovation of these facilities will have **no effect on historic properties**.

- We **concur** with your determination that four of the properties that comprise the *Small Arms Range Complex* are **not eligible** for the National Register because they are less than 50 years old and do not possess exceptional significance :
    - FAI-02435, Building 6420, Vehicle Operations Heated Parking Shed (1992)
    - FAI-02436, Building 6421, Combat Arms Maintenance and Training Facility (1992)
    - FAI-02437, Building 6422, Small Arms Indoor Range (8 Firing Points) (2009)
    - FAI-02438, Building 76389, Machine Gun Firing Point (2 Firing Points) (2014)

- Finally, we also **concur** with your determination that two properties of the *Small Arms Range Complex* are **not eligible** for the National Register because they lack integrity due to numerous modifications:
    - FAI-02433, Facility 91310, Small Arms Range Complex (1964)
    - FAI-02434, Building 6389, Firing Line Facility (35 Firing Points) (1964)

  We therefore **concur** with your finding that renovation of the six facilities of the *Small Arms Range Complex* will have **no effect on historic properties**.

Thank you for the opportunity to comment. Please contact Sylvia Elliott at 269-8724 or sylvia.elliott2@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner
State Historic Preservation Officer
JEB:she

cc: Lieutenant Colonel Justin W. Morrison
Ronald Gunderson, Chief, Natural and Cultural Resources

U.S. Fish and Wildlife Service Consultation

USFWS CONSULTATION

On August 11, 2015, the U.S. Fish and Wildlife Service (USFWS) was sent a package describing the Proposed Action and preliminary results of the findings of effects on federally listed threatened and endangered species. However, as no listed threatened or endangered species or their critical habitat are present in the area of potential effect for the Proposed Action Alternative, the request for concurrence with a finding of "may effect, but not likely to adversely affect the continued existence" for the two species identified, was made in error. No consultation is required if listed threatened or endangered species or their habitat are not present. The remainder of the letter was correct in requesting a finding of no adverse impacts to migratory bird species or other species of special concern, such as eagles. The USFWS has chosen not to provide comment, thereby providing default concurrence with the findings of no adverse impact on migratory birds and other species of special concern, as documented in this EIS. The letter and its attachment are provided herein.

DEPARTMENT OF THE AIR FORCE
PACIFIC AIR FORCES

AUG 11 2015

Justin W. Morrison, Lt Col, USAF
Base Civil Engineer
354th Civil Engineer Squadron
2310 Central Avenue Ste 100
Eielson AFB AK 99702

Ms. Sarah Conn
U.S. Fish and Wildlife Service
Fairbanks Fish and Wildlife Field Office
101 12th Avenue
Fairbanks AK 99701

Dear Ms. Conn

Pursuant to Section 7 of the Endangered Species Act (ESA) of 1973 (16 USC §§1531-1544), the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 USC §668), and the Migratory Bird Treaty Act (MBTA) of 1918 (16 USC §§703-712), we are requesting concurrence from the U.S. Fish and Wildlife Service (USFWS) that the beddown and operation of the F-35A aircraft at Eielson Air Force Base (EAFB) *may affect but is not likely to adversely affect* federally listed species, bald and golden eagles, and other migratory birds with ranges that are within the boundaries of EAFB or that may extend under the northern portions of the Joint Pacific Alaska Range Complex (JPARC). Though the F-35As could use other portions of the JPARC, that use would be occasional/ transient.

The United States Air Force (USAF) is preparing an Environmental Impact Statement (EIS) for the Proposed Action of stationing up to 54 F-35A aircraft at EAFB, which would include the assignment of additional military and civilian personnel, and the construction and/or modification of facilities for maintenance and operation of the aircraft. Within EAFB boundaries, proposed infrastructure projects include the construction of a flight simulator facility, a missile maintenance facility, aircraft hangars, dormitory, and support facilities. Additional renovations and alterations would occur to existing support facilities and aircraft weather shelters. Total acreage disturbed, which includes equipment laydown areas, construction clearing/grading, and landscaping, would be approximately 66 acres, of which about 21 acres are newly disturbed (i.e., on areas not previously supporting buildings or pavement). Of this, 13.21 acres of black spruce wetlands would be removed from areas adjacent to the flight line (Attachment 1, Figure 1). The F-35As would train and operate in Military Operations Areas (MOAs) within the northern JPARC (Attachment 1, Figure 2). No new airspace would be created under the Proposed Action and all current airspace restrictions would be adhered to, including those for use of ordnance and countermeasures (chaff and flares).

Federally Listed Threatened/Endangered Species and Critical Habitat

The USAF accessed the USFWS Information, Planning and Conservation Online system (http://ecos.fws.gov/ipac/) on 23 June 2015 to determine if any federally-listed species potentially occur in the vicinity of the Proposed Action. There are no federally listed species that occur on EAFB. The following species that could occur under the airspace proposed for use by the F-35As are federally listed for Alaska (Table 1). The Alaska Department of Fish and Game designations for these species are also shown. No critical habitat occurs under the Proposed Action area (on-base or within the JPARC airspace expected to be used by the F-35As on a regular basis); therefore, no effects to designated critical habitat are expected.

Table 1: Federally Listed and State Listed Species That May Occur under the Northern JPARC Airspace

Common Name	*Scientific Name*	*Federal Listing*	*State Listing*
Eskimo curlew	*Numenius borealis*	Endangered	Endangered
Shorttailed albatross	*Phoebastria albatrus*	Endangered	Endangered
Wood bison	*Bison bison athabascae*	Non-essential Experimental	Not listed

Note: These species do not occur on Eielson AFB

The Eskimo curlew historically nested in the Arctic tundra grassland, burned prairie, meadow, and pasture habitats and then migrated through eastern Canada and the western Atlantic Coast to South America. Overhunting and habitat loss have been identified as the primary causes for the drastic decline in Eskimo curlew populations. Sightings of the curlew have been extremely rare since 1900 and there has been no physical evidence to confirm the species existence for over 50 years. Few, if any, curlews still exist and the USFWS has not developed a recovery plan for Eskimo curlew. Therefore, the Proposed Action, if implemented, would not affect this species.

The short-tailed albatross is identified as a marine shore and open ocean species using coastal habitat in Valdez-Cordova Borough in the Gulf of Alaska. Though proposed F-35A operations would utilize Fox 3 and Paxon airspace units which are located in the northwestern portion of the borough (see Attachment 1, Fig. 2), those units are located well inland of coastal habitat areas preferred by the albatross. The albatross has not been reported in the area affected by the Proposed Action and it is not known to occur in areas located underneath or within the airspace proposed for regular use by the F-35A. Therefore, the Proposed Action, if implemented, would not affect this species.

The wood bison inhabited Alaska for thousands of years prior to the 1900s. The species is adapted to northern meadow and boreal forest habitats. Although wood bison use a wide variety of habitats throughout the year, they show a preference for wet and mesic sedge-grass meadows. Unregulated hunting and changes in habitat distribution resulted in the extirpation of the wood bison in Alaska, though the species continued to exist in other areas. The species was

originally listed under the ESA as endangered in 1970 and was downlisted from "endangered" to "threatened" in 2012.

The Alaska Department of Fish and Game is the lead agency managing wood bison and in implementing restoration efforts. Three reintroduction sites have been proposed for the wood bison, including the Yukon Flats site, a portion of which occurs under the airspace where regular use by F-35As is proposed. In April 2015, wood bison were reintroduced to the Lower Innoko/Yukon Rivers area, an area not within the area potentially affected by this Proposed Action (see Attachment 1, Fig. 2). Although current reintroduced populations fall outside of the Proposed Action airspace, there is a potential for the wood bison to be reintroduced to the Yukon Flats area during the lifetime of the Proposed Action.

Other Species of Special Concern

Several migratory birds of conservation concern potentially occur both on EAFB and under the airspace. Per the USFWS Planning and Conservation website (https://ecos.fws.gov/ipac/) accessed on 23 June 2015, the species include the arctic tern (*Sterna paradisaea*), Brewer's sparrow (*Spizella breweri*), fox sparrow (*Passerella iliaca*), lesser yellowlegs (*Tringa flavipes*), olive-sided flycatcher (*Contopus cooperi*), rusty blackbird (*Euphagus carolinus*), short-eared owl (*Asio flammeus*), Smith's longspur (*Calcarius pictus*), solitary sandpiper (*Tringa solitaria*), upland sandpiper (*Bartramia longicauda*) and whimbrel (*Numenius phaeopus*).

Bird dispersal and data collection for the EAFB Bird-Aircraft Strike Hazard (BASH) Program is contracted with the U.S. Department of Agriculture, Animal and Plant Health Inspection Service (APHIS), Wildlife Services. The MBTA Depredation Permit is maintained and implemented by the Wildlife Services' personnel for the 354th Fighter Wing (2014 Federal Permits MB717522-0 and MB212698-0; and State Permit 14-035). Over the past five years, aircraft operating to and from EAFB have averaged 9.8 incidents or 13 bird strikes per year (see Attachment 1, Table 1). Most documented incidents occurred around the airfield at EAFB, but some were detected during post flight aircraft inspections, for flights originating elsewhere; in some cases, it is not possible to determine where the strike/incident occurred. Sufficient remains for a positive identification were not available from all strikes; however, in those strikes that were identifiable, none of the migratory bird species of conservation concern were involved in the incidents. Of the approximately 65 identified individuals involved in the BASH incidents, 20 percent of the incidents involved swallow species (cliff and bank swallows). The incidents involved 24 identified and one unknown avian species.

The other species of concern identified in the project area are bald (*Haliaeetus leucocephalus*) and golden eagles (*Aquila chrysaetos*) protected under the BGEPA, and peregrine falcons (*Falco peregrines*). Although eagles have been observed at EAFB, they are not known to nest on the installation. Peregrine falcons also are not known to nest on EAFB AFB.

Analysis of the Effects of the Action

Activities occurring on the installation have the potential to affect migratory birds using the wetlands and areas under construction. Increased noise and vibrations from construction activities may disturb the daily activities of nesting avian species and foraging activities of bald and golden eagles. About 13.21 acres of natural habitat, mostly black spruce wetlands, balsam fir, and shrub species, will be disturbed and/or be converted to impervious surfaces.

Although no new airspace is proposed, after the arrival of all F-35As, currently projected by the end of 2020, aircraft operations around the EAFB airfield are expected to increase by 148 percent, from the current level of 18,563 to approximately 45,069. This could potentially increase the number of MBTA species struck during these operations, both at EAFB and in the northern JPARC airspace. Extrapolating based upon the increase in operations, the average number of bird strikes/incidents annually could increase to 24 per year (versus the current average of 9.8 strikes/incidents per year).

Noise effects on wildlife species under the northern JPARC airspace are expected to increase slightly, based on the initial noise analyses conducted as part of the draft EIS. F-35A flight operations are expected to increase the current flight operations level by 8 percent over the entire airspace. The overall JPARC supersonic activity would increase by approximately 10 percent, with 90 percent of F-35A supersonic flights occurring at altitudes greater than 30,000 feet above mean sea level (MSL). The F-35A would rarely fly below 5,000 feet above ground level (AGL) and 80 percent of all operations would occur above 23,000 feet MSL.

Determination of the Effects from the Proposed Action

No federally listed, proposed, or candidate species are expected to be affected by the Proposed Action as preferred habitat for short-tailed albatross does not occur in the project area and the Eskimo curlew is rare in the state. The wood bison currently does not exist in the Proposed Action area; however, future populations may occur under the northern portion of the JPARC airspace. Based on the location of the reintroduction in Alaska as well as the projected F-35A operational characteristics, the USAF has determined that the species would not be affected by this Proposed Action.

Wetlands areas are abundant on and around EAFB, and account for approximately half of all areas on base. The Proposed Action would impact 13.21 acres of wetlands from construction activities (see Attachment). Impacts to the wetlands cannot be avoided, due to mission requirements/constraints (e.g., co-location of related functions, required stand-off distances for ordnance/explosives facilities, location limited by availability of utilities, etc.). However, to mitigate any unavoidable impacts to wetlands, the USAF will develop compensatory mitigations in accordance to the U.S. Army Corps of Engineers (USACE) mitigation determination guidelines.

BASH is a major operational concern as well as affecting migratory bird species. If implemented, the Proposed Action is expected to increase the total number of airfield operations which, in turn, could increase the number of bird strikes/incidents by aircraft to an average of 24

per year. However, BASH incidents on EAFB are not centered on a single species; with the exception of swallows, the species of birds vary widely. To minimize potential effects, the base would continue implementing the 354 FW BASH Plan and USAF tools (bird avoidance model and Avian Hazard Advisory System) and cooperation with local U.S. Department of Agriculture Wildlife Services.

Avian species that occur under the airspace have been exposed to effects from past and ongoing military overflights similar to the Proposed Action. General noise levels within airspace used by F-35As would increase minimally. The greatest area of increase would be within the Blair Air Traffic Control Assigned Airspace (11 dB increase); however, the overall noise level would remain below 45 dB.

The number of sonic booms are expected to increase marginally (projected increase of three3 sonic booms during the busiest month within the entire airspace) above the current baseline. Individuals may be affected by the increased sonic booms (increased startle behavior), but the slight increase in noise levels is not likely to adversely affect avian or other wildlife populations.

Bald and golden eagles and peregrine falcons are present under the northern JPARC airspace where the bulk of the F-35A operations would occur. However, the F-35A operations, should the Proposed Action be implemented, are not expected to adversely affect these species, due to the continued implementation of mitigations identified in previous environmental analyses and decision documents (e.g., the 1997 Alaska MOA EIS and Record of Decision (ROD) and the 2013 JPARC EIS and ROD). These include:

- Peregrine Falcon Avoidance: The existing peregrine falcon Flight Avoidance Areas have been increased (2,000 feet AGL and 2 nautical miles (NM) either side of the river centerline on the Charley, Kandik, and Yukon Rivers) from April 15 to June 15 (Alaska MOA EIS, 1997)

- Eagle and Migratory Bird Avoidance: The minimum altitude has been limited to 1,000 feet AGL in the new FOX3 and PAXON MOAs from March 15 to September 30 (i.e., nesting season) to comply with the BGEPA (JPARC EIS, 2013).

In addition, if needed to accommodate mission requirements and subject to funding, the USAF may also coordinate with the USFWS to establish habitat use models and/or conduct bald and golden eagle nest surveys to establish low flying (500 feet AGL) areas outside of eagle habitat during the nesting season (March 15 to September 30) to comply with the BGEPA (JPARC EIS, 2013).

For these reasons, we conclude that implementation of the Proposed Action or the No Action Alternative *may affect, but is not likely to adversely affect* bald and golden eagles and other migratory birds with ranges that could extend under the northern JPARC airspace where the majority of the F-35A operations would be conducted. The USAF respectfully requests concurrence on this determination in compliance with Section 7 of the ESA. When complete, copies of the draft EIS will be forwarded for your review.

Please provide written comments, concurrence, or other information regarding the action at your convenience, within 30 days, if possible, from receipt of this letter. Written comments should be sent in care of: Ms. Julene May, Chief, Installation Management Flight, 354 CES/CEI, 2310 Central Avenue Ste 100, Eielson AFB, AK 99702, julene.may@us.af.mil.

Sincerely,
s/s

JUSTIN W. MORRISON, Lt Col, USAF
Base Civil Engineer

Attachment:
Supporting Documentation

Attachment 1 - Supporting Documentation

U.S. Fish and Wildlife Service Correspondence

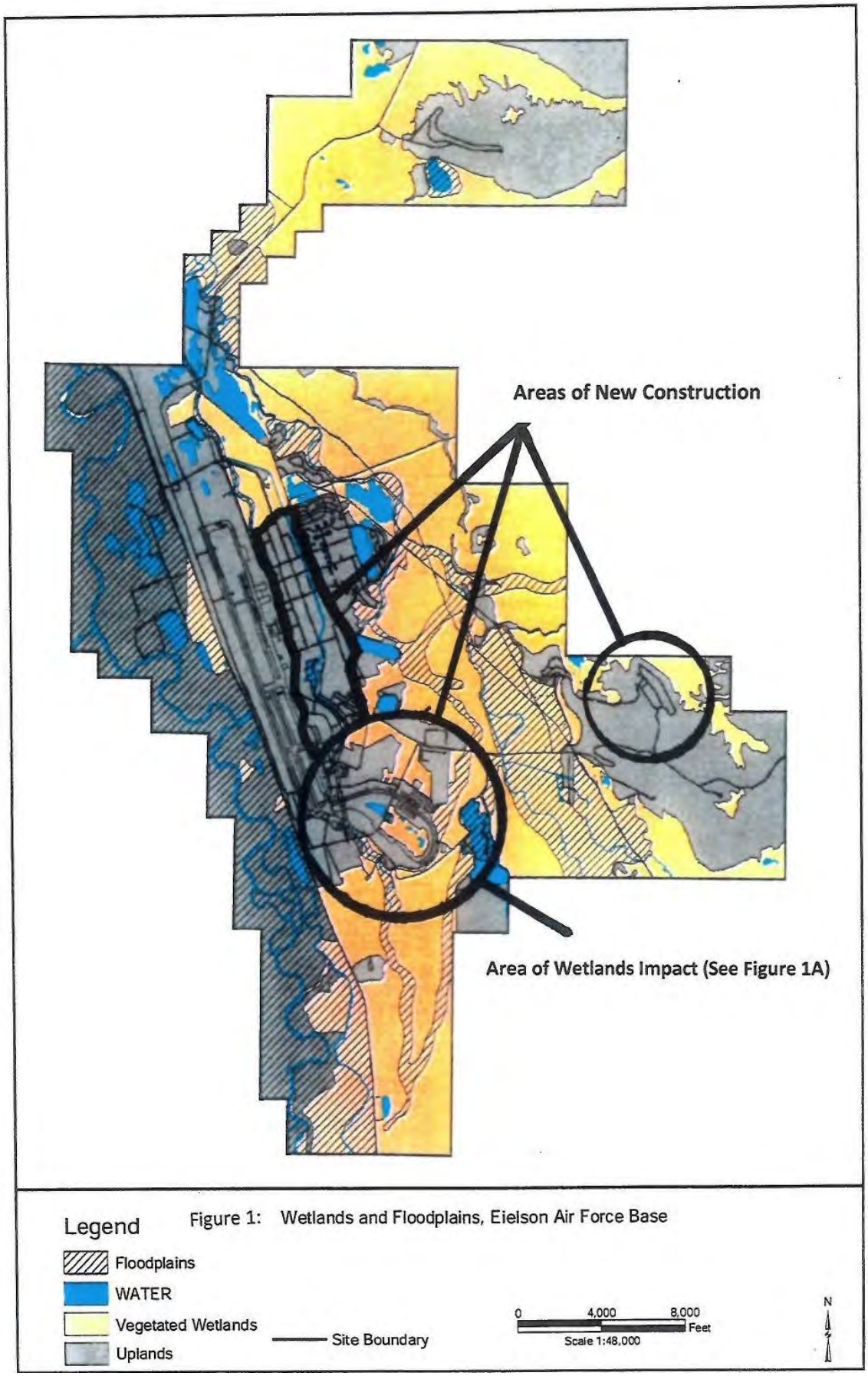


Figure 1: Wetlands and Floodplains, Eielson Air Force Base

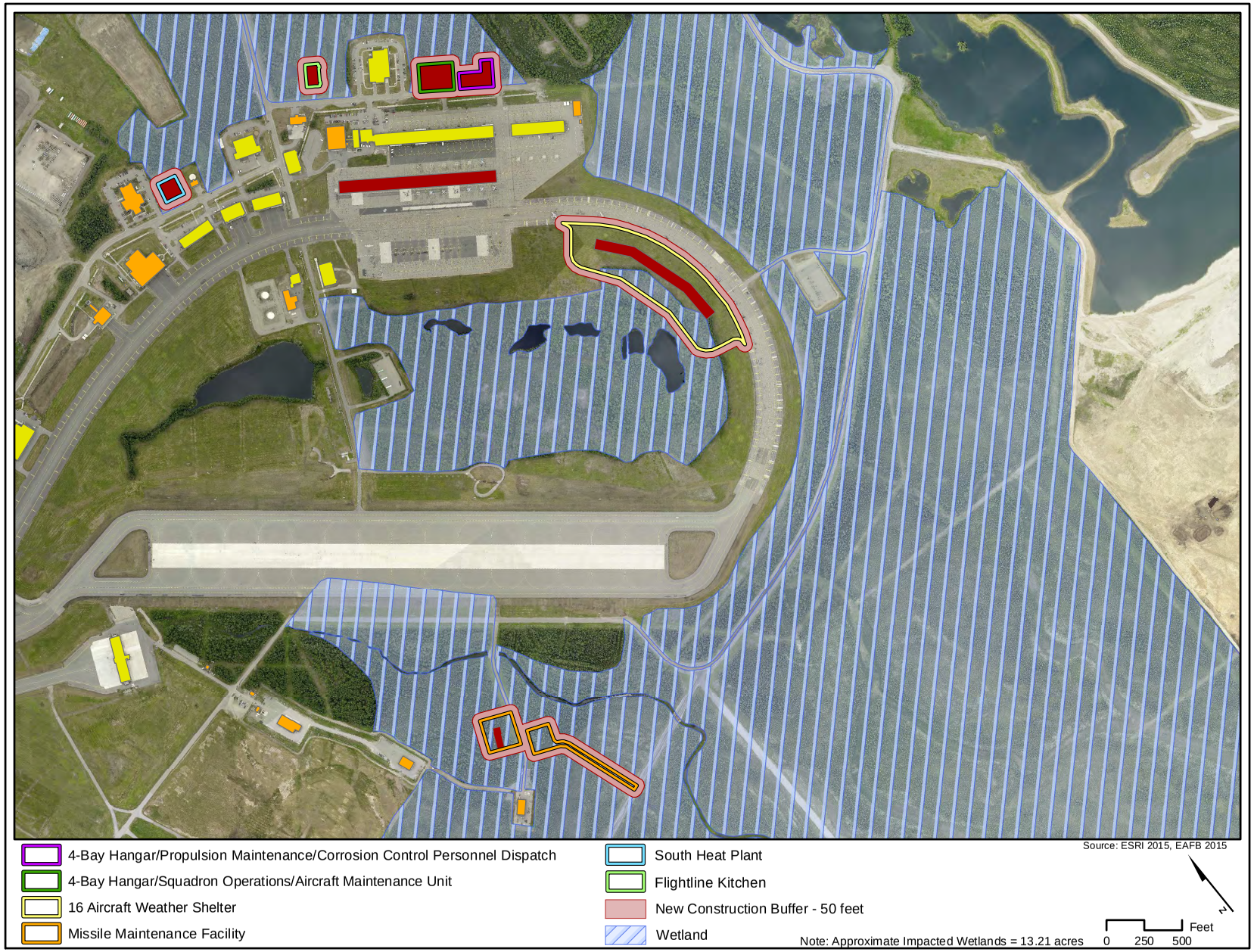


Figure 1A: Wetland Areas Impacted by Construction (13.21 Acres)

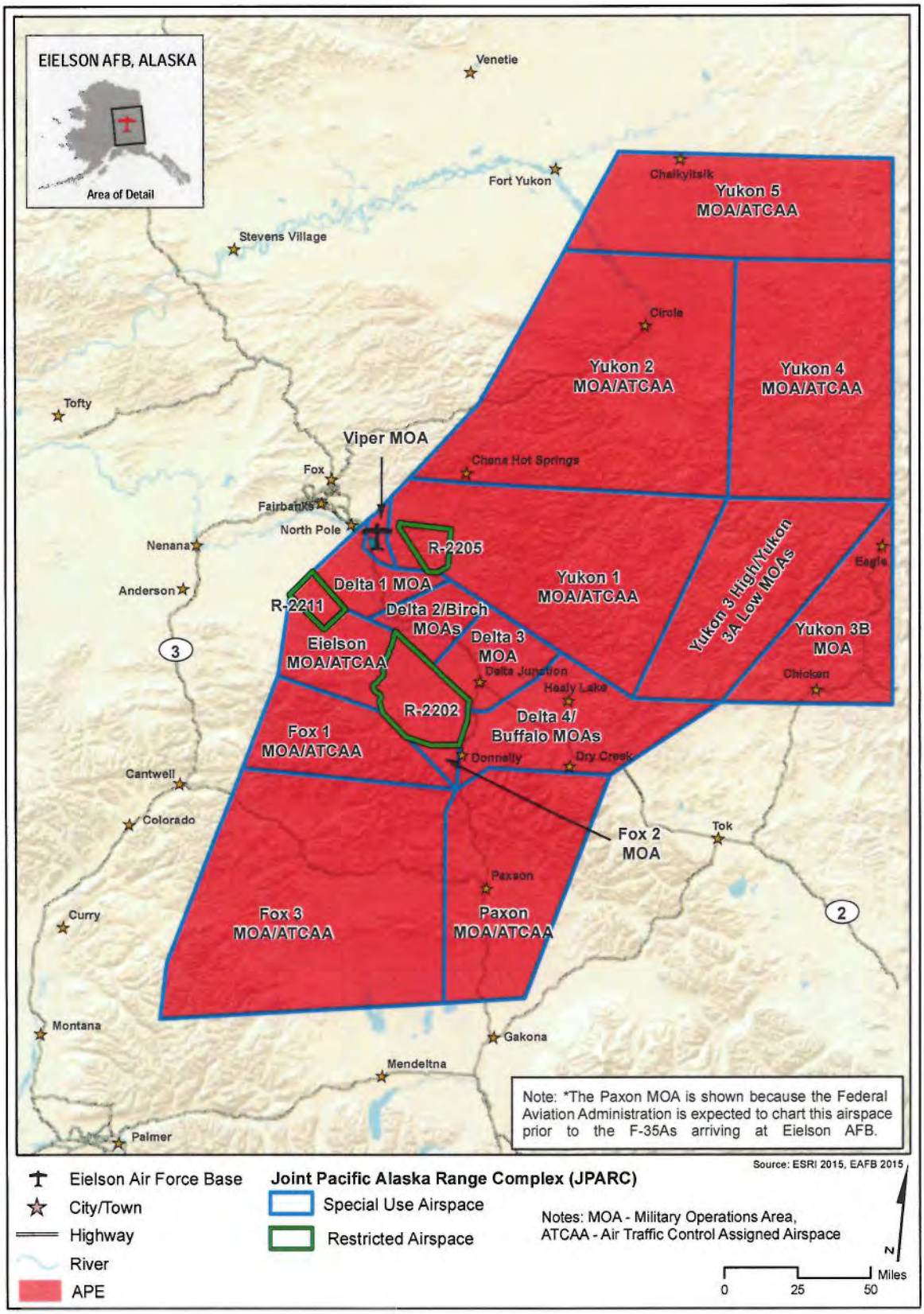


Figure 2: Area of Potential Effect

Table 1: Bird-Aircraft Strikes at Eielson AFB (2010-2014)

Date	Species (#)	Aircraft	Damage
5/13/2014	Solitary Sandpiper (2)	F16	None
6/25/2014	Cliff Swallow (1)	Unknown	None
6/25/2014	Savannah Sparrow (1)	Unknown	None
6/26/2014	Cliff Swallow (2)	A10	None
7/14/2014	Cliff Swallow (1)	Unknown	None
8/12/2014	Blackpoll Warbler (1)	H60	None
9/23/2014	Dark-eyed Junco (1)	KC135	None
10/30/2014	Unknown (1)	H60	Minor ($500)
12/16/2014	Unknown (1)	KC135	None
4/01/2013	Passerine/Perching Bird (1)	F-16	None
5/01/2013	Snow Bunting (2)	E-3	None
5/20/2013	American Golden-Plover (1)	Unknown	Unknown
5/20/2013	Baird's Sandpiper (1)	KC135	None
6/10/2013	Bank Swallow (1)	Unknown	Unknown
6/11/2013	Bank Swallow (1)	Unknown	Unknown
6/17/2013*	Javanese Collared Dove (2+) (En-route from Guam)	KC135	None
7/09/2013	Cliff Swallow (1)	KC135	None
7/13/2013	Cliff Swallow (1)	KC135	None
8/13/2013	Savannah Sparrow (1)	Unknown	Unknown
8/29/2013	Yellow-Rumped Warbler 2÷)	KC135	None
9/06/2013*	Ruby-Crowned Kinglet (1) (En-route from Kadena)	KC135	None
4/17/2012	Red-tailed Hawk (1)	F-16	Near Miss-Took Evasive Action
5/17/2012	Lapland Longspur (1)	Unknown	None
5/23/2012	Sandhill Cranes (4)	F-16	Aborted Take-Off
5/29/2012	Unknown (1)	German Eurofighter	None
6/26/2012	Cliff Swallow (1)	Unknown	None
6/26/2012	Cliff Swallow (1)	Unknown	None
8/26/2012	American Wigeon (1)	Unknown	None
8/28/2012	Mallard (1)	Unknown	None
9/17/2012	Dark-eyed Junco (1)	KC135	None
9/25/2012*	Common Nighthawk (1) (Enroute to Eielson)	KC135	None
05/11/2011	Common Chiffchaff (1)	KC135	None
05/10/2011	Lapland Longspur (4)	Unknown	None
06/04/2011	Unknown (1)	KC135	None
06/27/2011	Cliff Swallow (1)	Unknown	None
06/28/2011	Cliff Swallow (1)	Unknown	None
07/06/2011	Gull Species (1)	A-10C	None
08/12/2011	Unknown (1)	F18	None
08/15/2011	American Kestrel (1)	KC135	None
08/16/2011	American Kestrel (1)	Unknown	None
09/13/2011	American Kestrel (2)	Unknown	None
10/18/2011	Common Redpoll (1)	KC135	None

Date	Species (#)	Aircraft	Damage
06/18/2010	Common Redpoll (1)	F16	None
07/08/2010	Cliff Swallow (1)	KC135	None
08/06/2010	American Golden Plover (2)	KC135	None
08/08/2010	Savannah Sparrow (1)	KC135	None
08/12/2010	Unknown (4)	KC135	None
08/23/2010	Unknown (1)	KC135	Unknown
08/25/2010	Unknown (1)	Unknown	Unknown

Individuals Species Struck

Species	Numbers
Cliff Swallow	11
Bank Swallow	2
Savannah Sparrow	3
Solitary Sandpiper	2
Blackpoll Warbler	1
American Golden Plover	3
Common Redpoll	2
American Kestrel	4
Lapland Longspur	5
Common Chiffchaff	1
Common Nighthawk	1
Dark-eyed Junco	2
Mallard	1
American Wigeon	1
Sandhill Cranes	4
Red-tailed Hawk	1
Ruby-Crowned Kinglet	1
Yellow-Rumped Warbler	2+
Javanese Collared Dove	2+
Baird's Sandpiper	1
Snow Bunting	2
Gull (spp)	1
Passerine/Perching Bird	1
Unknown	11
Total	65

Appendix D: Detailed Resource Information

D.1 AIRSPACE MANAGEMENT AND MITIGATIONS

The following is a summary of airspace management and mitigation actions the Air Force and pilots operating in Alaska airspace must follow (Air Force 2014). Other restrictions or limitations required by the Army over their managed airspace are their responsibility; however, all military pilots who fly in the airspace must follow any applicable operating procedures. Additionally, there is a Memorandum of Agreement for the shared use of Special Use Airspace and underlying Army and Air Force managed training lands (Air Force/Army 2014). The memorandum is between the 11th Air Force, U.S. Army Alaska, and the Cold Regions Test Center.

If the Proposed Action Alternative to base and operate F-35As were implemented, pilots would adhere to all restrictions, limitations, mitigations, and seasonal adjustments codified in the April 1997, Record of Decision (ROD) establishing the current joint use Military Operations Areas (MOA) structure in Alaska. These MOAs are legally defined airspace found in Federal Aviation Administration (FAA) Order 7400.8, Regulatory/Non-Regulatory Special Use Airspace Areas. The ROD sketched out several proposed alternatives in the Description of Proposed Action and Alternatives (DOPAA). The FAA approved the Air Force request in June 1997.

The cooperative efforts to define the airspace limitations are contained in the Alaska MOA EIS (1995), and have been incorporated into the 11 AF Alaska Airspace Handbook (2015) prepared by the 11 AF Airspace and Range Operations Team (611 AOC/AODK). Copies of the ROD and the EIS Executive Summary for the EIS are located at: https://www.pacaf-f35aeis.com.The ROD formally adopted the mitigation specified in the EIS, defined exercises and MOA usage limitations, and balanced the needs of the community with the proposed military operations. The legal descriptions include latitude-longitude coordinates, floor and ceiling altitudes, use restrictions, scheduling and controlling agencies, and legally binding modifications for the airspace. It was not, however, a blanket approval. Modifications were imposed, and the ability of the military to use the airspace was made contingent on its compliance with several adjustments.

D.1.1 Excluded/Adjusted Areas

During the public process that led up to the approval of the airspace, some areas were so sensitive or controversial that the FAA excluded them by public law. Even though MOA airspace may surround them, these areas are excluded from the MOA descriptions as defined in FAA Order 7400.8. In addition to FAA requirements that must be met to use the airspace, the Air Force has identified procedures that make aircraft operations more efficient. The Air Force may impose its own, more restrictive conditions upon an area already excluded from the airspace. The adjustments to the exclusion do not change the legal description of the exclusion, but does require the military aviator to adhere to the more restrictive description. Even though not defined in any of the public processes, these adjustments are an integral part of the airspace complex. All Excluded/Adjusted Areas are coordinated by 611 AOC/CODK.

D.1.2 Implementation

The Air Force or Air Force-hosted military aircraft are not authorized to operate within any of the areas on the 11th Air Force Noise/Flight Sensitive Areas List or MOA exclusion areas, unless the aircraft is engaged in the activity specific to that area (Table D-1). This exception may include, but is not limited to, landing or taking off, participating in Search and Rescue or disaster relief, or responding to an in-flight emergency. Compliance with these adjustments and exclusions does not relieve a pilot from compliance with the Title 14 of the Code of Federal Regulations (CFR).

(1) In many cases, avoidance of locations would also be described by compliance with the CFRs. Such areas are included on the list to alert all aircrew to the presence of such an area. This is not an inference that areas of similar activity that are not on the list may be ignored.
(2) Wherever the adjustments are more restrictive than CFRs, the most restrictive conditions will be applied.
(3) Light aircraft activity in Alaska is extensive. In addition to any airports described in the adjustments, the following criteria are to be observed:
    (a) Controlled Airports: Avoid control zones and/or airport traffic areas when active and other times by 3 nautical miles (NM), below 1,500 feet (feet) above ground level (AGL).
    (b) Uncontrolled airports: (Unless participating on CTAF or specifically exempted in the list).
        (i) Avoid all civil airports identified in the Alaska Supplement as “public use” by 3 NM, below 1,500 feet AGL.
        (ii) Avoid airfields identified in the Alaska Supplement as "private" by 1 NM, below 1,500 feet AGL.
    (c) Avoid all well-known landing areas, such as fishing or hunting landing sites, by 1 NM, below 1,500 feet AGL, seasonal (as applicable).
    (d) Avoid VFR Corridors as described in the 11th Air Force Noise/Flight Sensitive Areas List/DOPAA.

Table D-1 is derived from an evaluation of the mitigation measures and restrictions prescribed by the Alaska MOA EIS and ROD (Air Force 1995, 1997) and codified as standard operating procedures in the 11th Air Force Alaska Airspace Handbook. Mitigation measures identified in the Joint Pacific Alaska Range Complex EIS and ROD (Air Force 2013a, b) are summarized in Table D-2 and will be implemented once the FAA has charted the expanded Fox 3 and lowered Paxon MOA. As these changes are expected to be adopted by the FAA and codified in a revision of the 11th Air Force Alaska Airspace Handbook within the next 12 to 18 months, it is assumed that F-35As would adhere to these operating procedures upon their arrival at Eielson AFB.

Table D-1. Alaska Airspace Restrictions, Limitations, Mitigations, and Seasonal Adjustments in Northern JPARC Airspace

Restriction Specifications	*Applicable MOA(s) or Restricted Area (R-)*
Conduct no Major Flying Exercises (MFEs) during September, December, or January	All
Provide a minimum 2-week break between MFEs	All
Conduct no MFEs the week prior to and the week following of July 4	All
Limit Use to MFE only	Yukon 3B Yukon 5
Conduct supersonic operations at or above 5,000 feet AGL or 12,000 feet mean sea level (MSL), whichever is higher	Fox 1 Fox 2 Fox 3 Yukon 1 Yukon 2 Yukon 3B Yukon 4 Yukon 5
Extend the existing peregrine falcon Flight Avoidance Areas 2,000 feet AGL and 2 nautical miles (NM) either side of the river centerline on the Charley, Kandik, and Yukon rivers to include April 15 to September 15	Yukon 1 Yukon 2 Yukon 3A Yukon 3B Yukon 4
Protect "at-risk" wildlife populations by restricting overflights during critical lifecycle periods. "At-Risk" populations and temporal and spatial protection parameters to be established through consultation with management agencies, and the smallest practicable and effective area mitigated	All
Protect the Delta caribou herd by establishing a minimum overflight altitude of 3,000 feet AGL over calving areas (normally May 15 – June 15)	Birch Eielson
Protect Dall sheep in the Northern Alaska Range and the Tanana Hills by establishing a minimum overflight altitude of 5,000 feet AGL over lambing areas and spring mineral licks (nominally from May 15 to June 15 and over rutting areas (nominally from November 15 to December 15)	Buffalo Eielson Fox 1 Yukon 1
Continue to provide the Special Use Airspace Information Service (SUAIS)	R-2202 R-2205 R-2211 Birch Buffalo Delta 1 – 4 (MFE) Eielson Viper A/B Yukon 1-3

Table D-1. Alaska Airspace Restrictions, Limitations, Mitigations, and Seasonal Adjustments in Northern JPARC Airspace

Restriction Specifications	*Applicable MOA(s) or Restricted Area (R-)*
Continue the in-state toll free number (1-800-538-6647)	All
Notify Alaska press outlets of the annual MFE schedule for release in publications such as visitor and travel guides, and various newspapers	All
Continue operation of the Alaska Civil/Military Aviation Council (ACMAC)	All
Establish a Resource Protection Council consisting of three inter-agency (federal, state, and Air Force) coordination teams: 1) Resources Protection/Mitigation, 2) public information, and 3) Research and Monitoring	All
Designate the Alaska Air Force Representative to the FAA as the focal point for sharing information received from the public regarding U.S. Air Force flight activities within the MOAs	All
Pleasant Valley Subdivision Exclusion, continuous	Viper A Yukon 1
Chena Recreation Area Exclusion, May 1 to September 30	Yukon 1
Chena Hot Springs Resort Exclusion, continuous	Yukon 2
Salcha River Area Two Adjustment, Below 1,000 feet AGL: May 1 to August 31; Below 5,000 feet MSL: September 1 to 20	Yukon 1
Sheep Lambing Area and Newman Creek Airstrip Adjustment: May 15 to June 15 and November 15 to December 15	Eielson
Clear Creek Exclusion, 1 NM radius around 64°13 feet05”N, 146°13 feet00”W, below 1,500 feet AGL, continuous	Birch
Birch Lake State Recreation Site Exclusion, 1 NM radius around 64°19 feet00”N, 146°39 feet00”W, below 2,000 feet AGL, May 15 to September 30	Birch
Delta Nation Wild and Scenic River Adjustment, 5 NM either side of the river from 63°03 feet00”N, 144°59 feet00”W to 63°34 feet0”N, 145°53 feet00”W, below 5,000 feet MSL, June 27 to July 11	Buffalo
Healy Lake/Village Exclusion, 3 NM radius around 63° 59 feet00”N,144° 45 feet00”W, Below 6,000 feet MSL, continuous	Buffalo
Donnelly Creek State Recreations Site Adjustment, 1 NM radius around 63°39 feet40”N, 145°53 feet00”W, Below 2,000 feet AGL. May 15 to September 30	Buffalo
Lake George Exclusion, 2 NM radius around 63°47 feet00”N, 144°32 feet00”W, below 1,500 feet AGL, continuous	Buffalo
Shaw Creek Youth Camp Adjustment, 1 NM radius around 64° 16 feet00”N, 146° 06 feet00”W, below 1,500 feet AGL, continuous	Birch
Town of Circle City Adjustment, 2 NM radius around 65°49 feet50”N, 114°40 feet33”W, below 6,000 feet MSL, continuous	Yukon 2
Towns of Central and Circle Hot Springs Adjustment, beginning 65°35 feet00N, 144°55 feet00”W to 65°38 feet00”N, 144°45 feet00”W to 65°29 feet00”N, 144°30 feet00”W to 65°26 feet00”N, 144°39 feet00”W, 10,000 feet MSL, continuous	Yukon 2
Towns of Central and Circle Hot Springs (Supersonic Operations) Adjustment, No supersonic operations within a 10 NM radius around 65°31 feet00”N,144°43 feet00”W, below 30,000 feet MSL, continuous	Yukon 2
Cirque Lakes Dall Sheep Lambing Area Adjustment, 7 NM radius around 64°48 feet00”N, 143°45 feet00”W, below 5,000 feet AGL, May 10 to June 15	Yukon 1

Table D-1. Alaska Airspace Restrictions, Limitations, Mitigations, and Seasonal Adjustments in Northern JPARC Airspace

Restriction Specifications	*Applicable MOA(s) or Restricted Area (R-)*
Salcha River Area Three Adjustment, 2 NM either side of the Salcha River from 64°39 feet30”N, 145°45 feet00”W to 64°39 feet00”N, 145°20 feet15”W, below 5,000 feet MSL for turbojet/turbofan aircraft, below 1,000 feet AGL for all other aircraft, September 1 to 20	Yukon 1
Gold King Creek Airstrip Exclusion, 3 NM radius around 64°11 feet47”N, 147°55 feet57”W, below 1,500 feet AGL, Continuous	Eielson
Pogo Airstrip and Goodpaster River Valley Adjustment, 3 NM radius around 64°27 feet12.4”N, 144°54 feet19.7”W, below 1,000 feet AGL, April 1 to November 30	Yukon 1

Table D-2. Mitigations Identified in Joint Pacific Alaska Range Complex (JPARC) EIS and ROD

Restriction Specifications	*Applicable MOA(s) or Restricted Area (R-)*
Stratify expanded Fox 3 MOA vertically into Low (500 feet AGL up to but not including 5,000 feet AGL) and High (5,000 feet AGL up to but not including FL180)	Fox 3
Stratify new Paxon MOA vertically into Low (500 feet AGL up to but not including 14,000 feet MSL) and High (14,000 feet MSL up to but not including FL180)	Paxon
Continue SUAIS in all areas where radio coverage exists; this includes a majority of the area beneath the proposed MOAs. The SUAIS Letter of Agreement (LOA) with the FAA will be updated to include current radio sites and any new MOAs to be covered by the system	Fox 3 Paxon
Limit minimum altitude to 1,000 feet AGL in the new MOAs from March 15 to September 30 (i.e., nesting season) to comply with the Bald and Golden Eagle Protection Act. Subject to available funding, the Air Force may coordinate with the U.S. Fish and Wildlife (USFWS) to establish habitat models and/or conduct bald and golden eagle nest surveys to establish low flying (500 feet AGL) area outside of eagle habitat during the nesting season	Fox 3 Paxon
Modify existing LOA with the Alaska Department of Fish and Game (ADFG) to maintain avoidance areas over caribou and Dall sheep populations under the new MOAs during critical lifecycle periods. Coordination with wildlife agencies will continue to determine specifics including seasons and minimum overflight altitudes; location of herds is monitored/reported by ADFG	Fox 3 Paxon
Expand the Visual Flight Rule (VFR) flight corridor over the Richardson Highway between Delta Junction and Glennallen to include the highway segment under the new MOA. The corridor will be 3 miles on either side of the Richardson Highway and up to 4,500 feet MSL. The MOA floor in the corridor would go to 5,000 feet MSL to allow a 500-feet buffer. The Paxson Fish Hatchery would be afforded protection from low overflight noise as an added benefit of the VFR corridor	Paxon
For the period May 15 to September 30, expand the Gulkana (west, middle, and north forks) and the Delta National Wild and Scenic River (NWSR) (and others, as designated) Flight Avoidance Areas to include portions with new MOA boundaries using a 5-NM buffer on either side of the river centerline with 5,000 feet MSL minimum altitude. The river corridors will include their headwater lakes areas (Tangle Lakes and Dickey Lake).	Fox 3 Paxon

Table D-2. Mitigations Identified in Joint Pacific Alaska Range Complex (JPARC) EIS and ROD (con't)

Comply with Flight Avoidance Areas established by the 11th Air Force Airspace and Range Team and listed in the 11th Air Force Alaska Airspace Handbook. Areas not specified by the JPARC ROD may be added, increased, decreased, or removed by the 11th Air Force as situations dictate (e.g., a mine and its air operations cease to exist).	Fox 3 Paxon
Comply with Alaska Department of Natural Resources (ADNR) comments to avoid leasehold properties in the north and south corners of the proposed restricted area by adjusting the borders of the Alternative A airspace.	R-2202
Air Force will proved support to ADNR throughout the Special Use Designation (SUD) process, and will develop a Concept of Operations (CONOPs) and an Access and Safety Plan for the exclusive use of state land to support Realistic Live Ordnance Delivery. The SUD will identify areas and dates of closure and will have to indicate which activities are affected. The Access Plan will provide the maximum public use to the ground evacuation areas, closing such areas for the minimum period of time necessary to conduct such operations. The Access plan (Updated Annually) will identify areas and dates of closure and will indicate which activities are affected. It will describe roles and responsibilities for securing the area, ensuring it is evacuated, publishing and posting closure notices, signs and other media to advertise and alert the public of hazards, times and locations.	R-2202
All applicable conservation, monitoring, and management procedures currently followed by U.S. Army Garrison – Fort Wainwright (USAG-FWA) in the management of this range will be applicable to the Proposed Action in the ROD, including measure for the protection of soils and permafrost, including, but not limited to the USAG-FWA Integrate Natural Resources Management Plan, the Storm Water Pollution Prevention Plan, and the monitoring guidelines of the integrated Training Area Management (ITAM) Sustainable Range Awareness.	R-2202
Identified Mitigations Becoming Effective with JPARC Airspace Changes (These were formerly below the floors of the MOAs)	
Fielding Lake State Recreation Site Avoidance Area, 1 NM radius around 63 10 feet00N. 145 40.00"W. 1 NM radius around 63 11 feet12"N, 145 38 feet00", below 2,000 feet AGL, 15 May to 30 May	Paxon
Sheep Lambing Avoidance Area, beginning at 63°21 feet00"N, 145°05 feet00"W to 63° 33 feet00"N, 144°05 feet00"W to 63°22 feet00"N, 144°05 feet00"W to 63°10 feet00"N, 145°05 feet00"W to point of beginning, below 1,000 feet AGL, 1 May to 30 June	Paxon
Caribou Hunting Avoidance Area, beginning at 62°55 feet49"N, 147°11 feet08"W to 62°46 feet02"N, 147°06 feet49"W to 62°54 feet05"N, 145°52 feet08"W to 63°03 feet53"N, 145°55 feet52"W to point of beginning, below 1,000 feet AGL, 1 August to 30 September	Fox 3

D.1.3 11th Air Force Noise/Flight Sensitive Areas List

Historically, the 11th Air Force Noise/Flight Sensitive Areas List identified locations the Air Force would voluntarily avoid because of public need and commercial use. The 11th Air Force Noise/Flight Sensitive Areas List was published in the Alaska MOA EIS and confirmed by the ROD, establishing a baseline for noise and flight sensitive areas. Although some of the adjustments are outside of MOA airspace, the process that brought the airspace complex into existence dictates that adjustments must be honored as described. Additionally, identification and avoidance of noise and flight sensitive areas is a dynamic, on-going process. The 611 AOC/CODK conducts periodic reviews of this list. When appropriate, avoidance areas are either deleted or defined and added to the list, and an updated Noise/Flight Sensitive Areas List is distributed. The Alaska MOA EIS permanently captured locations 1 through 39 from the list and A through O from the DOPAA (Figure D-1). The airspace names are provided in Table D-3. The numbered and lettered restrictions are defined following the figure. Subsequent lists do not change those numbers or the areas they describe. If the area is deleted, the number will not be re-used. The following is taken from the 11th Air Force Alaska Airspace Handbook (Air Force 2014).

Table D-3. Northern JPARC Airspace Units

Airspace Unit	*Map Key*
Delta 1 MOA	A
Delta 2/Birch MOAs	B
Delta 3 MOA	C
Delta 4/Buffalo MOAs	D
Eielson MOA	E
Fox 1 MOA	F
Fox 2 MOA	H
Fox 3 MOA	G
Paxon Low MOA/ATCAA	I
Yukon 1 MOA	J
Yukon 2 MOA	K
Yukon 3 High/3A Low MOAs	L
Yukon 3B MOA	M
Yukon 4 MOA	N
Yukon 5 MOA	O
Viper A/B MOAs	P
R-2202	Q
R-2205	R
R-2211	S

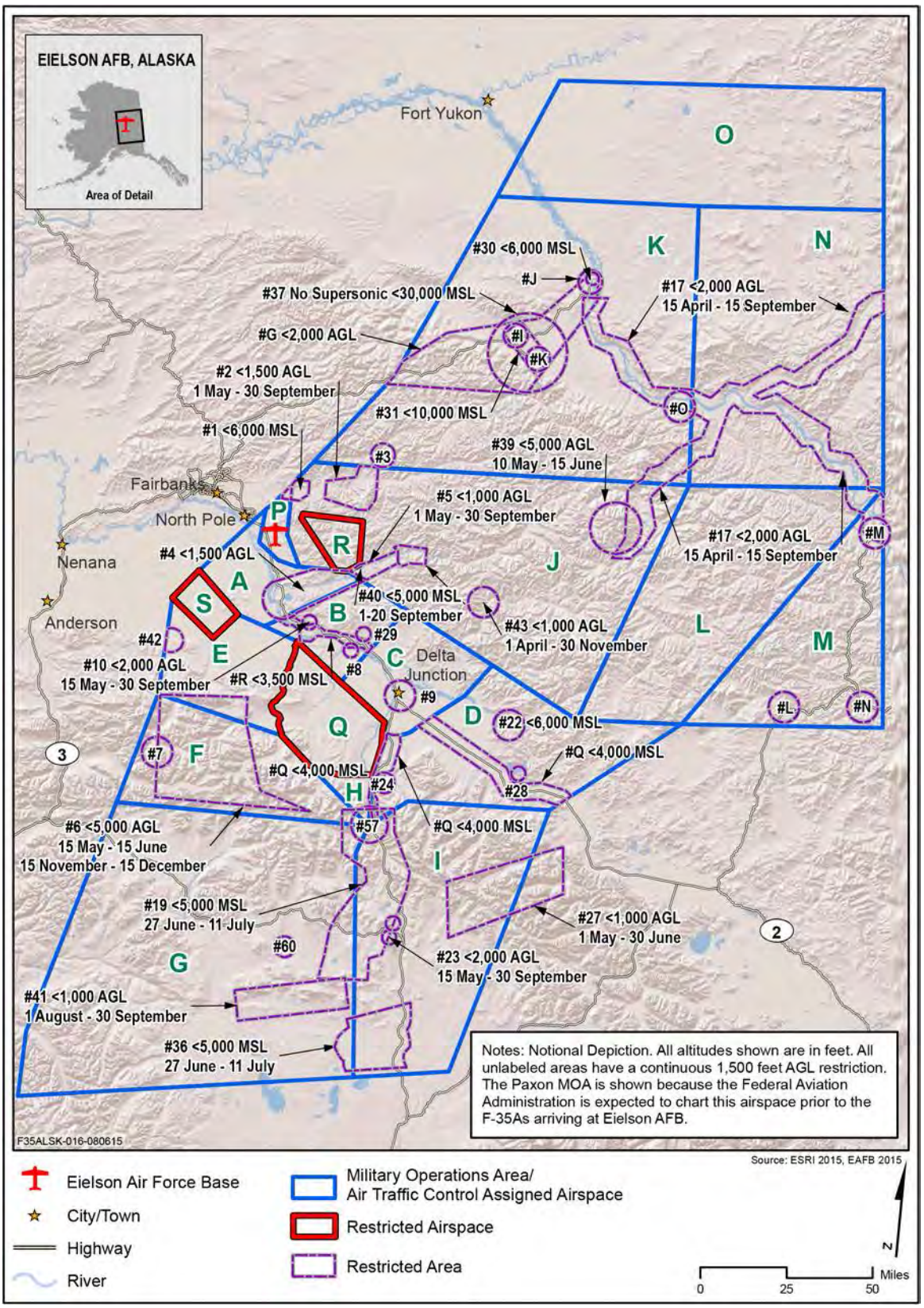


Figure D-1. Joint Pacific Alaska Range Complex Northern Airspace Restrictions, Limitations, and Seasonal Adjustments

Noise Avoidance/Exclusion Areas List as Contained in the 11 Air Force Alaska Airspace Handbook (11th Air Force 2015)

(1) **Pleasant Valley Subdivision (exclusion to *Yukon 1 and Viper A*)**
- Altitude: No flight below 6,000 feet MSL. Flight at altitudes above 6,000 feet MSL is restricted to non-maneuvering, non-afterburning, navigational flight only.
- Time of year: Continuous

(2) **Chena Recreation Area (exclusion to *Yukon 1*)**
- Altitude: Below 1,500 feet AGL
- Time of year: May 1 to September 30

(3) **Chena Hot Springs Resort (exclusion to *Yukon 2*)**
- Description: 3 NM radius around 65°03’07"N, 146°02’51"W
- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(4) **Salcha River Area One (outside of MOAs)**
- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(5) **Salcha River Area Two (adjustment to *Yukon 1*)**
- Below 1,000 feet AGL: May 1 to August 31
- Below 5,000 feet MSL: September 1 to September 20

(6) **Sheep Lambing Area and Newman Creek Airstrip (adjustment to *Eielson* and below the floor of *Fox 1*)**
- Altitude: Below 5,000 feet AGL
- May 15 to June 15
- November 15 to December 15

(7) **Wood River Lodge (below the floor of *Fox 1*)**
- Description: 3 NM radius around 63°46’00"N, 147°58’00"W
- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(8) **Clear Creek Cabins (exclusion to *Birch*)**
- Description: 1 NM radius around 64°13’05"N, 146°13’00"W
- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(9) **Delta Junction (outside of MOAs)**
- Description: 3 NM radius around 64°02’30"N, 145°43’30"W
- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(10) **Birch Lake State Recreation Site (exclusion to *Birch*)**
- Description: 1 NM radius around 64°19 feet 00"N, 146°39 feet 00"W
- Altitude: Below 2,000 feet AGL
- Time of year: May 15 to September 30

(19) **Delta National Wild and Scenic River (Adjustment to *Buffalo* & below the floor of *Fox 2&3* and outside these MOAs)**

- Altitude: Below 5,000 feet MSL, 5 NM either side of the river
- Time of year: June 27 to July 11

(22) **Healy Lake/Village (exclusion to *Buffalo*)**

- Description: 3 NM radius around 63°59’00"N, 144°45’00"W
- Altitude: Below 6,000 feet MSL
- Time of year: Continuous

(23) **Fielding Lake State Recreation Sites (outside of MOAs)**

- Description: 1 NM radius around 63°10'00"N, 145°40'00"W, 1 NM radius around 63°11'12"N, 145°38'00"W
- Altitude: Below 2,000 feet AGL
- Time of year: May 15 to September 30

(24) **Donnelly Creek State Recreation Site (adjustment to *Buffalo*)**

- Altitude: Below 2,000 feet AGL
- Time of year: May 15 to September 30

(27) **Sheep Lambing Area (outside of MOAs)**

- Altitude: Below 1,000 feet AGL
- Time of year: May 1 to June 30

(28) **Lake George (exclusion to *Buffalo*)**

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(29) **Shaw Creek Youth Camp (exclusion to *Birch*)**

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(30) **Town of Circle City (adjustment to *Yukon 2*)**

- Altitude: Below 6,000 feet MSL
- Time of year: Continuous

(31) **Towns of Central and Circle Hot Springs (adjustment to *Yukon 2*)**

- Altitude: Below 10,000 feet MSL
- Time of year: Continuous

(36) **Gulkana National Wild and Scenic River (outside of MOAs)**

- Altitude: Below 5,000 MSL, 5 NM either side of river
- Time of year: June 27 to July 11

(37) **Towns of Central and Circle Hot Springs (Supersonic operations) (adjustment to *Yukon 2*)**

- Description: No supersonic operations within a 10 NM radius around 65°31’00"N, 144°43’00"W
- Altitude: Below 30,000 feet MSL
- Time of year: Continuous

(39) **Cirque Lakes Dall Sheep Lambing Area (adjustment to *Yukon 1*)**

- Altitude: Below 5,000 feet AGL
- Time of year: May 10 to June 15

(40) **Salcha River Area Three (adjustment to *Yukon 1*)**

- Altitude: Below 5,000 feet MSL for turbojet/turbofan aircraft; Below 1,000 feet AGL for all other aircraft
- Time of year: September 1 to September 20

(41) **Caribou Hunting Area (below the floor of *Fox 3*)**

- Altitude: Below 1,000 feet AGL
- Time of year: August 1 to September 30

(42) **Gold King Creek airstrip (exclusion to *Eielson*)**

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(43) **Pogo airstrip and Goodpaster River Valley (adjustment to *Yukon 1*)**

- Altitude: Below 1,000 feet AGL
- Time of year: April 1 to November 30

(57) **Black Rapids Airport (exclusion to Buffalo)**

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

(60) **Maclaren Lodge and Airstrip (MTR937 and under Fox 3 MOA)**

- Altitude: below 1,500 feet AGL
- Time of year: continuous

G. Steese Highway (exclusion to Yukon 2)

- Altitude: Below 2,000 feet AGL
- Time of year: Continuous

I. Central (CEM) Airport (adjustment to *Yukon 2)*

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

J. Circle City (CRC) Airport (exclusion to *Yukon 2*)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

K. Circle Hot Springs (CHP) Airport (adjustment to *Yukon 2*)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

L. Chicken (CKX) Airport (below the floor of *Yukon 3B*)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

M. Eagle (EAA) Airport (below floor of *Yukon 3B*)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

N. Boundary (BYA) Airport (below floor of Yukon 3B)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

O. Coal Creek (L20) Airport (exclusion to Yukon 2)

- Altitude: Below 1,500 feet AGL
- Time of year: Continuous

P. Yukon MOAs Peregrine Falcon Areas (exclusion and adjustment to Yukon 1, 2, 3A Low, 3B, 4) Source document ROD of 97/EIS of 95 Vol. 3.

(a) Upper Yukon River:

- Altitude: Below 2,000 feet AGL, 2 NM either side of river centerline
- Time of year: April 15 to September 15

(b) Charley River:

- Altitude: Below 2,000 feet AGL, 2 NM either side of river centerline
- Time of year: April 15 to September 15

(c) Kandik River:

- Altitude: Below 2,000 feet AGL, 2 NM either side of river centerline
- Time of year: April 15 to September 15

Q. Buffalo MOA VFR Corridor (exclusions)

(a) Richardson Highway VFR Corridor NORTH:

- Description: From 2 NM east of the Richardson Highway to ½ NM west of the Richardson Highway or the Alaska Pipeline whichever is further west, north of a line established between 63°41’4"N, 145°54’48"W to 63°42’01"N, 145°48’52"W
- Altitude: Below 4,000 feet MSL
- Time of year: Continuous

(b) Richardson Highway VFR Corridor SOUTH:

- Description: From ½ NM east of the Richardson Highway to the west side of the Delta River south of a line established between 63°41’14"N, 145°54’48"W to 63°42’01"N, 145°48’52"W
- Altitude: Below 4,000 feet MSL
- Time of year: Continuous

(c) Alaska Highway VFR Corridor:

- Description: 2 NM either side of the Alaska Highway
- Altitude: Below 4,000 feet MSL
- Time of year: Continuous

R. Birch MOA VFR Corridor (exclusion)

(a) Richardson Highway VFR Corridor:

- Description: 0.5 NM north of the Alaska Highway to the south side of the Tanana River.
- Altitude: Below 3,500 feet MSL
- Time of year: Continuous

D.1.4 Airspace Operations

D.1.4.1 Defensive Countermeasures

Flares are the principal defensive countermeasure dispensed by military aircraft to evade attack by enemy air defense systems. Although the F-35A's stealth features significantly reduce its detectability, pilots must train to employ these countermeasures. Flares dispensed from aircraft provide high-temperature heat sources that mislead heat-sensitive or heat-seeking targeting systems. Flares provide an infrared countermeasure to counter homing, heat seeking surface-to-air and air-to-air missiles. Flares are used only in approved airspace at altitudes designated for the airspace. Flares burn out in approximately 500 feet, so altitude restrictions in special use airspace are established to ensure flare burnout before it reaches the ground or water.

Flare deployment in authorized airspace associated with the preferred alternative is governed by a series of regulations based on safety and environmental considerations and limitations. These regulations establish procedures governing the use of flares over ranges, other government-owned and controlled lands, and nongovernment-owned or controlled areas. All areas used for flare deployment must be analyzed through appropriate NEPA documentation. Air Combat Command (ACC) has set standard minimum-release altitudes (ACC Supplement to AFI 11-214) for flares over government-owned and controlled lands.

These standards, which vary from 400 to 900 feet AGL according to aircraft type, are designed to allow the flares to burn out completely at least 100 feet above the ground. For legacy fighter aircraft, the minimum release altitude for flares is 700 feet AGL. Minimum release altitudes for the F-35As are expected to be similar. Over nongovernment-controlled lands, flare release is restricted to a minimum of 2,000 feet AGL and above for all aircraft. More restrictive altitude restrictions are followed for specific airspace units in response to local considerations, including wildfire threat levels (e.g., those found under the Memorandum of Agreement between the City of Delta Junction and the U.S. Army Alaska). Flares can also be dispensed in the offshore Warning Areas without altitude restrictions.

Defensive flares are made of magnesium that, when ignited, burn for a short period (less than 5 seconds) at approximately 2,000 degrees Fahrenheit (°F). The burn temperature is hotter than the F-35A exhaust, so the flare attracts and decoys heat-seeking weapons and sensors targeted on the aircraft. Pilots must train regularly with defensive flares under simulated threat conditions to ensure flare deployment in extremely high stress combat conditions. While the specific flare to be used in F-35A training has not yet been determined or approved, flares currently used in the training airspace are the M-206 and Mobile Jettison Unit (MJU)-7/B. Another flare that could be used is the MJU-61/B. Table D-4 describes all three flares under consideration for F-35A training. Additional environmental analysis would be needed prior to the F-35A pilot employing flares other than the MJU-61/B, M-206, or MJU-7/B outside airspace where training is currently approved for such flares or the MJU-10/B flare with the same Safe and Initiation residual piece as in the MJU-7/B.

Table D-4. Residual Material Deposited on the Ground Following Deployment of One Flare

Material	***Disposition***	***Flare Type***		
		MJU-61/B	*M-206*	*MJU-7/B*
Flare Case	Aluminum, remains in aircraft	1 inch by 1 inch by 8 inches	1 inch by 1 inch by 8 inches	2 inch by 1 inch by 8 inches
Flare Insert	Burns when deployed	Magnesium, Teflon	Magnesium, Teflon	Magnesium, Teflon
End Cap/Pad	Deposited on the ground	One 1 inch x 1 inch x 1/8 inch plastic or nylon; one same sized silicone foam pad	One 1 inch x 1 inch x 1/8 inch plastic or nylon; one same sized silicone foam pad	One 2 inch x 1 inch x 1/8 inch plastic or nylon; one same sized silicone foam pad
Piston	Deposited on the ground	One 1 inch x 1 inch x 1/2 inch nylon/plastic	One 1 inch x 1 inch x 1/2 inch nylon/plastic	One 2 inch x 1 inch x 1/2 inch nylon/plastic
Flare/Body Wrapping	Deposited on the ground	One up to 2 inch x 17 inch piece of graphite fabric stiff duct-tape type material	One up to 2 inch x 17 inch piece of graphite fabric stiff duct-tape type material	One up to 3 inch x 17 inch piece of graphite fabric stiff duct-tape type material
Initiator or S&I Device	Deposited on the ground	One 1 inch x 1 inch x 1/2 inch plastic/spring device	None	One 2 inch x 1 inch x 1/2 inch plastic/spring device

The MJU-61/B flare is the same size as the M-206 flare. Each flare is approximately 1.0 inch x 1.0 inch x 8.1 inches long. The difference is that the MJU 61/B flare has an igniter device, which allows the hot gasses propelling the flare from the aluminum cartridge to ignite the flare magnesium pellet as the flare exits the cartridge. The M-206 initiates flare ignition while the flare magnesium pellet is still in the aluminum cartridge. After a flare is deployed, residual materials fall to the ground. The MJU-7/B flare is approximately 2.0 inches x 1.0 inch x 8.1 inches long and includes an S&I device, which permits the flare to ignite as it exits the cartridge. As shown in Table D.2-1, residual materials can be deposited on the ground following deployment of each MJU-61/B, M-206, and MJU-7/B flare.

Different flare residual materials have different rates of descent and different impacts when they reach the ground. All of the MJU-61/B and M-206 residual flare materials that fall have surface area to weight ratios that would not produce any substantial impact when the residual flare material struck the ground. The largest item is the 0.975 inch × 0.975 inch × 0.5-inch plastic and spring igniter device with a weight of approximately 0.33 ounces in the MJU-61/B flare. This igniter device would strike the ground with a momentum of 0.046 pound/second, or approximately the same force as a small hailstone. The MJU-7/B has the largest piece of residual material, the S&I device, which would strike the ground with a momentum of 0.16 pound/second or approximately the same force as a large hailstone. If an igniter device were to strike an unprotected individual, it would be expected to be noticed, but not cause a bruise. An S&I device could cause a bruise. The likelihood of a strike would depend upon the number of flares deployed, the areal extent of the airspace, the population density under the airspace, and the proportion of time a person would be expected to be outside. If 32,000 flares were deployed annually within a representative airspace unit overlying 8,900 square miles of land with a western rural population density of one person per square mile, and the population is outside an average of 10 percent of the time, the

potential for a strike has been calculated as 1 in 681,000,000 in a given year. Most areas under airspace authorized for flare use associated with the preferred alternative support low population densities and would, therefore, be subject to miniscule risk of a strike.

Other flare residual pieces would not fall with a momentum, which could result in a bruise. On extremely rare occasions (estimated at approximately 0.01 percent of flares dispensed), a flare may not ignite and would fall to the earth as a dud flare. If such a rare occasion occurs and a dud flare is found, it should not be moved, the location should be identified, and the Air Force base public affairs office contacted and provided with the dud flare location.

Although F-35A missions and training would retain similarities with those of the F-16 aircraft, tactics and training events are evolving and continue to develop. Based on these expectations, overall flare use would increase in authorized training airspace roughly in proportion to net changes in operations. Flare use by the F-35A would conform to existing altitude and seasonal restrictions to ensure fire safety. These restrictions would continue to minimize the potential for fires, so the impacts of flare use would not exceed the negligible impacts already occurring. Based on the emphasis on flight at higher altitudes for the F-35A, roughly 86 percent of F-35A flares released throughout the authorized airspace units would occur above 15,000 feet MSL, further reducing the potential risk for accidental fires.

D.1.4.2 Ordnance Use

The F-35A has the requirement and capability to perform air-to-ground missions. For the F-35A operational aircraft, air-to-ground training would represent about 60 percent of the training program, with the air superiority mission accounting for the remaining 40 percent. Most air-to-ground training would be simulated, where nothing is released from the aircraft. The F-35As use high-fidelity avionics and embedded training systems to simulate ordnance delivery on a target. This type of training could be conducted in any of the airspace units meeting the airspace training event requirements for floor, ceiling, and size. Air-to-ground training would also include occasional ordnance delivery. Actual ordnance delivery would occur during the times when F-35A aircraft would operate in restricted airspace over approved ranges (e.g., Blair Lake Air Force Range).

The F-35A would train for and deploy all the types of ordnance it is capable of carrying. However, the primary air-to-ground ordnance carried by the F-35A is expected to be the GBU-31 variant of the Joint Direct Attack Munition (JDAM), which uses a 2,000-pound, general-purpose Mark-84 bomb. The JDAMs are guided to the target by an attached Global Positioning System (GPS) receiver. These weapons, commonly released between 20,000 and 40,000 feet MSL, require no laser guidance. Use of the JDAMs would occur only on ranges and targets previously approved for that training activity. The Air Force expects the use of JDAMs would be the same per aircraft as current F-16 use. As such, the total number of JDAMs used in training would remain minimal and confined to ranges approved for JDAM deployment. Optional internal loads include eight GBU-39 small diameter bombs and a wide variety of air-to-ground missiles, dispensers, and guided weapons. Training ordnance loads would include the same types of weapons. However, during most training missions, no missiles or bombs would be carried on the aircraft. Since the F-35A has an internal 25-mm cannon, occasional tactical strafing training would occur on approved ranges and targets. Strafing involves flying towards and firing at a prescribed strafing target for a short burst. All strafing must follow specific procedures for safety and be deployed only on approved targets. With a capacity of 180 rounds, strafing by the F-35A would be limited. All ordnance delivery training would adhere to the requirements and restrictions of the ranges.

D.2 SOCIOECONOMICS

This section describes result variables and inputs of the economic impact analysis. Economic variables that are presented as results of economic analysis include Jobs, Labor Income, and Economic Output. Each of these variables consists of a direct, indirect, and induced element. Estimates of these variables are calculated by the IMPLAN model.

D.2.1 Jobs

Jobs impacts represent the number of jobs that would be created or sustained within the Region of Influence (ROI) because of construction and operations associated with the proposed action. Some direct operational (military and civilian) job estimates were provided by the Air Force while estimates for all other jobs were calculated by the IMPLAN model, based on planned expenditures. The IMPLAN model generates jobs numbers that include both full-time and part-time jobs.

D.2.2 Labor Income

Labor income impacts represent the income generated through the jobs that would be created or sustained within the ROI because of the proposed action. Labor income is calculated by the IMPLAN model, based on employment and expenditures.

D.2.3 Economic Output

Economic output impacts represent total production and sales volume that would be generated in the ROI because of the proposed action. Economic output is generated by increases in employment and expenditures.

D.2.4 Direct Economic Impacts

Direct economic impacts are associated with the proposed action itself and include construction and operations jobs; the incomes earned by those workers; the economic output associated with initial purchases of local construction materials and supplies; and goods and services that facilitate operations associated with the proposed action.

D.2.5 Indirect Economic Impacts

Indirect economic impacts are the jobs, income, and economic output generated by the businesses that would supply goods and services that facilitate construction and operations associated with the proposed action. Indirect jobs include jobs at companies that supply construction materials and supplies or support jobs related to operations. Indirect jobs extend to include jobs related to the manufacture of products used to construct and operate the complex. Indirect labor income includes the income earned by people working indirect jobs. Indirect output includes the total sales volume related to the supply of goods and services.

D.2.6 Induced Economic Impacts

Induced economic impacts are the result of spending of the wages and salaries of the direct and indirect employees on items such as food, housing, transportation, and medical services. This spending creates induced employment in nearly all sectors of the economy, especially service sectors.

D.2.7 Inputs into the IMPLAN Model

For construction, a total of $303 million was input into IMPLAN sector 58 – Construction of other new non-residential structures.

Table D-5 shows operations inputs into the IMPLAN model. Inputs were based on information provided by the Air Force related to employment associated with the proposed action, current base operations expenditures, and planned increases in operations activities associated with the proposed action.

Table D-5. Operations Inputs

IMPLAN Sector	*IMPLAN Sector Description*	*Jobs Inputs*	*Expenditures Inputs (2015 $)*
536	Employment and payroll of federal govt., military	1,563	
395	Wholesale trade		$17,252,825
405	Retail – general merchandise sores		$532,764
437	Insurance carriers		$1,182,645
463	Facilities support services		$6,695,532
472	Elementary and secondary schools		$791,241
503	All other food and drinking places		$252,377
		Total	**$26,707,384**

D.3 CULTURAL RESOURCES

The following is the Program Comment between the Advisory Council on Historic Preservation (ACHP) and the Department of Defense outlining the responsibilities for managing World War II and Cold War Era (1939-1974) Ammunition Storage Facilities (ACHP 2006). The Air Force announced its subsequent adoption of the Program Comment in *Federal Register*, on May 21, 2007 (page 28462).

Preserving America's Heritage

PROGRAM COMMENT FOR
WORLD WAR II AND COLD WAR ERA (1939 – 1974)
AMMUNITION STORAGE FACILITIES

I. Introduction

This Program Comment provides the Department of Defense (DoD) and its Military Departments with an alternative way to comply with their responsibilities under Section 106 of the National Historic Preservation Act with regard to the effect of the following management actions on World War II and Cold War Era ammunition storage facilities that may be eligible for listing on the National Register of Historic Places: ongoing operations, maintenance and repair, rehabilitation, renovation, mothballing, cessation of maintenance, new construction, demolition, deconstruction and salvage, remediation activities, and transfer, sale, lease, and closure of such facilities.

The term Ammunition Storage Facilities means all buildings and structures, listed in or eligible for listing in the National Register of Historic Places, that were designed and built as ammunition storage facilities within the years 1939-1974, regardless of current use, and that are identified by a DoD Category Group (2 digit) code of 42, Ammunition Storage (category code 42XXXX), in the Military Service's Real Property Inventory currently or at the time of construction. Table 1 (attached) provides all such buildings and structures associated with ammunition storage, by Military Department, that are applicable to this program comment.

In order to take into account the effects on Ammunition Storage Facilities, DoD and its Military Departments will conduct documentation in accordance with The Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation. As each Military Department will be responsible for conducting its own mitigation actions, the following required documentation is structured by Military Department, followed by DoD-wide requirements.

II. Treatment of Properties

A. Army Mitigation

1. The Army shall expand and revise its existing context study, Army Ammunition and Explosives Storage in the United States, 1775-1945 to include the Cold War Era. This document provides background information and criteria for evaluating the historic significance of such buildings. The updated context study will:

identify the changes in ammunition storage during the Cold War;

ADVISORY COUNCIL ON HISTORIC PRESERVATION
1100 Pennsylvania Avenue NW, Suite 809 • Washington, DC 20004
Phone: 202-606-8503 • Fax: 202-606-8647 • achp@achp.gov • www.achp.gov

focus on the changes required for ammunition storage due to technological advancement in weaponry;

consider the importance of major builders, architects or engineers that may have been associated with design and construction of Ammunition Storage Facilities throughout the Army or at specific Army installations; and

describe the inventory of Ammunition Storage Facilities in detail, providing information on the various types of buildings and architectural styles and the quantity of each.

2. The Army shall undertake in-depth documentation on Ammunition Storage Facilities at nine installations. The existing context study concluded that the Army possessed "only a few basic types and an abundance of examples" of Ammunition Storage Facilities, due to the standardization of ammunition storage facilities beginning in the 1920s. The context study suggests that six geographically dispersed installations contain an array of primary examples of both aboveground and underground magazines with a high degree of integrity:

Hawthorne Army Depot, Nevada – early igloos;

McAlester Army Ammunition Plant, Oklahoma – Corbetta Beehive;

Pine Bluff Arsenal, Arkansas – biological and chemical igloos;

Ravenna Army Ammunition Plant, Ohio – standard World War II and aboveground magazines;

Blue Grass Army Ammunition Plant, Kentucky – standard World War II igloos and aboveground magazines; and

Louisiana Army Ammunition Plant, Louisiana – Stradley special weapons.

The Army shall document these six as well as three additional installations that possess Cold War Era Ammunition Storage Facilities. Documentation at the three additional installations will be determined after completion of the expanded context study described in section II.A.1., above. This study will include a brief history of the installation and the surrounding community, if appropriate, and a detailed history of the storage facilities and documentation of the buildings. The documentation will primarily consist of historic photographs and existing plans. Documentation will be tailored to address the different natures of aboveground and underground storage.

B. Navy Mitigation

1. The Navy will develop a supplemental context study that will be attached as an appendix to the Army's existing context study, Army Ammunition and Explosives Storage in the United States, 1775-1945. The final product will be a separately bound volume of additional information and photographs and tabular appendices that, when presented with the Army's and Air Force's context studies, provide a clear picture of the Department of Defense's Ammunition Storage facilities. This context study appendix will:

cover both World War II and the Cold War Era, from 1939-1974;

explore the changes in ammunition storage resulting from World War II;

examine the changes required for ammunition storage due to technological advancement in weaponry during the Cold War;

consider the importance of major builders, architects or engineers that may have been associated with design and construction of Ammunition Storage Facilities; and

describe the inventory of Ammunition Storage Facilities in detail, providing information on the various types of buildings and architectural styles and the quantity of each.

2. The Navy shall document a representative sample of the basic types of both aboveground and underground ammunition storage facilities. The Navy will choose three geographically dispersed installations with the greatest number and variety of such resources. The Marines will choose one such installation. The sample chosen shall be the best representative examples of the range of Ammunition Storage types constructed during World War II and the Cold War era. This documentation will include collecting existing plans and drawings, writing a historic description in narrative or outline format, and compiling existing historic photographs of the structures. Documentation will be tailored to address the different natures of aboveground and underground storage.

C. Air Force Mitigation

1. The Air Force will develop a supplemental context study that will be attached as an appendix to the Army's existing context study, Army Ammunition and Explosives Storage in the United States, 1775-1945. The final product will be a separately bound volume of additional information and photographs and tabular appendices that, when presented with the Army's and Navy's context studies, provide a clear picture of the Department of Defense's Ammunition Storage facilities. This context study appendix will:

cover the Cold War Era, from 1946-1974;

explore the changes in ammunition storage resulting from the Cold War;

examine the changes required for ammunition storage due to technological advancement in weaponry during the Cold War;

consider the importance of major builders, architects or engineers that may have been associated with design and construction of Ammunition Storage Facilities; and

describe the inventory of Ammunition Storage Facilities in detail, providing information on the various types of buildings and architectural styles and the quantity of each.

2. The Air Force shall document a representative sample of the basic types of both aboveground and underground ammunition storage facilities. The Air Force will choose three geographically dispersed installations with the greatest number and variety of such resources. The sample chosen shall be the best representative examples of the range of Ammunition Storage types constructed during the Cold War era. This documentation would include collecting existing plans and drawings, writing a historic description in narrative or outline format, and compiling existing historic photographs of the structures. Documentation will be tailored to address the different natures of aboveground and underground storage.

3. The Air Force will not be required to consider its World War II Era facilities in these mitigation actions. The Air Force was established in September 1947 and therefore was not associated with structures constructed during this era. Rather the Air Force has inherited its current inventory of 263 World War II Era Ammunition Storage facilities from former Army installations. Given the substantial

mitigation actions that will be undertaken by the Army to document its facilities, further documentation for the small number of similar facilities located at Air Force installations provides no additional historic value. While no documentation will be done on World War II facilities under the Air Force's control, all of the 263 facilities in its inventory are covered under this Program Comment.

D. DoD-Wide Mitigation

1. Copies of the documentation described above will be made available electronically, to the extent possible under security concerns, and hard copies will be placed in a permanent repository, such as the Center for Military History.

2. In addition, as a result of on-going consultations, each Military Department will provide a list of properties covered by the Program Comment, by State, to State Historic Preservation Officers, Tribal Historic Preservation Officers, and other interested parties, as appropriate. Each Military Department will be responsible for determining how to convey its information.

3. All Military Departments will encourage adaptive reuse of the properties as well as the use of historic tax credits by private developers under lease arrangements. Military Departments will also incorporate adaptive reuse and preservation principles into master planning documents and activities.

The above actions satisfy DoD's requirement to take into account the effects of the following management actions on World War II and Cold War Era ammunition storage facilities that may be eligible for listing on the National Register of Historic Places: ongoing operations, maintenance and repair, rehabilitation, renovation, mothballing, cessation of maintenance, new construction, demolition, deconstruction and salvage, remediation activities, and transfer, sale, lease, and closure of such facilities.

III. Applicability

A. 1. This Program Comment applies solely to Ammunition Storage Facilities as defined in Section I, above. The Program Comment does not apply to the following properties that are listed, or eligible for listing, on the National Register of Historic Places: (1) archeological properties, (2) properties of traditional religious and cultural significance to federally recognized Indian tribes or Native Hawaiian organizations, and/or (3) ammunition storage facilities in listed or eligible National Register of Historic Places districts where the ammunition storage facility is a contributing element of the district and the proposed undertaking has the potential to adversely affect such historic district. This third exclusion does not apply to historic districts that are made up solely of ammunition storage facility properties. In those cases the Program Comment would be applicable to such districts.

Since the proposed mitigation for the Ammunition Storage facilities documents site plans, building designs, and the spatial arrangement of ammunition storage facilities, along with the events and actions that lead to the development of standardized ammunition storage facilities in DoD, the important aspects of ammunition storage, whether single buildings or districts made up entirely of ammunition storage, will be addressed regardless of the type of undertaking that may affect this particular property type. The one currently known ammunition storage district, at Hawthorne Army Ammunition Plant, has been identified for further study, as outlined in Section II(A)(2) above.

2. An installation with an existing Section 106 agreement document in place that addresses ammunition storage facilities can choose to:

(i) continue to follow the stipulations in the existing agreement document for the remaining period of the agreement; or

(ii) seek to amend the existing agreement document to incorporate, in whole or in part, the terms of this Program Comment; or

(iii) terminate the existing agreement document, and re-initiate consultation informed by this Program Comment if necessary.

3. All future Section 106 agreement documents developed by the Military Departments related to the undertakings and properties addressed in this Program Comment shall include appropriate provisions detailing whether and how the terms of this Program Comment apply to such undertakings.

IV. Completion Schedule

On or before 60 days following issuance of the Program Comment, DoD, its Military Department and ACHP will establish a schedule for completion of the treatments outlined above.

V. Effect of the Program Comment

By following this Program Comment, DoD and its Military Departments meet their responsibilities for compliance under Section 106 regarding the effect of the following management actions on World War II and Cold War Era ammunition storage facilities that may be eligible for listing on the National Register of Historic Places: ongoing operations, maintenance and repair, rehabilitation, renovation, mothballing, cessation of maintenance, new construction, demolition, deconstruction and salvage, remediation activities, and transfer, sale, lease, and closure of such facilities. Accordingly, DoD installations are no longer required to follow the case-by-case Section 106 review process for such effects. As each of the Military Departments is required under this Program Comment to document their own facilities, failure of any one Military Department to comply with the terms of the Program Comment will not adversely affect the other Departments' abilities to continue managing their properties under the Program Comment.

This Program Comment will remain in effect until such time as the Office of the Secretary of Defense determines that such comments are no longer needed and notifies ACHP in writing, or ACHP withdraws the comments in accordance with 36 CFR § 800.14(e)(6). Following such withdrawal, DoD and its Military Departments would be required to comply with the requirements of 36 CFR §§ 800.3 through 800.7 regarding the effects under this Program Comments' scope.

DoD, its Military Departments and ACHP will review the implementation of the Program Comment seven years after its issuance and determine whether to take action to terminate the Program Comment as detailed in the preceding paragraph.

John L. Nau, III
Chairman

August 18, 2006
Date

Attachment: Table

TABLE 1 - RPCS Hierarchy for Category Group 42

CG & Title	BC	BC Title	FAC	UM	FAC Title	MilDep	CAT CODE	UM AREA	UM OTH	UM ALT	CATCODE LONG NAME
- 42 - Ammunition Storage											
	421	Depot and Arsenal Ammunition Storage									
			4211	SF	Ammunition Storage, Depot and Arsenal						
						Army	42104	SF			EXPLOSIVE TRANSFER BUILDING, DEPOT LEVEL
						Army	42107	SF			STRADLEY, NONATOMIC BLAST RESISTANT, DEPOT LEVEL
						Army	42110	SF			FUSE AND DETONATOR MAGAZINE, DEPOT LEVEL
						Army	42120	SF			HIGH EXPLOSIVE MAGAZINE, DEPOT LEVEL
						Army	42150	SF			SMOKELESS POWDER MAGAZINE, DEPOT LEVEL
						Army	42160	SF			SPECIAL WEAPONS MAGAZINE, DEPOT LEVEL
						Army	42170	SF			GUIDED MISSILE MAGAZINE, DEPOT LEVEL
						Army	42180	SF			IGLOO STORAGE, DEPOT LEVEL
						Army	42181	SF			AMMUNITION STOREHOUSE, DEPOT LEVEL
						Army	42182	SF			SMALL ARMS AMMUNITION MAGAZINE, DEPOT LEVEL
						Army	42183	SF			GENERAL PURPOSE MAGAZINE, DEPOT LEVEL
						Army	42184	SF			AMMUNITION HUT, DEPOT LEVEL
						Army	42186	SF			AMMUNITION STORAGE STRUCTURE, DEPOT LEVEL
						Army	42288	SF			AMMO STORAGE OTHER THAN DEPOT OR UNIT
						Navy	42112	SF		CF	FUSE&DETONATOR MAGAZINE
						Navy	42122	SF		CF	HIGH-EXPLOSIVE MAGAZINE
						Navy	42132	SF		CF	INERT STOREHOUSE
						Navy	42142	SF		CF	SMOKEDRUM STOREHOUSE
						Navy	42148	SF		CF	SMALL-ARMS PYROTECHNIC MAGAZINE
						Navy	42152	SF		CF	SMOKELESS-POWDER-PROJECTILE MAGAZINE
						Navy	42162	SF		CF	SPECIAL-WEAPONS MAGAZINE
						Navy	42172	SF		CF	MISSILE MAGAZINE

		4212	SF	Intercontinental Ballistic Missile Storage Facility				
					Navy	42182	SF		SUBMARINE LAUNCHED BALLISTIC MISSILE STORAGE FACILITY
422	Installation and Ready Issue Ammunition Storage								
		4221	SF	Ammunition Storage, Installation					
					Air Force	422253	SF		STORAGE, MULTI-CUBICLE MAGAZINE
					Air Force	422256	SF		STORAGE, ROCKET CHECKOUT AND ASSEMBLY
					Air Force	422257	SF		STORAGE SEGREGATED MAGAZINE
					Air Force	422258	SF		STORAGE MAGAZINE ABOVE GROUND TYPE A, B, &C
					Air Force	422259	SF		MISSILE STORAGE FACILITY
					Air Force	422264	SF	EA	STORAGE IGLOO
					Air Force	422271	SF		STORAGE, MODULE BARRICADED
					Air Force	422273	SF		STORAGE IGLOO STEEL ARCH UNDERPASS
					Army	42210	SF		FUSE AND DETONATOR MAGAZINE, INSTALLATION
					Army	42215	SF		HIGH EXPLOSIVE MAGAZINE, INSTALLATION
					Army	42225	SF		SMOKEDRUM STOREHOUSE, INSTALLATION
					Army	42230	SF		SMALL ARMS AMMUNITION AND PYROTECHNICS MAGAZINE, INSTALL
					Army	42231	SF		AMMUNITION STOREHOUSE, INSTALLATION
					Army	42235	SF		READY MAGAZINE, INSTALLATION
					Army	42240	SF		FIXED AMMUNITION MAGAZINE, INSTALLATION
					Army	42250	SF		SPECIAL WEAPONS MAGAZINE, INSTALLATION
					Army	42260	SF		GUIDED MISSILE MAGAZINE, INSTALLATION
					Army	42280	SF		IGLOO STORAGE, INSTALLATION
					Army	42281	SF		AMMUNITION HUT, INSTALLATION
					Army	42283	SF		GENERAL PURPOSE MAGAZINE, INSTALLATION
					Army	42285	SF		UNIT SMALL ARMS AMMUNITION STORAGE, INSTALLATION
					Army	42286	SF		AMMUNITION STORAGE STRUCTURE, INSTALLATION

				Navy	42135	SF	CF	READY MAGAZINE
423	Liquid Propellant Ammunition Storage							
		4231	GA	Liquid Propellant Storage, Ammunition Related				
				Air Force	423111	GA		LIQUID PROPELLANT AMMO STORAGE
				Army	42310	SF GA		LIQUID PROPELLANT STORAGE, AMMUNITION, BUILDING
				Army	42311	GA		LIQUID PROPELLANT STORAGE, AMMUNITION, FACILITY
				Army	42312	SF GA		LIQUID PROPELLANT STORAGE, AMMUNITION, STRUCTURE
				Navy	42310	GA		LIQUID-PROPELLANT STORAGE
424	Weapon-Related Battery Storage							
		4241	SF	Battery Storage, Weapon Related				
				Army	42410	SF		BATTERY COLD STORAGE BUILDING
				Navy	42410	SF	SH	WEAPON-RELATED BATTERY STORAGE
425	Open Ammunition Storage							
		4251	SY	Open Ammunition Storage				
				Army	42510	SY		AMMUNITION STORAGE PAD
				Navy	42510	SY		OPEN-AMMUNITION-STORAGE PAD
				Navy	42520	SY		CONTAINER-HOLDING YARD -EMPTY
				Navy	42530	SY		BARRICADED MODULE (OPEN)

D.4 HAZARDOUS MATERIALS, HAZARDOUS WASTE, TOXIC SUBSTANCES, AND CONTAMINATED SITES

D.4.1 Toxic Substances

Toxic substances include asbestos containing materials, lead-containing paint, polychlorinated biphenyls, and radon; descriptions of these substances are provided below.

- Asbestos is the name of a group of naturally occurring minerals that are used in a variety of applications. Asbestos containing materials are common in many types of building and insulation materials such as cement pipes, wallboard, siding, floor tiles, mastics, plaster, coatings and paint, ceiling tiles, roofing materials, electrical insulation, caulking materials, joint compounds, boiler wrap, and duct materials. Asbestos becomes a health hazard when microscopic-sized fibers are released into the air. Inhalation of asbestos fibers is known to cause asbestosis, a chronic disease of the lungs, and mesothelioma, a cancer of chest membranes.
- In the past, lead pigments were used to increase the durability of paint and provide added anti-corrosion properties. Exposure to lead-containing paint is associated with adverse health effects, including permanent damage to the central nervous system. Lead exposure can result from the ingestion of paint chips or associated dust generated from deteriorating paints or from improper paint removal processes. Young children are at greatest risk from lead-containing paint exposure. The federal government banned the use of lead-containing paint in 1978 (U.S. Environmental Protection Agency 2013).
- Polychlorinated biphenyls are highly stable organic chemical compounds with low flammability, high heat capacity, and low electrical conductivity. In the past, polychlorinated biphenyls were extensively used as a component of many materials, most notably as heat insulating materials and as dielectric fluids used in electrical transformers and capacitors. In addition, polychlorinated biphenyls may be present in certain pre-1978 building materials (e.g., concrete, caulk, paint). Polychlorinated biphenyls are known to cause skin irritation and cancer and are highly persistent in the environment. In 1979, the U.S. Environmental Protection Agency banned most uses of polychlorinated biphenyls. In addition, effective controls have been mandated related to existing equipment containing polychlorinated biphenyls.
- Radon is a naturally occurring, colorless, odorless, radioactive gas produced by the decay of uranium in rock and soil. Radon is a known carcinogen responsible for increasing the risk of lung cancer when inhaled. Electrically charged radon atoms can attach to indoor air dust particles. These dust particles may be inhaled and adhere to lining in the lungs. The deposited atoms decay by emitting radiation that has the potential to cause cellular damage. Typically, outside air contains very low levels of radon (U.S. Environmental Protection Agency 2014b), but radon tends to accumulate in enclosed indoor spaces. When present, radon gas would typically concentrate in relatively airtight buildings that have little outside air exchange.

  Although there are no federal regulations that mandate an acceptable level of radon exposure, the U.S. Environmental Protection Agency recommends the voluntary radon action level that was developed and issued by the American Society for Testing and Materials International, Standard Practice for Installing Radon Mitigation Systems in Existing Low-Rise Residential Buildings, ASTMI E-2121.

The U.S. Environmental Protection Agency recommended action level for radon is 4 picocuries per liter (U.S. Environmental Protection Agency 2014b). As a proactive measure, the U.S. Military has ongoing radon monitoring and abatement programs to ensure that its existing facilities meet the U.S. Environmental Protection Agency radon health recommendations (Agency for Toxic Substances and Disease Registry 2002). In addition, for new facilities, radon resistant construction techniques, radon testing, and the installation of radon mitigation systems as appropriate are employed.

D.4.2 Contaminated Sites

Within the Defense Environmental Restoration Program of the Department of Defense there are several program categories: the Installation Restoration Program, Formerly Used Defense Sites, Military Munitions Response Program, and Base Realignment and Closure; detailed definitions are provided below.

- The Installation Restoration Program focuses on cleaning up releases of hazardous substances that pose risks to the public and/or the environment at properties actively owned or used by the U.S. military, including the Navy and the Air Force.
- The Formerly Used Defense Sites is a program that manages environmental cleanup on eligible properties formerly owned, leased, possessed, or used by the U.S. Military. The program only applies to properties that transferred from the U.S. Military before 1986 (U.S. Army Corps of Engineers 2014).
- The Military Munitions Response Program addresses non-operational range lands with suspected or known hazards from munitions and explosives of concern that occurred prior to September 2002, but are not already included within an Installation Response Program site cleanup activity.
- Base Realignment and Closure is the process that the U.S. Military uses to reorganize its installations to better match facilities to changing military requirements. The process includes some level of environmental cleanup for 208 installations (Department of Defense 2014).

D.5 RECREATIONAL AND VISUAL RESOURCES

D.5.1 Federal Special Use Areas under Northern JPARC Airspace

Birch Creek National Wild River. The Birch Creek National Wild River is managed by the Bureau of Land Management (BLM). Its upper reaches (approximately 80 river miles) lie within the Steese National Conservation Area. The entire designated portion of the river is approximately 126 miles long. The river is a principal recreation resource, with road access at two points separating an undisturbed river segment. River segments designated a “wild” are generally not accessible by road. Boaters can put in at Twelve Creek off the Steese Highway and float to a take-out point on the highway between the communities of Central and Circle. Other popular summer activities along the river include hiking, camping, sport hunting and fishing, recreational mining, and off-road vehicle use. Popular winter activities include cross-country skiing and snow machining. Peak summer use occurs between May and July (Air Force 2013a).

Steese National Conservation Area. The Steese National Conservation Area (NCA) is managed by the BLM and encompasses 1.2 million acres about 100 miles northeast of Fairbanks. The Steese NCA is split into the North and South Units, located on either side of the Steese Highway. The Steese NCA includes

Pinnell Mountain National Recreation Trail, Birch Creek Wild and Scenic River, crucial caribou calving grounds and home range, and Dall sheep habitat. While various land uses are allowed in the Steese NCA, the area is managed so that its scenic, scientific, cultural, and other resources are protected (BLM 2015).

Delta Wild and Scenic River and Delta River Special Recreation Management Area. This area is administered by the BLM, originates south of the Denali Highway, and includes the entire Upper and Lower Tangle Lakes, the Tangle River, and the Delta River. Access is along the Denali Highway about 21 miles west of the community of Paxson. Powerboats greater than 15 horsepower are not recommended. Aircraft are not recommended in the wild river corridor (Air Force 2013a).

The Delta Wild and Scenic River (DWSR) is one of a few easily accessible Wild and Scenic Rivers in the State of Alaska. They provide both day use and overnight boating opportunities. A wide range of outstanding recreational opportunities attracts people to the DWSR. Some segments of the river corridor provide opportunities for river-related solitude, enjoyment of natural river sounds, and primitive and unconfined recreation in a natural, undisturbed environment. Other segments provide a remote setting for recreation activities such as wildlife viewing, fishing, hunting, trapping, camping, hiking, snow machining, skiing, photography, Off-Highway Vehicle (OHV) travel, and a variety of water for both the floater and motorized boater. Boating opportunities include both lake paddling and river paddling on clear and glacial water stretches, challenging whitewater, and opportunities for both day use and extended overnight backcountry excursions (Air Force 2013a).

The BLM in the East Alaska Resource Management Plan (EARMP) designated the Delta Wild and Scenic River corridor as a Special Recreation Management Area (SMRA). Specific recreation-related land use allocations and recreation management zones are designated within the Delta SMRA with objectives to maintain existing recreation opportunity spectrum classes that include primitive, semi-primitive non-motorized, semi-primitive motorized, and roaded natural, with an emphasis on managing for a primitive experience in the portion of the Delta WSR corridor classified as wild (Air Force 2013a).

Fortymile National Wild, Scenic, and Recreational River. The Fortymile National Wild, Scenic and Recreational River is managed by the BLM. It is the largest designated network of a river and its tributaries in the National Wild and Scenic Rivers System. River segments designated as “wild” are intended to offer visitors a chance to experience solitude in a primitive setting. Segments designated “scenic” are mostly primitive with largely undeveloped shorelines; while “recreational” segments are road accessible and may be more developed (Air Force 2013).

The most commonly used “wild” segments of the Fortymile network include: 1) the Middle Fork from Joseph to the confluence with the North Fork, 2) the North Fork from its confluence with the Middle Fork to its confluence with the South Fork, and 3) the Mosquito Fork (of the South Fork) to Kechumstuk to the mouth. Power boating also takes place on the navigable segments of the river network, including the South Fork, portions of the North Fork, and the Fortymile main stem. Sport hunting and fishing are also popular in the river drainage (Air Force 2013a).

The BLM also operates the 60-acre Walker Fork Campground at mile 82 of the Taylor Highway. The campground has approximately 20 campsites and is popular for camping, fishing, and recreational gold panning. It is open from May through September. The Walker Fork portion of the Fortymile River is designated as “scenic” (Air Force 2013a).

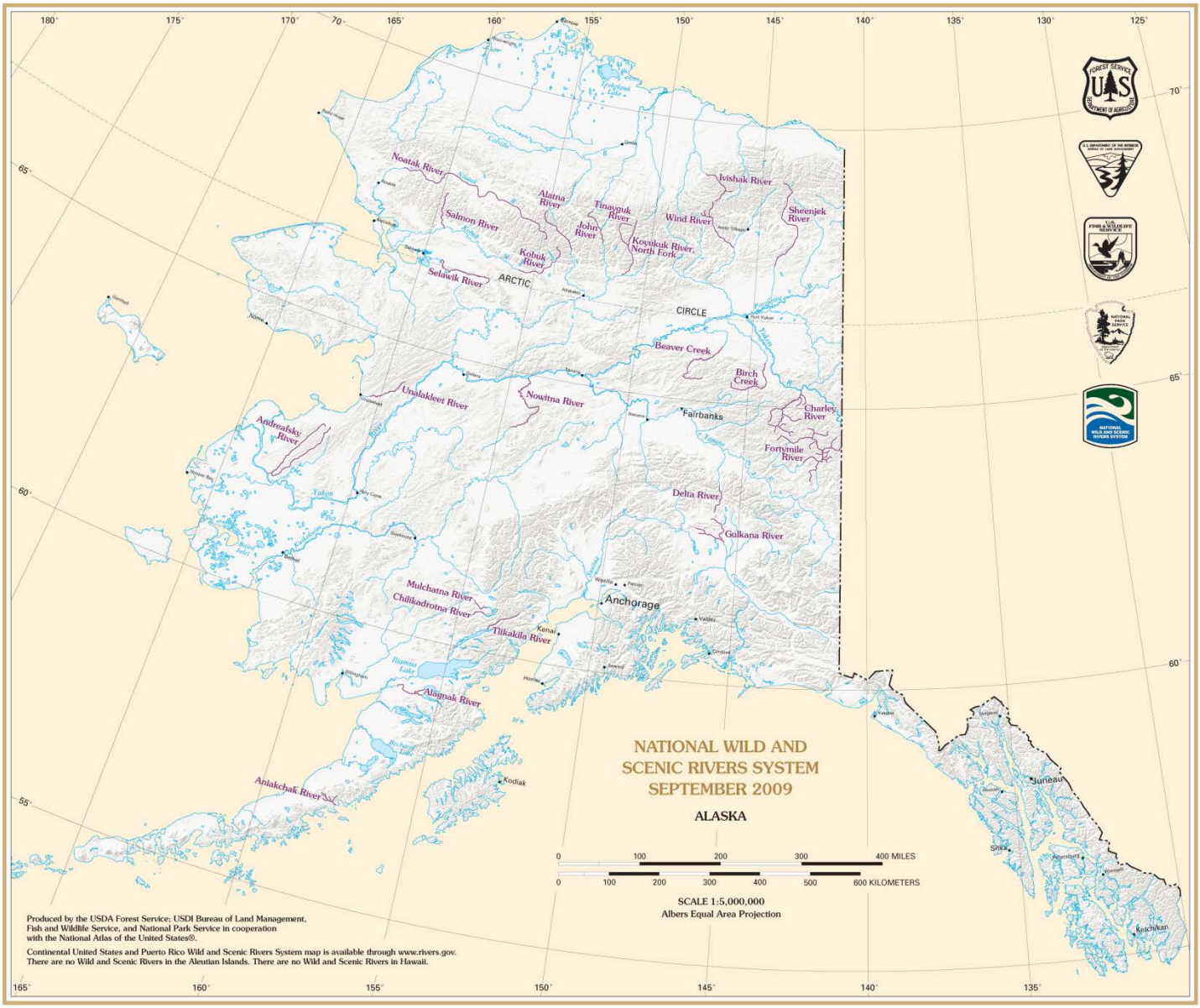
Gulkana National Wild River and Gulkana River Special Recreation Management Area (Including Middle Fork and West Fork). This area is the largest clear-water river system in the Copper River Basin and is considered one of the most popular sport fishing streams in Alaska. The lakes have good populations of lake trout, burbot, and whitefish. Rivers and streams contain Rainbow trout (*Oncorhynchus mykiss)*, Arctic grayling (*Thymallus arcticus)*, Chinook salmon (*Oncorhynchus tshawytscha)*, Red salmon (*Oncorhynchus nerka*), Whitefish (*Coregonus lavaretus*), Long nose suckers (*Catostomus catostomus*), and Artic lamprey (*Lethenteron camtschaticum*). Other recreational activities in this area include kayaking, rafting, boating, hiking, camping, and wildlife viewing. Access is typically provided by trail, boat, or OHV (Air Force 2013a).

Specific recreation-related land use allocations and recreation management zones are designated within the Gulkana National Wild River corridor. Management objectives are to maintain existing recreation opportunity spectrum classes that include semi-primitive (upper river), primitive (Middle Fork and Upper West Fork), undeveloped (Sourdough), semi-primitive motorized (Lower West Fork), and roaded natural, with an emphasis on managing for a primitive experience in the portion of the Delta Wild and Scenic River corridor classified as wild (Air Force 2013a).

Yukon Charley Rivers National Preserve. The Yukon-Charley Rivers National Preserve and the Charley National Wild River are managed by NPS. Floating the Yukon River is the primary recreational activity in the preserve (Air Force 1997). The Yukon River between Eagle and Circle is a popular 154-mile, 5- to 10-day float trip. Portions of the Kandik and Nation Rivers are also within the preserve and are floated as part of remote, fly-in trips. Limited floating occurs on the Charley River. Other types of recreational use (e.g., hiking) are low as most of the preserve is inaccessible. Concentrated areas of recreational use are along the major tributaries of the Yukon River: the Nation and Kandik Rivers and the first 5 to 10 miles of the Charley River. Cabins that visitors can use are concentrated along the Yukon River, with the Coal Creek and Slaven Cabin area receiving the highest visitor use. Other relatively high-use cabins (private cabins that can be used by the public) are located at Glenn Creek, the mouth of the Kandik River, Nation Bluff, and the mouth of the Charley River. The majority of the annual recreational use on the preserve occurs between June and August, with highest visitor use in June (Air Force 2013a). Limited winter use takes place primarily from the communities of Circe and Central.

Yukon Flats National Wildlife Refuge. The Yukon Flats National Wildlife Refuge is managed by the USFWS. The refuge is a remote and roadless area; access is limited to boats along the Yukon River and its tributaries and by small aircraft. There are no recreational facilities or developed resources for visitors. The primary recreation activities are river floating and sport hunting. Birch Creek and the Yukon River are popular float destinations. There are no floating designations in the portion of the refuge located beneath the Yukon 4 MOA. Some recreational floating occurs on the Yukon River between Circle and Fort Yukon and the Black River between the Salmon Fork and Chalkyitsik. Summer uses occur between late May and September (Air Force 2013a).

Figure D-2 illustrates the numerous national Wild and Scenic Rivers across the state of Alaska.



Source: www.rivers.org, accessed July 2015.

Figure D-2. Alaska Wild and Scenic Rivers System

D.5.2 State Special Use Areas Under Northern JPARC Airspace

Big Delta State Historical Park. Big Delta State Historical Park is a 10-acre park located 8 miles north of Delta Junction off Richardson Highway. Amenities include campsites, picnic area, trails, and a museum (Air Force 2013a).

Birch Lake State Recreation Site. The Birch Lake State Recreation Site (SRS) is 58 miles south of Fairbanks off the Richardson Highway. It offers campsites and an unimproved boat launch and is a popular fishing area. The lake is popular with fishers, jet-skiers, and water skiers in the summer and with snow machine riders and ice fishers in the winter. There is fishing all year for stocked species, including rainbow trout, king and silver salmon, grayling, and arctic char (Air Force 2013a).

Chena River State Recreation Area. The Chena River State Recreation Area (SRA) is managed by the Alaska Division of Parks and Outdoor Recreation. The SRA encompasses more than a quarter million acres of rolling hills and is located east of the North Pole community, approximately 30 miles east of Fairbanks, and is easily accessible from the Chena Hot Springs Road, making it a popular year-round use area. The Chena Hot Springs Road is the only paved road that provides access to the SRA. There is no public transportation to the SRA. Two RS 2477 rights-of-way exist within the SRA (Air Force 2013a). One is the Chena Hot Springs Winter Trail (RST 278), and the other is a winter trail that runs east on the East Fork of the Chena River (RST 46). Both of these trails are primarily used in the winter months.

The park is located along the Chena River, which is available for kayaking, canoeing, and fishing, particularly for arctic grayling. There are three developed campgrounds and camping is permitted in undeveloped areas along gravel bars and river access roads. Public cabins are also available and the park is open to biking, all-terrain vehicles, and horses. Other attractions include hunting, biking, all-terrain vehicles, horseback riding, and rock climbing. In the winter, snow machining and ski touring is permitted. The park also hosts two dog sled races on the Chena Hot Springs Winter Trail. Total visitor use in fiscal year 2004 was 163,900 and the majority of use occurs during the summer months (Air Force 2013a).

Clearwater State Recreation Site. The Clearwater SRS is a campground located off Richardson Highway that has campsites, a boat launch, and a picnic area. Popular activities include fishing, boating, and wildlife viewing (Air Force 2013a). The Delta Clearwater River provides access to the Tanana and Goodpaster Rivers.

Delta Junction Bison Range Area. The Delta Junction Bison Range Area is located approximately 12 miles southeast of Delta Junction on the Richardson Highway. The 90,000-acre Delta Junction State Bison Range was established in 1979 to perpetuate free-ranging bison by providing adequate winter range and to alter seasonal movements of bison to reduce damage to agriculture. The bison range is managed for a wide variety of public uses including timber sales, hunting, cross-country skiing, dog sledding, trapping, wildlife viewing, and fishing (Air Force 2013a). The best bison viewing on the range is from mid-July to mid-September.

Delta State Recreational Site. The Delta SRS is located near Delta Junction off the Richardson Highway. It is a campground and includes campsites and a picnic area. A city airstrip next to the site allows for fly-in camping (Air Force 2013a).

Donnelly Creek State Recreational Site. The Donnelly Creek SRS is located 126 miles south of Fairbanks off the Richardson Highway on the Delta River. It has campsites, picnic sites, and a trail. It is primarily a camping facility and does not support other specific recreation activities in the immediate vicinity. Popular activities include fishing and day use (Air Force 2013a).

Harding Lake State Recreational Area. The Harding Lake SRA is located off the Richardson Highway, about 42 miles south of Fairbanks. The facility includes campsites, boat launches, picnic sites, a trail, and ball fields (Air Force 2013a). Summer activities are picnicking, boating, hiking, and sport fishing; winter activities include ice fishing, ice skating, cross-country skiing, and snow machining (Air Force 2013a).

Lake Louise State Recreation Area. The Lake Louise SRA is located near Glennallen in the Copper Valley. Area activities include camping, fishing, boating, bird watching, hiking, biking, berry picking, snow machining, skiing, skating, hunting, and Northern Lights viewing. Users fish year-round for lake trout, whitefish, burbot, and arctic grayling. Wildlife viewing opportunities include moose, wolf, bear,

fox, sheep, lynx, and the annual migration of the Nelchina caribou herd each October through November (Air Force 2013a).

Matanuska Valley Moose Range. The Matanuska Valley Moose Range is located on approximately 132,500 acres in south-central Alaska and was established to maintain, improve, and enhance moose populations, habitat, and other wildlife resources of the area, as well as perpetuate public use of the area including fishing, grazing, forest management, hunting, trapping, mineral and coal entry, and development (Air Force 2013a). The ADNR manages the surface and subsurface resources on the range, while Alaska Department of Fish and Game (ADFG) manages the fish and wildlife.

Nelchina Public Use Area. The Nelchina Public Use Area covers approximately 2.4 million acres in the Talkeetna Mountains of south-central Alaska. The area was created to protect fish and wildlife habitat, perpetuate and enhance public enjoyment of fish and wildlife and their habitat, and perpetuate and enhance additional public uses. Most access to this area is along an extensive OHV and foot trail system that starts from the Glenn Highway. Floatplanes and ski planes also land on lakes in the area. Motorboats are used along rivers to reach parts of the area. Uses include hunting, fishing, trapping, hiking, camping, boating, and aircraft landing (Air Force 2013a).

Quartz Lake State Recreation Area. The Quartz Lake SRA is a 600-acre park located 10 miles north of Delta Junction off Richardson Highway. The SRA includes campsites, public use cabins, boat lunches, fishing dock, picnic sites, swimming area, and volleyball court. Summer activities include wildlife viewing, camping, picnicking, swimming, water skiing, and hiking; winter activities include ice fishing, snow machining, dog mushing, skiing, and snowshoeing. Fishing is the primary activity at Quartz Lake SRA. Each year more than 34,000 fish are harvested (Air Force 2013a). The ADFG stocks Quartz Lake annually with rainbow trout and coho salmon, and biennially with arctic char and Chinook salmon. Lost Lake is stocked annually with rainbow trout by ADFG.

Salcha River State Recreation Site. The Salcha River SRS is located off the Richardson (Alaska) Highway approximately 40 miles south of Fairbanks. Amenities include campsites, a public use cabin, boat launches, and picnic facilities. Primary summer activities include camping, picnicking, boating, and sport fishing (Air Force 1997). King salmon, arctic grayling, and northern pike are the most common species of fish caught in the Salcha River (Air Force 2013a). A winter trail for snow machine use extends up the Salcha River from the SRS.

Tanana Valley State Forest. The Tanana Valley State Forest is managed by the Alaska Division of Forestry. It comprises over 1.8 million acres in the east-central part of Alaska. Timber production is the major commercial activity. The forest is also open to mining, gravel extraction, oil and gas leasing, and grazing, although very little is done (Air Force 2013a). While the primary use of these lands is forestry, recreational use also occurs, including hunting, fishing, trapping, camping, hiking, dog mushing, cross-country skiing, wildlife viewing, snow machining, boating, and berry picking (Air Force 2013).

D.6 FLOODPLAIN IMPACT ANALYSIS

Subsequent to release of the Draft EIS for the F-35A Operational Beddown – Pacific, the Federal Emergency Management Agency's (FEMA) *Floodplain Management Guidance* for implementing Executive Order (EO) 11988: *Floodplain Management* and EO 13690: *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input* was released on October 8, 2015. These new guidelines required a re-evaluation of actions taking place in the 100-year floodplains at Eielson AFB. The following discussion summarizes the results of the 8-Step Review, a guideline requirement to evaluate fully all floodplain impacts.

Step 1: Identification of Floodplain Extent

Approximately 6,480 acres (about 33 percent) of Eielson AFB is located within the 100-year floodplain of the Tanana River, as shown on Flood Insurance Rate Maps prepared by the U.S. Department of Housing and Urban Development for the Fairbanks North Star Borough dated 2004 (Figure D.6-1). However, with issuance of the new floodplains guidance, the more conservative FEMA data had to be used to evaluate actions within floodplains. These data show the majority of the southern portion of Eielson AFB lies within areas identified as the 100-year floodplain (Figure D.6-2). The acreage of base floodplains increased to 10,318 acres (about 52 percent), including the southern third of the flight line. For the purposes of the Final EIS, the FEMA floodplains delineations were used to identify the full extent of floodplains and associated impacts.

Step 2: Early Public Review

Public notification of potential impacts to the floodplain was included in the Draft EIS and discussed during the Public Hearings. However, the EIS discussion focused on the 100-year floodplain as identified in Figure D.6-1, with impacts limited to approximately 5 acres of the floodplain. The comment period for the Draft EIS was 45 days. Comments received from the U.S. Environmental Protection Agency requested that more discussion of alternatives to locating F-35A facilities in the 100-year floodplain be included in the Final EIS. This review provides a more detailed discussion of the identification process applied to identify any practicable alternatives for proposed F-35A facility locations using the more conservative FEMA delineated 100-year floodplain.

With the post-comment period availability of the new *Floodplain Management Guidance*, re-analysis of floodplains impacts was made in the Final EIS. The area of floodplain impacts increased to 56 acres, but continues to be unavoidable under the Proposed Action Alternative. The public will have an additional time to review of the updated floodplain analysis contained in the Final EIS, prior to signature of the Record of Decision.

Figure D.6-1: Fairbanks North Star Borough Flood Insurance Rate Maps of the 100-year Floodplain on Eielson AFB

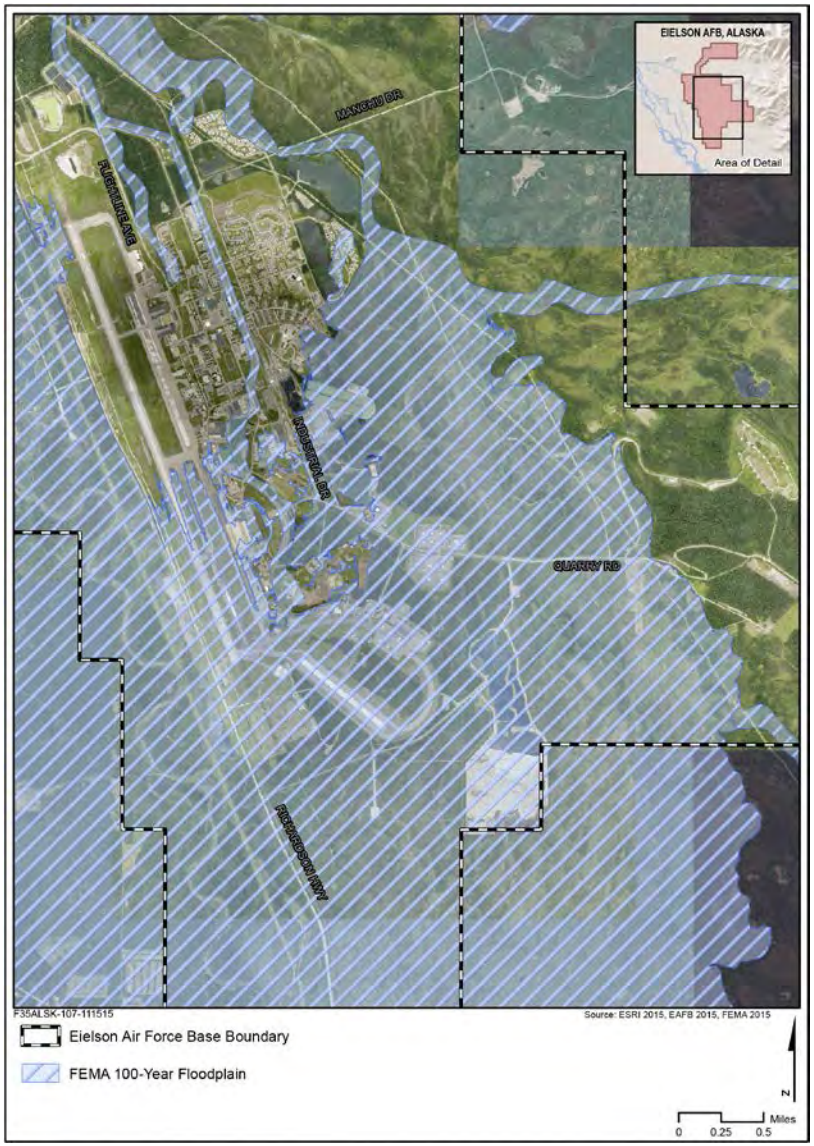


Figure D.6-2: FEMA Map of the 100-year Floodplain on Eielson AFB

Step 3: Identify and Evaluate Practicable Alternatives to Locating in a Floodplain

Alternative Site Requirements: Placement of F-35A operational and maintenance facilities is restricted by several factors analyzed during the planning and siting process:

- Operational efficiencies dictate that the two F-35 squadrons be located adjacent to one another along the flight line.
- Facilities cannot be sited within explosive safety arcs.
- Aircraft weapons loading safety requirements dictate that, locations used for this purpose must be oriented so that aircraft are pointed away from developed areas during loading and unloading.
- Ramp access to shelters and hangars cannot exceed a slope of in excess of 1 percent.

Preferred Location – South Loop: Due to the extent of floodplains on the South Loop area of the flight line, there are no alternative facility locations available that meet F-35 mission requirements. The projected FEMA 100-year flood elevations for the South Loop area of the flight line range from 554 on the north end, to 566 feet on the south end (Figure D.6-3: FEMA Flood Insurance Rate Map # 02090C5475J). These elevations are far in excess of the current elevations (552 feet) of the existing facilities in the area, which is also the minimum elevation of the proposed facilities (Figure D.6-4). As can be seen in the inset for this figure, the highest elevation on the South Loop taxiway is at Red 8 (556.2 feet), approximately 10 feet below the 100-year flood level predicted for that location. Construction of Aircraft Weather Shelter # 6/7/8 would have to be raised to a floor-level height of 556 feet to meet ramp slope requirements.

Alternative Facility Locations Rejected During Planning

A-10 Operations Area: Located in the 100-year floodplain along the flight line to the north of the South Loop area, this beddown location was rejected because it does not meet weapons loading safety requirements. The weapons loading aircraft weather shelter could only be located in parallel with the runway, orienting the aircraft to face across the flight line or into developed portions of the base. The Richardson Highway, one of the two north-south highways out of Fairbanks is less than a half mile from the proposed shelter location to the west across the flight line, placing civilians in jeopardy in the event of weapons discharge. Although an earthen berm could be constructed to the east of the weapons loading shelter as a protective measure for developed areas of the base, main access roads and facilities in the vicinity would remain within potential blast distances of the shelter.

Undeveloped areas of the Flight Line: Although the north end of the flight line is outside of the 100-year floodplain, there is insufficient area available to support construction of required the F-35A facilities. Even if sufficient land were available, new facilities would need to have major extensions to the existing heating and electrical grid be developed. This would introduce significant expenses in the sub-arctic environment that would not be required under the Proposed Action Alternative location.

No Action: The only alternative action to locating the proposed F-35A facilities in the floodplain would be the No-Action Alternative in the Final EIS. However, implementing the No-Action Alternative would preclude the Air Force from accomplishing a major new aircraft beddown in the Pacific Air Forces (PACAF) Area of Responsibility (AOR). This would severely restrict the ability of the Air Force to deploy rapidly F-35 aircraft in support of strategic requirements in the PACAF AOR.

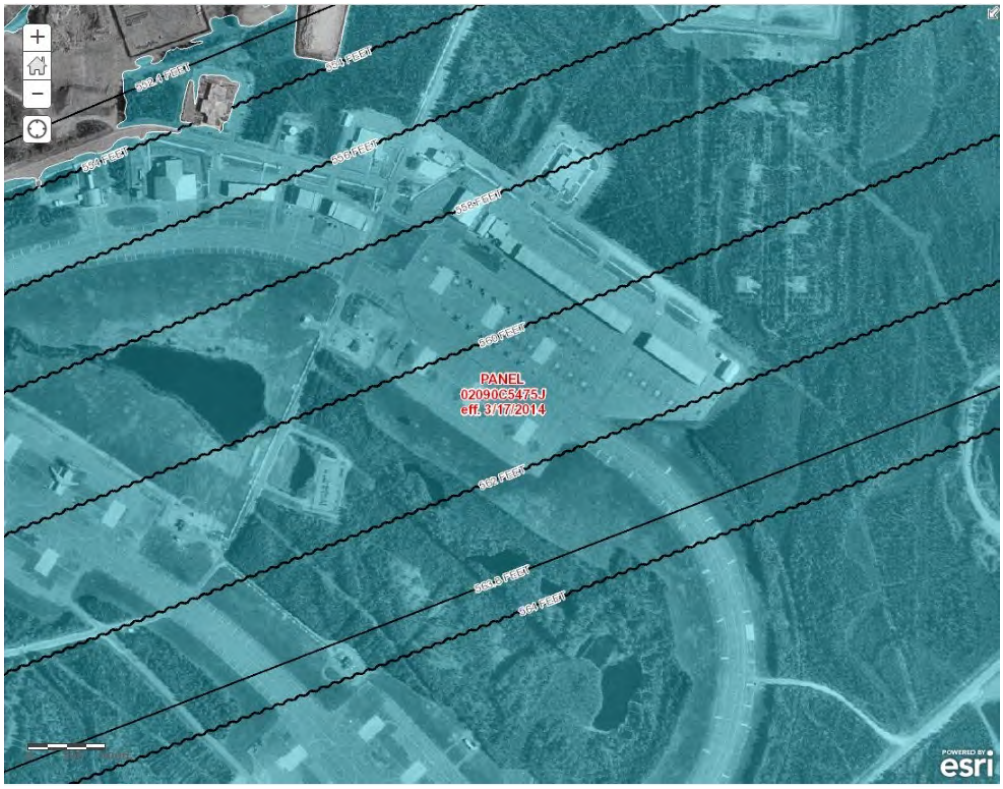


Figure D.6-3: FEMA Flood Insurance Rate Map # 02090C5475J showing Flood Elevations in the South Loop Area

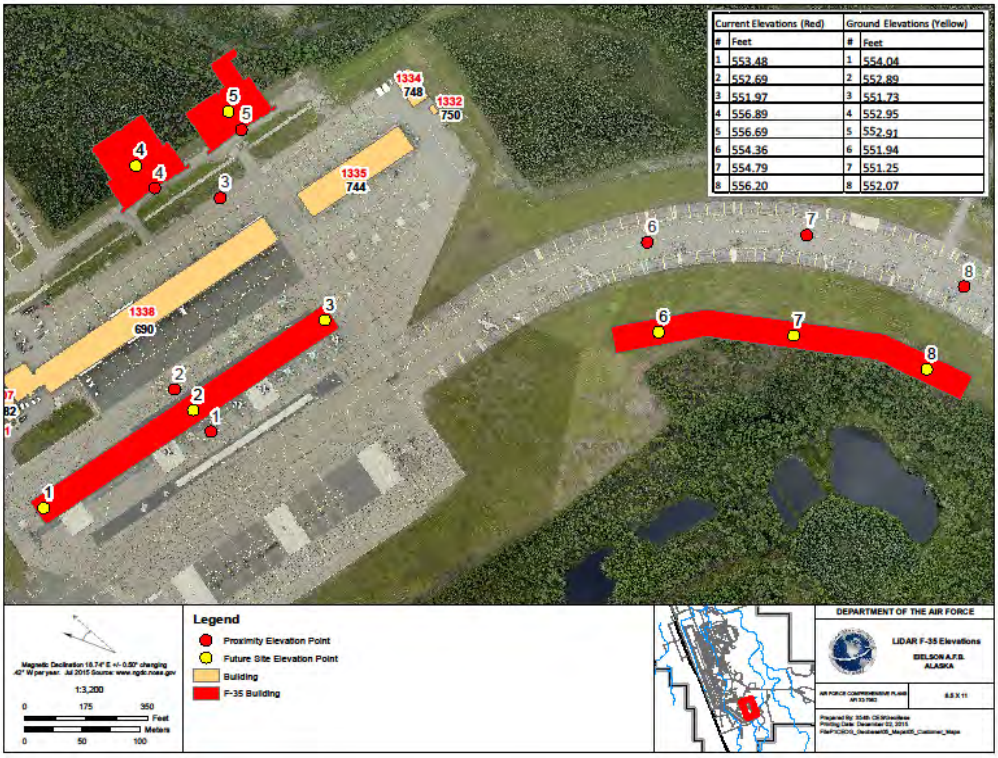


Figure D.6-4: Facilities Located in the 100-year Floodplain on Eielson AFB

Step 4: Identify Impacts of the Proposed Action

Direct Impacts: Implementing the Proposed Action Alternative would have direct impacts that are unavoidable, based on the extent of floodplains and the lack of practicable alternative F-35A facility locations. As all existing facilities in the South Loop area are 8 to 10 feet below the predicted 100-year floodplain elevations, new construction in the area cannot be raised to meet flood-proofing requirements of 2 feet above the flood elevation. New construction will correspond to existing facility elevational levels or, as required, to meet ramp/taxiway slope requirements. This means that facility elevations would range from 552 to 556 feet, and would have the effect of displacing a volume of the floodwaters.

Indirect Impacts: There would be no on- or off-base actions outside of the 100-year floodplain that would indirectly affect the floodplain.

Types of Impacts:

Positive Impacts: Implementing the Proposed Action Alternative, with the construction of F-35A facilities in the 100-year floodplain would have a beneficial impact on accomplishing the Air Force mission, as identified in the Final EIS. It would also benefit the local FNSB economy through a short-term increase in construction jobs and a long-term increase in permanent jobs at Eielson AFB.

Negative Impacts:

- Approximately 56 acres of floodplains would be impacted by proposed facility construction. Some impacts would be concentrated and/or direct (e.g., facility footprints) and others would be dispersed or temporary impacts (e.g., construction staging and support).
- Approximately 1.6 acres of floodplains would be impacted by temporarily re-opening the South Gate for construction traffic. This work would be accomplished by the Alaska Department of Transportation as part of current plans to widen the highway in this area, and would take place within the existing Right-of-Way.
- The Air Force would have to accept the risk of flood damage to facilities resulting from a 100-year flood event.

Concentrated: Approximately 21 acres of the floodplain would be directly impacted by new construction of F-35A facilities. Based on the Light Detection and Ranging data (or LIDAR) ground elevation information provided by the 354 Civil Engineer Squadron GeoBase Office, Table D.6-1 provides estimates of flood volume displacement caused by raising facility elevations for the new construction along the flight line to elevations of 552 or 556 feet. This information is. Only construction of the Aircraft Weather Shelter (indicated as the Yellow points 6/7/8) and the R-11 Fuel Truck Garage would require appreciable volumes of fill to bring their floor elevations up to grade with the adjacent taxiway and ramp. All other new construction will take place at the same ground elevations at their identified locations. Including ramp space requirements, the fill for the Aircraft Weather Shelter would cover an area of approximately 420,000 square feet, to a depth of 4 feet. This fill volume was converted to acre-feet, with an acre-feet being defined as 43,560 cubic feet. Although the R-11 fuel truck facility covers only 5,580 square feet, approximately 2.5 acres of fill would be required to accommodate ramp and parking spaces, displacing an estimated 5.23 acre-feet of flood volume.

Table D.6-1: Flood Volume Displacement

New Facilities in Floodplain	*Ground Elevation (Feet)*	*Constructed Facility Elevation (Feet)*	*Floodplain Displacement (Acre-feet)*
16-Aircraft Shelter (Yellow 6/7/8)	551.75	556	40.98
R-11 Fuel Truck Garage	549.91	552	5.23
South Gate Highway Ramps	558	562	6.4
Total	**-**	**-**	**52.68**

Reopening of the South Gate during F-35A facility construction would directly impact approximately 1.6 acres of the 100-year floodplain on both sides of the Richardson Highway. The South Gate ramp development, though being undertaken by the Alaska Department of Transportation, is incorporated in this analysis, as this development is beyond the planned footprint for the Richardson Highway widening project. Fill would be required to widen the highway north of the gate by 20 feet, to provide turnoff and merge lanes for heavy vehicle traffic. The highway grade would not be raised, so that this fill requirement would be to a depth of 4 feet at the edge of the widened portion, and tapered to the existing ground level over an additional 20 feet.

The total of 52.61 acre-feet of floodwater displacement, when compared to the floodplain acreage on Eielson AFB, amounts to a less than 0.1-inch increase in flood elevation on the base. This potential increase in floodwater elevation would not increase the likelihood of facility flooding at locations on or off base that are currently outside of the 100-year floodplain**.**

Assessment of Flood Hazards

The Role of Past and Probable Floods in Determining Flood Hazards: Eielson AFB was originally constructed in 1943 as a satellite field, called Mile 26 for Ladd Field, now Fort Wainwright. Since its establishment, the Eielson AFB flight line has never been flooded, even though the southern third of the flight line is identified as being in the 100-year floodplain of the Tanana River. The 2008 flooding of the Salcha and Tanana Rivers, which caused substantial flooding of the Salcha Community to the south of Eielson AFB, reached a Tanana River flood level of 26.53 feet, 2.03 feet above the flood stage of 24.5 feet at Fairbanks. Although Fairbanks is downstream of the base, it is the official flood-elevation monitoring site for the Tanana River. The Flood of Record for the Tanana River (August 1967) was measured at 27.8 feet. Neither of these flood events, resulting from unusually heavy summer rains, caused flooding on Eielson AFB.

High-Hazard Areas: The Tanana River is approximately 1 mile from the Eielson flight line, and flows from the south-southeast to the north-northwest, adjacent to the base boundary. Due to the diking effect of the Richardson Highway, as shown in Figure D.6-1, the FNSB does not identify any high-hazard areas subject to maximum water pressures during potential flood events. Should flood waters spread to the east side of the highway, as depicted in Figure D.6-5, forest and wetland vegetation on the south end of the base and adjacent lands would serve to buffer and slow down flood waters. This would reduce the potential for erosion and facility movement. However, due to the normal high silt load of the Tanana River, areas where water flow is slowed would be subject to silt deposition.

Lives and Property: Risk to lives and property is limited for the facilities proposed for construction in the floodplain, and is considered minor. As flood events are predictable, there is sufficient time for military personnel occupying these facilities to evacuate, to include relocation of portable equipment and

aircraft to areas of the installation outside of the floodplain. The Proposed Action Alternative is not expected to increase the risk to lives and property off the installation.

Natural Moderation of Floods: The floodplain on Eielson AFB covers a large area, and as can be seen in Figure D.6-2, the floodplains to the east of the Richardson Highway form a pocket between higher elevations on the developed portion of the base, and the hills to the east. During the 100-year flood event, movement of water in this area would be slow because of its distance from the Tanana River's main channel, lack of a high-flow volume outlet to the north, and the amount of vegetation between the base and the main channel of the river. As most of the area outside the flight line is heavily vegetated with forest, brush, and wetland species (Figure D.6-5), this vegetation would slow or impede the flow of floodwaters by trapping or filtering out woody debris and silt. The small amount of floodwater displacement associated with proposed F-35A construction (see Table D.6-1), would not adversely impact the ability of the floodplain to moderate floodwater impacts.

Water Quality Maintenance: Due to the small acreage involved (21 acres), converting portions of the floodplains to impervious surfaces associated with construction projects under the Proposed Action Alternative would not change surface or groundwater quality from what is associated with the No-Action Alternative. Sufficient areas of the floodplain will continue to be available for groundwater recharge and filtration. Construction activities are not expected to cause impacts to surface waters on the base because these activities must comply with the Installation Storm Water Pollution Prevention Plan. This guidance implements state stormwater discharge regulations, which has specific measures required to be in place during ground disturbing activities, such as silt fencing to prevent off-site surface water runoff.

Climate Regulation Resources: Changes in land cover associated with the Proposed Action Alternative are not expected to impact base floodplain and wetlands ability to serve as sinks or sources of greenhouse gases.

Living Resources: As discussed in the Final EIS, on-base flora and fauna are not expected to be adversely impacted by the Proposed Action above those currently being experienced. Most of the proposed construction will take place on previously developed portions of the installation having little natural vegetation. These developed areas have low value as wildlife food production areas. Very little vegetation will be removed when compared to amount found on the rest of the floodplain. All natural resources on Eielson AFB are managed in accordance with the current Five-Year Integrated Natural Resources Management Plan, with the goal of maintaining a healthy natural environment.

Cultural and Community Resources: No Alaska Native cultural resources are known to exist on Eielson AFB, so no cultural resource impacts are anticipated. Due to the restricted access to the flight line, no community recreational resources will be impacted by the Proposed Action Alternative.

Forestry Resources: There would be a minor amount of forested wetlands impacted by the removal 17 acres of wetlands near the South Loop and the South Gate. Both the amount of wetlands and associated forest vegetation impacted by construction is minor in comparison to the amount of these resources found on the installation. Loss of this forested vegetation will not alter the continued functioning of the 100-year floodplain on base.

Figure D.6-5: Eielson AFB Vegetation Map

Step 5 – Minimize, Restore, Preserve

As previously identified in Step 3 of this review, as well as in the Final EIS, there are No Practicable Alternatives to proposed construction impacts, which represent the minimum area within the 100-year floodplain required to accomplish the proposed beddown of F-35As at Eielson AFB. There are no means available to restore the loss of floodplain values from previously accomplished construction of the flight line and associated support facilities as they continue to be required for operations. The floodplain values in areas outside of the footprints of the proposed facility construction would be maintained as closely as possible to their natural condition. The exception to this would be the continued mowing and vegetation control immediately adjacent to the flight line.

Step 6 – Re-evaluate Alternatives

Location in a Floodplain: Based on this review and the information provided by the Proponent for this action, there are no practicable alternatives to locating proposed F-35A facilities within the Tanana River 100-year floodplain. The following four requirements were evaluated and incorporated into the planning process for this action:

- Avoid direct or indirect development within the floodplain wherever there is a practicable alternative. As no practicable alternatives exist, impacts to floodplains would be minimized to the extent possible.
- Reduce the risk of flood loss. As the existing facilities on the South Loop are already 8 to 10 feet below the predicted 100-year flood elevations, there are no practicable methods available to flood proof existing or new facilities.
- Minimize the impact of floods on human safety, health and welfare—road access in and out of the South Loop portion of the flight line is more than adequate to evacuate personnel in advance of a 100-year or greater flood event.
- Restore and preserve the natural and beneficial floodplain values—steps have been taken to preserve floodplains values by minimizing vegetation removal and the amount of impervious surfaces being added on the base.

Limit Action: As the four requirements listed above were addressed during the planning process for new construction, there is no need to limit the Proposed Action Alternative.

Step 7 – Findings and Public Notification

Release of the Final F-35A Operational Beddown – Pacific EIS will be announced through publication of a Notice of Availability in the Federal Register. This will be accompanied by notices in the newspapers of the local communities impacted by this Beddown, providing the public with the information contained in this appendix that satisfies the requirements identified below:

- A description of why the proposed action must be located in the floodplain.
- A description of all significant facts considered in making the determination, including alternative sites and actions.
- A statement indicating whether the actions conform to applicable state or local floodplain protection standards.
- If appropriate for the action being taken, a statement indicating why the National Flood Insurance Program criteria are demonstrably inappropriate for the proposed action.

- A description of how the activity will be designed or modified to minimize harm to or within the floodplain.
- A statement indicating how the action affects natural or beneficial floodplain values.
- A statement listing other involved agencies and individuals.

All Actions Located in the Floodplain: A statement of findings (including the explanatory information discussed above) will be issued by the Air Force in compliance with Section 2(a) (2) of EO 11988.

Step 8 – Implement Action

Because of the information contained in this review and the Final EIS, there are no practicable alternatives to locating new F-35A facility construction in the Tanana River 100-year floodplain on Eielson AFB. However, there is a continuing Air Force responsibility for insuring that the Proposed Action Alternative is carried out in compliance with EO 11988 to minimize impacts to the floodplain. The 354 Civil Engineer Squadron will be responsible for monitoring compliance with floodplain impact minimization efforts to ensure compliance.

D.7 REFERENCES

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Appendix E: Noise Modeling, Methodology, and Effects

ACRONYMS AND ABBREVIATIONS

AAD	Annual Average Daily
AGL	Above Ground Level
ANSI	American National Standards Institute
ASHLA	American Speech-Language-Hearing Association
CHABA	Committee on Hearing, Bioacoustics, and Biomechanics
CNEL	Community Noise Equivalent Level
$CNEL_{mr}$	Onset-Rate Adjusted Monthly Community Noise Equivalent Level
dB	Decibel
dBA	A-Weighted Decibels
dB(A)	A-Weighted Decibels
DLR	German Aerospace Center (*Deutsches Zentrum für Luft und Raumfahrt e.V.*)
DNL	Day-Night Average Sound Level
DoD	Department of Defense
FAA	Federal Aviation Administration
FICAN	Federal Interagency Committee on Aviation Noise
FICON	Federal Interagency Committee on Noise
HA	Highly Annoyed
HYENA	Hypertension and Exposure to Noise near Airports
Hz	Hertz
ISO	International Organization for Standardization
L	Sound Level
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
$L_{eq(16)}$	Equivalent Sound Level over 16 hours
$L_{eq(24)}$	Equivalent Sound Level over 24 hours
$L_{eq(30min)}$	Equivalent Sound Level over 30 minutes
$L_{eq(8)}$	Equivalent Sound Level over 8 hours
$L_{eq(h)}$	Hourly Equivalent Sound Level
L_{max}	Maximum Sound Level
L_{pk}	Peak Sound Level
mmHg	millimeters of mercury
MOA	Military Operations Area
MTR	Military Training Route
NA	Number of Events At or Above a Selected Threshold
NATO	North Atlantic Treaty Organization
NDI	Noise Depreciation Index
NIPTS	Noise-induced Permanent Threshold Shift
NSDI	Noise Sensitivity Depreciation Index
OR	Odd Ratio
POI	Point of Interest
PTS	Permanent Threshold Shift
RANCH	Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health
SEL	Sound Exposure Level
SIL	Speech Interference Level
SUA	Special Use Airspace
TA	Time Above
TTS	Temporary Threshold Shift
U.S.	United States
UKDfES	United Kingdom Department for Education and Skills
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
WHO	World Health Organization

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E NOISE MODELING, METHODOLOGY, AND EFFECTS

Section E.1 of this appendix discusses sound and noise and their potential effects on the human and natural environment. The largest section, Section E.2, reviews the potential effects of noise, focusing on effects on humans but also addressing effects on property values, terrain, structures, and animals. Section E.3 presents the DNL gradient maps. Section E.4 contains the list of references cited.

E.1 NOISE AND SONIC BOOM

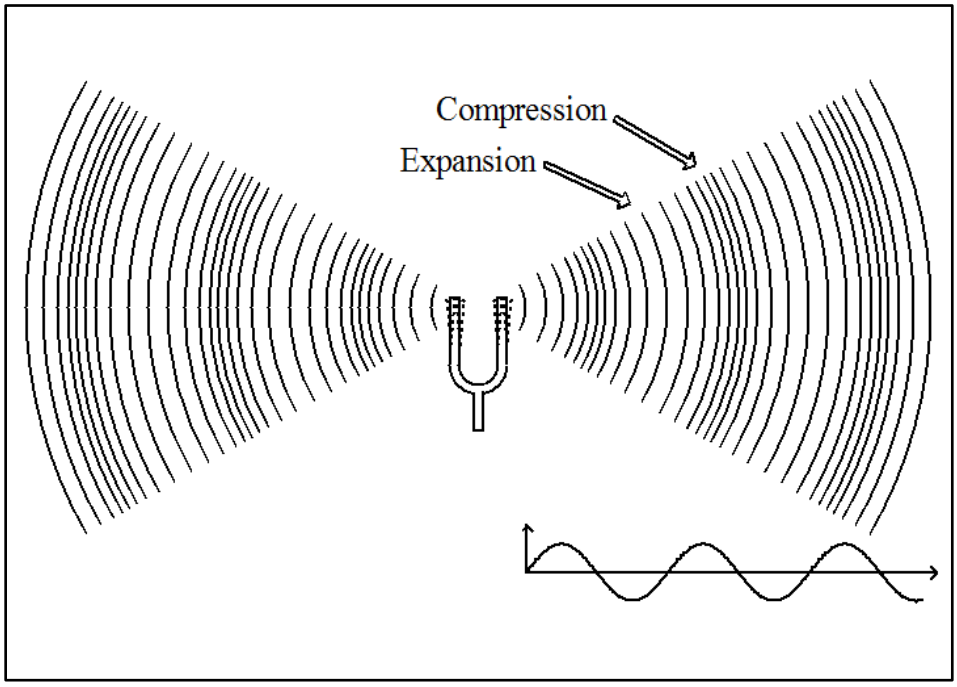
Section E.1.1 provides an overview of the basics of sound and noise. Section E.1.2 defines and describes the different metrics used to describe noise.

E.1.1 Basics of Sound

The following four subsections describe sound waves, sounds levels and types of sounds, sonic boom and workplace noise.

E.1.1.1 Sound Waves and Decibels

Sound consists of minute vibrations in the air that travel through the air and are sensed by the human ear. Figure E-1 is a sketch of sound waves from a tuning fork. The waves move outward as a series of crests where the air is compressed and troughs where the air is expanded. The height of the crests and the depth of the troughs are the amplitude or sound pressure of the wave. The pressure determines its energy or intensity. The number of crests or troughs that pass a given point each second is called the frequency of the sound wave.



Source: Wyle Laboratories.

Figure E-1. Sound Waves from a Vibrating Tuning Fork

The measurement and human perception of sound involves three basic physical characteristics: intensity, frequency, and duration.

- *Intensity* is a measure of the acoustic energy of the sound and is related to sound pressure. The greater the sound pressure, the more energy carried by the sound and the louder the perception of that sound.
- *Frequency* determines how the pitch of the sound is perceived. Low-frequency sounds are characterized as rumbles or roars, while high-frequency sounds are typified by sirens or screeches.
- *Duration* or the length of time the sound can be detected.

As shown in Figure E-1, the sound from a tuning fork spreads out uniformly as it travels from the source. The spreading causes the sound's intensity to decrease with increasing distance from the source. For a source such as an aircraft in flight, the sound level will decrease by about 6 dB for every doubling of the distance. For a busy highway, the sound level will decrease by 3 to 4.5 dB for every doubling of distance.

As sound travels from the source it also gets absorbed by the air. The amount of absorption depends on the frequency composition of the sound, the temperature, and the humidity conditions. Sound with high frequency content gets absorbed by the air more than sound with low frequency content. More sound is absorbed in colder and drier conditions than in hot and wet conditions. Sound is also affected by wind and temperature gradients, terrain (elevation and ground cover) and structures.

The loudest sounds that can be comfortably heard by the human ear have intensities a trillion times higher than those of sounds barely heard. Because of this vast range, it is unwieldy to use a linear scale to represent the intensity of sound. As a result, a logarithmic unit known as the decibel (abbreviated dB) is used to represent the intensity of a sound. Such a representation is called a sound level. A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 and 140 dB are felt as pain (Berglund and Lindvall 1995).

Because of the logarithmic nature of the decibel unit, sound levels cannot simply be added or subtracted and are somewhat cumbersome to handle mathematically. However, some simple rules are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. For example:

60 dB + 60 dB = 63 dB, and

80 dB + 80 dB = 83 dB.

Second, the total sound level produced by two sounds of different levels is usually only slightly more than the higher of the two. For example:

60.0 dB + 70.0 dB = 70.4 dB.

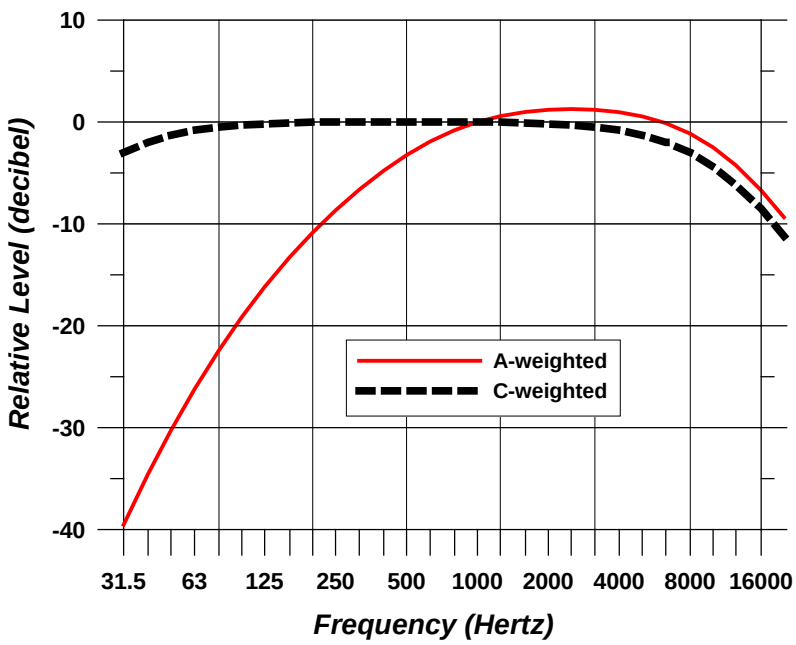
Because the addition of sound levels is different than that of ordinary numbers, this process is often referred to as "decibel addition."

The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a change in sound level of about 10 dB as a doubling (or halving) of the sound's loudness. This relation holds true for loud and quiet sounds. A decrease in sound level of 10 dB actually represents a 90% decrease in sound intensity but only a 50% decrease in perceived loudness because the human ear does not respond linearly.

Sound frequency is measured in terms of cycles per second or hertz (Hz). The normal ear of a young person can detect sounds that range in frequency from about 20 Hz to 20,000 Hz. As we get older, we lose the ability to hear high frequency sounds. Not all sounds in this wide range of frequencies are heard equally. Human hearing is most sensitive to frequencies in the 1,000 to 4,000 Hz range. The notes on a piano range from just over 27 Hz to 4,186 Hz, with middle C equal to 261.6 Hz. Most sounds (including a single note on a piano) are not simple pure tones like the tuning fork in Figure E-1, but contain a mix, or spectrum, of many frequencies.

Sounds with different spectra are perceived differently even if the sound levels are the same. Weighting curves have been developed to correspond to the sensitivity and perception of different types of sound. A-weighting and C-weighting are the two most common weightings. These two curves, shown in Figure E-2, are adequate to quantify most environmental noises. A-weighting puts emphasis on the 1,000 to 4,000 Hz range.

Very loud or impulsive sounds, such as explosions or sonic booms, can sometimes be felt, and can cause secondary effects, such as shaking of a structure or rattling of windows. These types of sounds can add to annoyance, and are best measured by C-weighted sound levels, denoted dBC. C-weighting is nearly flat throughout the audible frequency range, and includes low frequencies that may not be heard but cause shaking or rattling. C-weighting approximates the human ear's sensitivity to higher intensity sounds.



Source: ANSI S1.4A -1985 "Specification of Sound Level Meters".

Figure E-2. Frequency Characteristics of A- and C-Weighting

E.1.1.2 Sound Levels and Types of Sounds

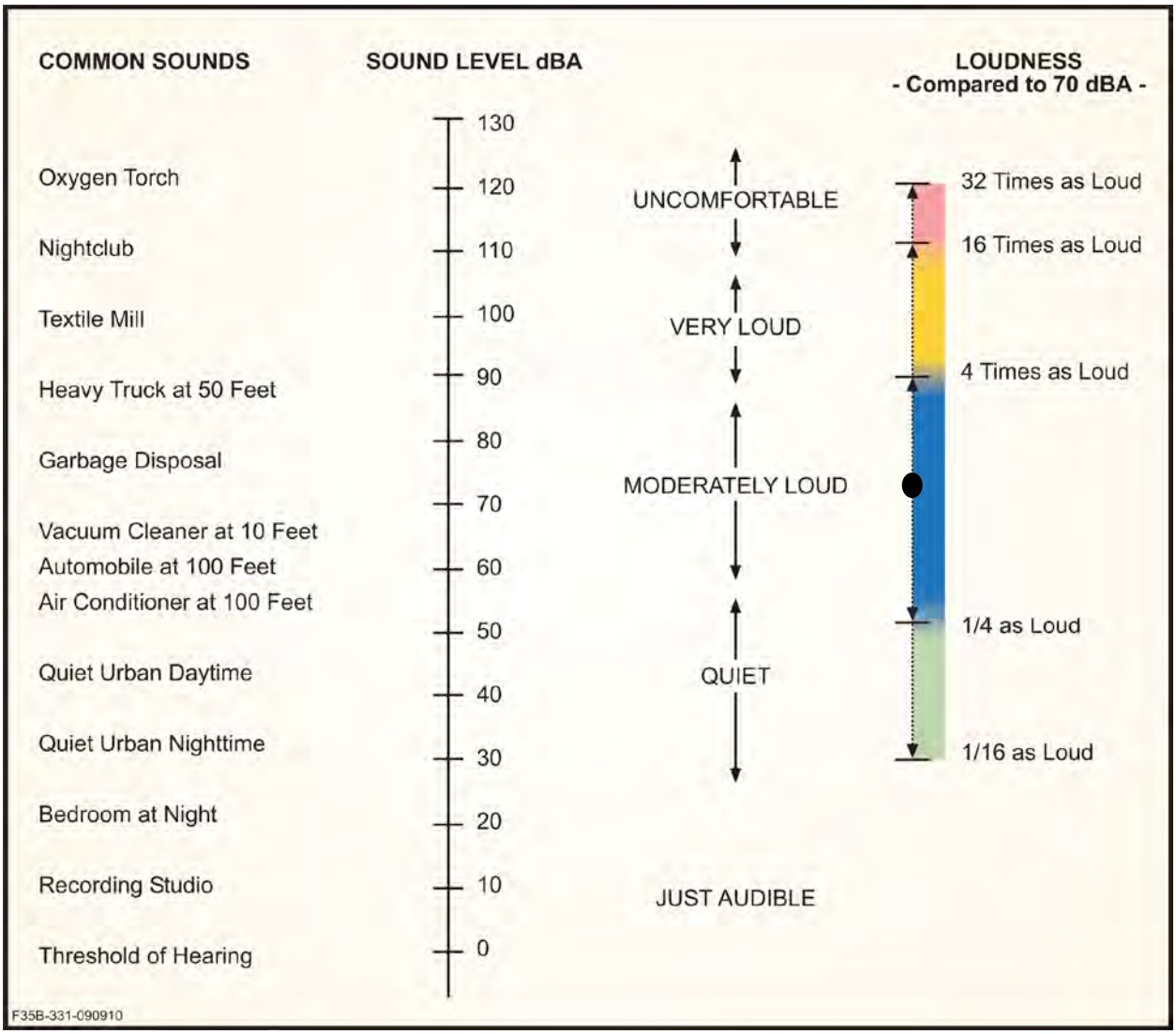
Most environmental sounds are measured using A-weighting. They are called A-weighted sound levels, and sometimes use the unit dBA or dB(A) rather than dB. When the use of A-weighting is understood, the term "A-weighted" is often omitted and the unit dB is used. Unless otherwise stated, dB units refer to A-weighted sound levels.

Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is unwanted sound. Noise can become an issue when its level exceeds the ambient or background sound level. Ambient noise in urban areas typically varies from 60 to 70 dB, but can be as high as 80 dB in the center of a large city. Quiet suburban neighborhoods experience ambient noise levels around 45-50 dB (U.S. Environmental Protection Agency (USEPA) 1978).

Figure E-3 is a chart of A-weighted sound levels from common sources. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like "urban daytime" and "urban nighttime" are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods. These are discussed in detail in Section A.2.

Aircraft noise consists of two major types of sound events: flight (including takeoffs, landings and flyovers), and stationary, such as engine maintenance run-ups. The former are intermittent and the latter primarily continuous. Noise from aircraft overflights typically occurs beneath main approach and departure paths, in local air traffic patterns around the airfield, and in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.

Impulsive noises are generally short, loud events. Their single-event duration is usually less than 1 second. Examples of impulsive noises are small-arms gunfire, hammering, pile driving, metal impacts during rail-yard shunting operations, and riveting. Examples of high-energy impulsive sounds are quarry/mining explosions, sonic booms, demolition, and industrial processes that use high explosives, military ordnance (e.g., armor, artillery and mortar fire, and bombs), explosive ignition of rockets and missiles, and any other explosive source where the equivalent mass of dynamite exceeds 25 grams (American National Standards Institute [ANSI] 1996).



Sources: Harris 1979; Federal Interagency Committee on Aviation Noise (FICAN) 1997.

Figure E-3. Typical A-weighted Sound Levels of Common Sounds

E.1.1.3 Sonic Booms

When an aircraft moves through the air, it pushes the air out of its way. At subsonic speeds, the displaced air forms a pressure wave that disperses rapidly. At supersonic speeds, the aircraft is moving too quickly for the wave to disperse, so it remains as a coherent wave. This wave is a sonic boom. When heard at the ground, a sonic boom consists of two shock waves (one associated with the forward part of the aircraft, the other with the rear part) of approximately equal strength and (for fighter aircraft) separated by 100 to 200 milliseconds. When plotted, this pair of shock waves and the expanding flow between them has the appearance of a capital letter “N,” so a sonic boom pressure wave is usually called an “N-wave.” An N-wave has a characteristic "bang-bang" sound that can be startling. Figure E-4 shows the generation and evolution of a sonic boom N-wave under the aircraft. Figure E-5 shows the sonic boom pattern for an aircraft in steady supersonic flight. The boom forms a cone that is said to sweep out a “carpet” under the flight track.

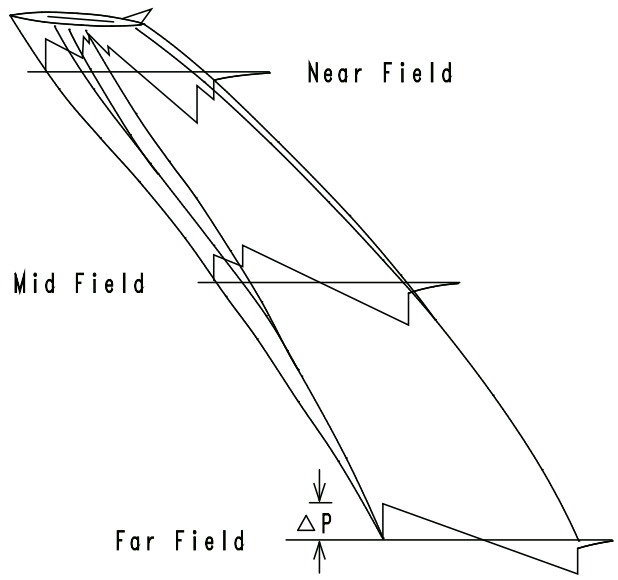


Figure E-4. Sonic Boom Generation and Evolution to N-Wave

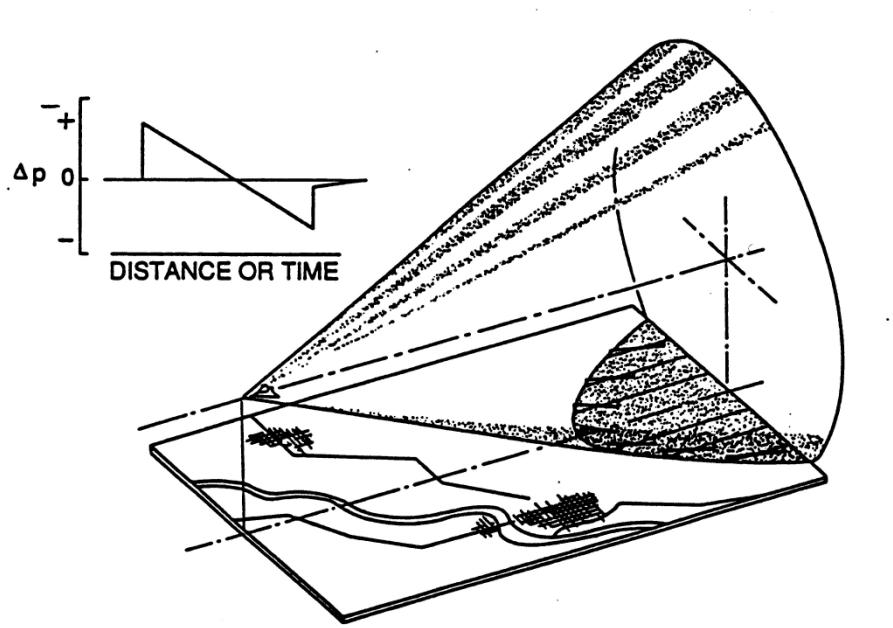


Figure E-5. Sonic Boom Carpet in Steady Flight

The complete ground pattern of a sonic boom depends on the size, shape, speed, and trajectory of the aircraft. Even for a nominally steady mission, the aircraft must accelerate to supersonic speed at the start, decelerate back to subsonic speed at the end, and usually change altitude. Figure E-6 illustrates the complexity of a nominal full mission.

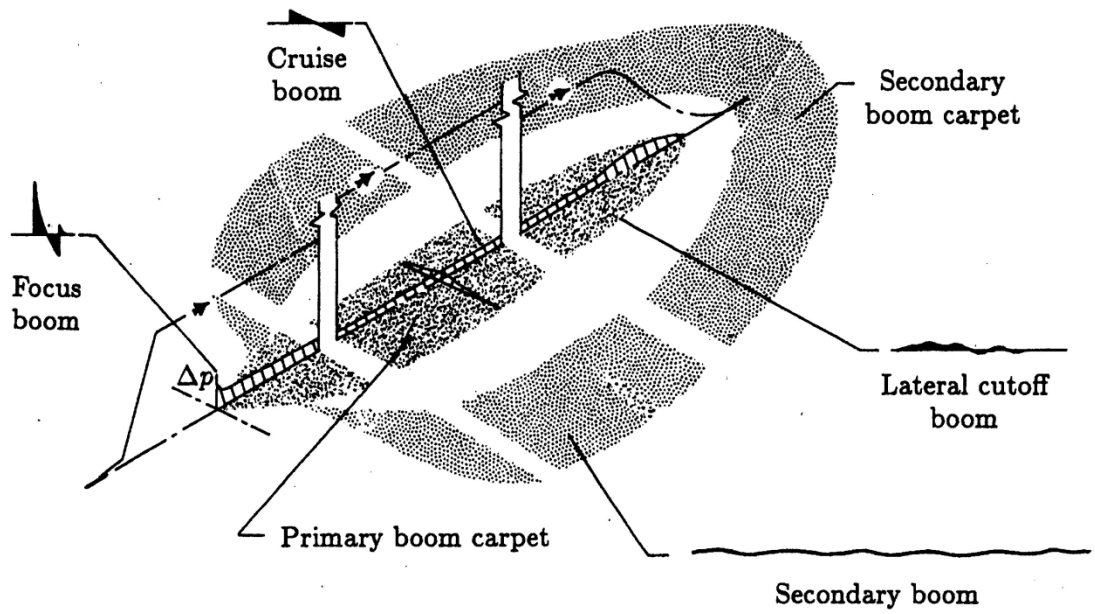


Figure E-6. Complex Sonic Boom Pattern for Full Mission

E.1.1.4 Workplace Noise

In 1972, the National Institute for Occupational Safety and Health (NIOSH) published a criteria document with a recommended exposure limit of 85 dB as an 8-hour time-weighted average. This exposure limit was reevaluated in 1998 when NIOSH made recommendations that went beyond conserving hearing by focusing on the prevention of occupational hearing loss (NIOSH 1998). Following the reevaluation using a new risk assessment technique, NIOSH published another criteria document in 1998 which reaffirmed the 85 dB recommended exposure limit (NIOSH 1998). Active-duty and reserve components of the Air Force (including the ANG), as well as civilian employees and contracted personnel working on Air Force bases and Air Guard stations must comply with Occupational Safety and Health Administration (OSHA) regulations (29 CFR § 1910.95 Occupational Noise Exposure), DoD Instruction 6055.12, Hearing Conservation Program; Air Force Occupational Safety and Health (AFOSH) Standard 48-20 (June 2006), and Occupational Noise and Hearing Conservation Program (including material derived from the International Standards Organization 1999.2 Acoustics-Determination of Occupational Noise Exposure and Estimation of Noise Induced Impairment). Per AFOSH Standard 48-20, the Hearing Conservation Program is designed to protect workers from the harmful effects of hazardous noise by identifying all areas where workers are exposed to hazardous noise. The following are main components of the program:

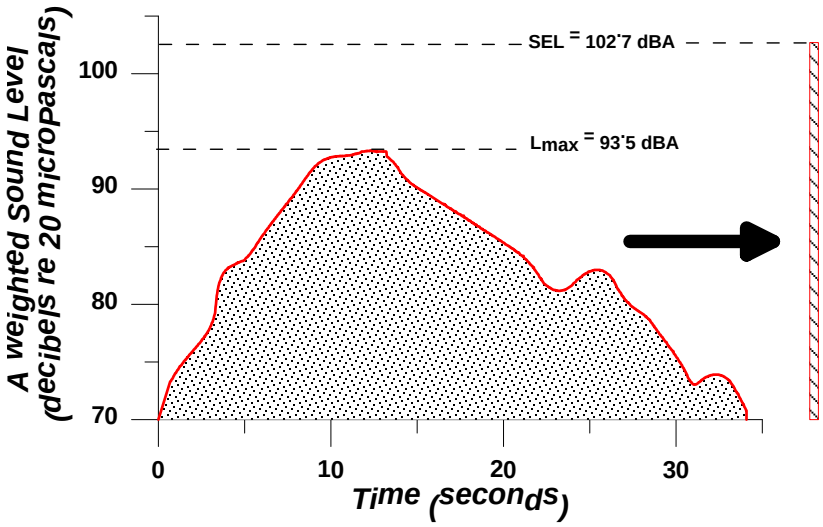
1. Identify noise hazardous areas or sources and ensure these areas are clearly marked.
2. Use engineering controls as the primary means of eliminating personnel exposure to potentially hazardous noise. All practical design approaches to reduce noise levels to below hazardous levels by engineering principles shall be explored. Priorities for noise control resources shall be

assigned based on the applicable risk assessment code. Where engineering controls are undertaken, the design objective shall be to reduce steady-state levels to below 85 dBA, regardless of personnel exposure time, and to reduce impulse noise levels to below 140 dB peak sound pressure level.

3. Ensure workers with an occupational exposure to hazardous noise complete an initial/reference audiogram within 30 days from the date of the workers' initial exposure to hazardous noise.
4. Ensure new equipment being considered for purchase has the lowest sound emission levels that are technologically and economically possible and compatible with performance and environmental requirements. 42 USC § 4914, *Public Health and Welfare, Noise Control, Development of Low-Noise Emission Products*, applies.
5. Education and training regarding potentially noise hazardous areas and sources, use and care of hearing protective devices, the effects of noise on hearing, and the Hearing Conservation Program.

E.1.2 Noise Metrics

Noise metrics quantify sounds so they can be compared with each other, and with their effects, in a standard way. The simplest metric is the A-weighted level, which is appropriate by itself for constant noise such as an air conditioner. Aircraft noise varies with time. During an aircraft overflight, noise starts at the background level, rises to a maximum level as the aircraft flies close to the observer, then returns to the background as the aircraft recedes into the distance. This is sketched in Figure E-7, which also indicates two metrics (L_{max} and SEL) that are described in Sections A.2.1 and A.2.3 below. Over time there can be a number of events, not all the same.



Source: Wyle Laboratories

Figure E-7. Example Time History of Aircraft Noise Flyover

There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section describes the metrics relevant to environmental noise analysis.

E.1.2.1 Single-Events

Maximum Sound Level (L_{max})

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event in Figure E-7.

L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the "fraction of a second" is one-eighth of a second, denoted as "fast" response on a sound level measuring meter (ANSI 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted "slow" response. L_{max} is important in judging if a noise event will interfere with conversation, TV or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise, because it does not account for how long the sound is heard.

Table E-1 reflects L_{max} values for typical aircraft associated with this assessment operating at the indicated flight profiles and power settings. On takeoff through 1,000 ft AGL, the F-22 has the highest L_{max} of 112 dB with the F-35A ranked a close second with 111 dB L_{max}. On approach through 1,000 ft AGL, the F-22 has the highest L_{max} of 104 dB with the B-1 and F-15 tied for second with 97 dB L_{max}.

Table E-1. Representative Instantaneous Maximum Sound Levels (L_{max})[1]

Aircraft (engine type)	*Power Setting*	*Power Unit[2]*	*L_{max} (in dBA) At Varying Altitudes (In Feet)*				
			500	*1,000*	*2,000*	*5,000*	*10,000*
Takeoff/Departure Operations							
A-10A	6200	NF	100	92	82	68	58
B-1[3]	97.5%	RPM	113	105	97	84	72
F-15 (PW220)	90%	NC	111	104	97	85	75
F-16 (PW229)	93%	NC	114	106	98	86	76
F-22	100%	ETR	120	112	105	93	83
F-35A[4]	100%	ETR	119	111	103	91	81
Landing/Arrival Operations[5]							
A-10A	5225	NF	97	89	79	60	46
B-1	90%	RPM	104	97	89	76	65
F-15 (PW220)	75%	NC	104	97	89	77	66
F-16 (PW229)	83.5%	NC	93	86	78	66	56
F-22	43%	ETR	111	104	96	84	73
F-35A[4]	40%	ETR	100	93	85	73	62

Source: NOISEMAP OPX file using standard weather conditions of 59 degrees Fahrenheit and 70 percent relative humidity

1. Power settings indicated may not be comparable across aircraft, that all numbers are rounded, and power settings are typical but not constant for departure/arrival operations.
2. RPM—Revolutions Per Minute; ETR—Engine Thrust Request; NC—Engine Core RPM; and NF—Engine Fan RPM.
3. B-1 Takeoff/Departure modeled with Afterburner, all other departure aircraft modeled without afterburner (if available).
4. Based on 2013 Edwards measurements.
5. All Landing/Arrival aircraft modeled with "parallel-interpolation" power setting for gear down configuration (except if noted).

Peak Sound Pressure Level (L_{pk})

The Peak Sound Pressure Level is the highest instantaneous level measured by a sound level measurement meter. L_{pk} is typically measured every 20 microseconds, and usually based on unweighted or linear response of the meter. A- or C-weighting is not applied. It is used to describe individual impulsive events such as sonic boom and blast noise. Because blast noise varies from shot to shot and varies with meteorological (weather) conditions, the U.S. Department of Defense (DoD) usually

characterizes L_{pk} by the metric PK 15(met), which is the L_{pk} exceeded 15% of the time. The "met" notation refers to the metric accounting for varied meteorological or weather conditions.

For sonic booms, this is the peak pressure of the shock wave, as described in Section 3.2 of this appendix. This pressure is usually presented in physical units of pounds per square foot. Sometimes it is represented on the decibel level scale, with symbol L_{pk}.

Sound Exposure Level (SEL)

Sound Exposure Level combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. Figure E-7 indicates the SEL for an example event, representing it as if all the sound energy were contained within 1 second.

Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time, but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

Table E-2 shows SEL values corresponding to the aircraft and power settings reflected in Table E-1. At 1,000 ft AGL on takeoff, the F-22 has the highest SEL of 121 dB, with the F-35A closed behind with 119 dB SEL. At 1,000 ft AGL on approach, the F-22 has the highest SEL of 109 dB, with the B-1 ranked second with 105 dB SEL.

C-weighted SEL can be computed for impulsive sounds, and the results denoted CSEL or LCE. SEL for A-weighted sound is sometimes denoted ASEL. Within this study, SEL is used for A-weighted sounds and CSEL for C-weighted.

E.1.2.2 Cumulative Events

Equivalent Sound Level (L_{eq})

Equivalent Sound Level is a "cumulative" metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity, and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq(24)}$ for 24 hours). The L_{eq} from 7 a.m. to 3 p.m. may give exposure of noise for a school day.

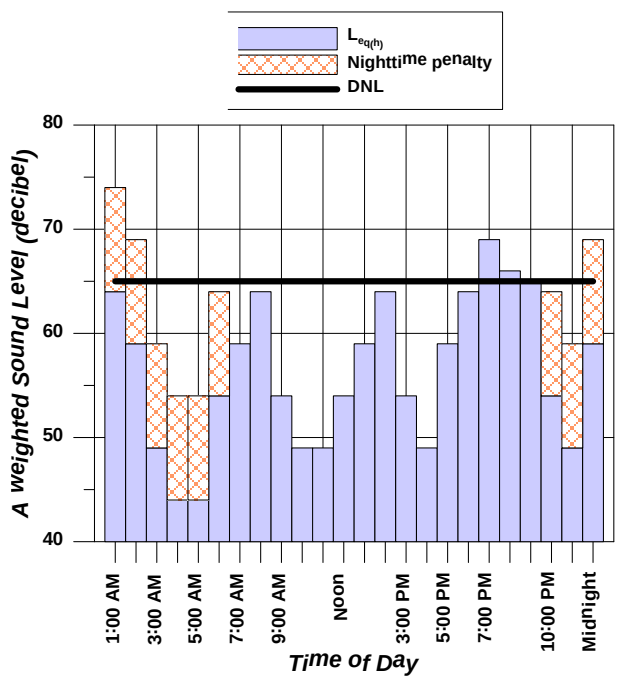
Figure E-8 gives an example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. The $L_{eq(24)}$ for this example is 61 dB.

Table E-2. Representative Sound Exposure Levels (SEL)[1]

Aircraft (engine type)	*Power Setting*	*Power Unit[2]*	*SEL (in dBA) At Varying Altitudes (In Feet)*				
			500	*1,000*	*2,000*	*5,000*	*10,000*
Takeoff/Departure Operations[3]							
A-10A	6200	NF	105	99	91	80	71
B-1[4]	97.5%	RPM	119	113	106	96	86
F-15 (PW220)	90%	NC	120	115	109	100	91
F-16 (PW229)	93%	NC	119	114	107	98	89
F-22	100%	ETR	127	121	115	106	98
F-35A	100%	ETR	125	119	113	103	95
Landing/Arrival Operation[5]							
A-10A	5225	NF	98	92	83	67	55
B-1	90%	RPM	111	105	98	88	79
F-15 (PW220)	75%	NC	99	94	88	79	71
F-16 (PW229)	83.5%	NC	97	92	86	77	68
F-22	43%	ETR	115	109	103	94	85
F-35A[6]	40%	ETR	107	102	95	86	76

Source: NOISEMAP OPX file using standard weather conditions of 59 degrees Fahrenheit and 70 percent relative humidity.

1. Power settings indicated may not be comparable across aircraft, that all numbers are rounded, and power settings are typical but not constant for departure/arrival operations.
2. RPM—Revolutions Per Minute; ETR—Engine Thrust Request; NC—Engine Core RPM; and NF—Engine Fan RPM.
3. Takeoff/Departure modeled at 160 knots airspeed for SEL purposes.
4. B-1 Takeoff/Departure modeled with Afterburner, all other departure aircraft modeled without afterburner (if available).
5. All Landing/Arrival aircraft modeled at 160 knots airspeed for SEL purposes.
6. Based on 2013 Edwards measurements.



Source: Wyle Laboratories.

Figure E-8. Example of $L_{eq}(24)$, DNL Computed from Hourly Equivalent Sound Levels

Day-Night Average Sound Level (DNL or L_{dn})

Day-Night Average Sound Level is a cumulative metric that accounts for all noise events in a 24-hour period. However, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10 dB penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent.

For airports and military airfields outside of California, DNL represents the average sound level for annual average daily aircraft events. Figure E-8 gives an example of DNL using notional hourly average noise levels ($L_{eq(h)}$) for each hour of the day as an example. Note the $L_{eq(h)}$ for the hours between 10 p.m. and 7 a.m. have a 10 dB penalty assigned. The DNL for this example is 65 dB. Figure E-9 shows the ranges of DNL that occur in various types of communities. Under a flight path at a major airport the DNL may exceed 80 dB, while rural areas may experience DNL less than 45 dB.

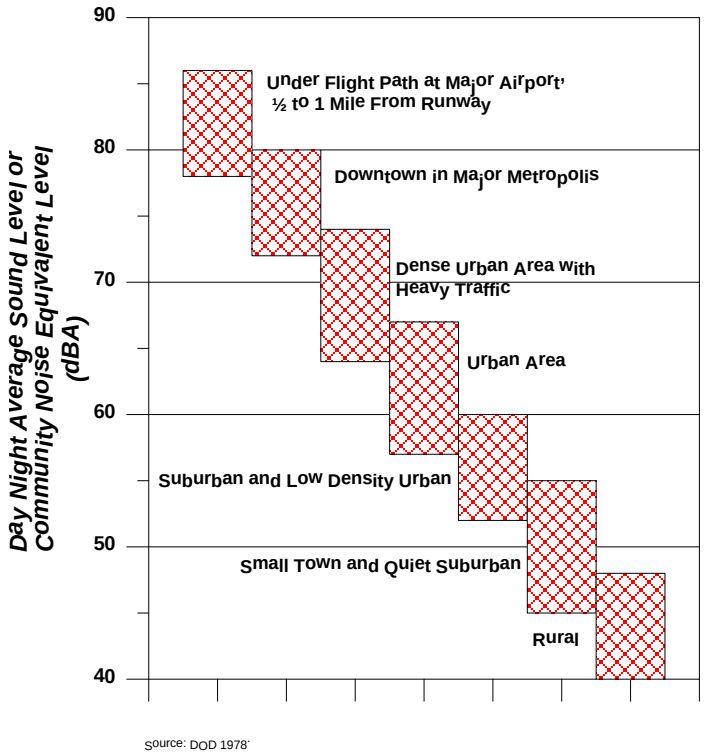


Figure E-9. Typical DNL Ranges in Various Types of Communities

The decibel summation nature of these metrics causes the noise levels of the loudest events to control the 24-hour average. As a simple example, consider a case in which only one aircraft overflight occurs during the daytime over a 24-hour period, creating a sound level of 100 dB for 30 seconds. During the remaining 23 hours, 59 minutes, and 30 seconds of the day, the ambient sound level is 50 dB. The DNL for this 24-hour period is 65.9 dB. Assume, as a second example that 10 such 30-second overflights occur during daytime hours during the next 24-hour period, with the same ambient sound level of 50 dB during the remaining 23 hours and 55 minutes of the day. The DNL for this 24-hour period is 75.5 dB. Clearly, the averaging of noise over a 24-hour period does not ignore the louder single events and tends to emphasize both the sound levels and number of those events.

A feature of the DNL metric is that a given DNL value could result from a very few noisy events or a large number of quieter events. For example, 1 overflight at 90 dB creates the same DNL as 10 overflights at 80 dB.

DNL does not represent a level heard at any given time, but represent long term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz 1978; USEPA 1978).

Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr})

Military aircraft utilizing Special Use Airspace (SUA) such as Military Training Routes (MTRs), Military Operations Areas (MOAs), and Restricted Areas/Ranges generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in SUAs is highly sporadic. It is often seasonal, ranging from 10 per hour to less than 1 per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, with rates of up to 150 dB per second.

The cumulative daily noise metric devised to account for the "surprise" effect of the sudden onset of aircraft noise events on humans and the sporadic nature of SUA activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB to the event's SEL, while onset rates below 15 dB per second require no adjustment to the event's SEL (Stusnick *et al.* 1992). The term 'monthly' in L_{dnmr} refers to the noise assessment being conducted for the month with the most operations or sorties—the so-called busiest month.

E.1.2.3 Supplemental Metrics

Number-of-Events Above (NA) a Threshold Level (L)

The Number-of-Events Above (NA) metric gives the total number of events that exceed a noise level threshold (L) during a specified period of time. Combined with the selected threshold, the metric is denoted NAL. The threshold can be either SEL or L_{max}, and it is important that this selection is shown in the nomenclature. When labeling a contour line or point of interest (POI), NAL is followed by the number of events in parentheses. For example, where 10 events exceed an SEL of 90 dB over a given period of time, the nomenclature would be NA90SEL(10). Similarly, for L_{max} it would be NA90L_{max}(10). The period of time can be an average 24-hour day, daytime, nighttime, school day, or any other time period appropriate to the nature and application of the analysis.

NA is a supplemental metric. It is not supported by the amount of science behind DNL/CNEL, but it is valuable in helping to describe noise to the community. A threshold level and metric are selected that best meet the need for each situation. An L_{max} threshold is normally selected to analyze speech interference, while an SEL threshold is normally selected for analysis of sleep disturbance.

The NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level.

Time Above (TA) a Specified Level (L)

The Time Above (TA) metric is the total time, in minutes, that the A-weighted noise level is at or above a threshold. Combined with the threshold level (L), it is denoted TAL. TA can be calculated over a full

24-hour annual average day, the 15-hour daytime and 9-hour nighttime periods, a school day, or any other time period of interest, provided there is operational data for that time.

TA is a supplemental metric, used to help understand noise exposure. It is useful for describing the noise environment in schools, particularly when assessing classroom or other noise sensitive areas for various scenarios. TA can be shown as contours on a map similar to the way DNL contours are drawn.

TA helps describe the noise exposure of an individual event or many events occurring over a given time period. When computed for a full day, the TA can be compared alongside the DNL in order to determine the sound levels and total duration of events that contribute to the DNL. TA analysis is usually conducted along with NA analysis so the results show not only how many events occur, but also the total duration of those events above the threshold.

E.2 NOISE AND SONIC BOOM EFFECTS

Noise is of concern because of potential adverse effects. The following subsections describe how noise can affect communities and the environment, and how those effects are quantified. The specific topics discussed are:

- Annoyance;
- Land Use Compatibility
- Speech interference;
- Sleep disturbance;
- Noise-induced hearing impairment;
- Non-auditory health effects;
- Performance effects;
- Noise effects on children;
- Property values;
- Noise-induced vibration effects on structures and humans;
- Noise effects on terrain;
- Noise effects on historical and archaeological sites;
- Effects on domestic animals and wildlife; and
- Sonic Boom.

E.2.1 Annoyance

With the introduction of jet aircraft in the 1950s, it became clear that aircraft noise annoyed people and was a significant problem around airports. Early studies, such as those of Rosenblith *et al.* (1953) and Stevens *et al.* (1953) showed that effects depended on the quality of the sound, its level, and the number of flights. Over the next 20 years considerable research was performed refining this understanding and setting guidelines for noise exposure. In the early 1970s, the USEPA published its “Levels Document” (USEPA 1974) that reviewed the factors that affected communities. DNL (still known as L_{dn} at the time) was identified as an appropriate noise metric, and threshold criteria were recommended.

Threshold criteria for annoyance were identified from social surveys, where people exposed to noise were asked how noise affects them. Surveys provide direct real-world data on how noise affects actual residents.

Surveys in the early years had a range of designs and formats, and needed some interpretation to find common ground. In 1978, Schultz showed that the common ground was the number of people "highly annoyed," defined as the upper 28% range of whatever response scale a survey used (Schultz 1978). With that definition, he was able to show a remarkable consistency among the majority of the surveys for which data were available. Figure E-10 shows the result of his study relating DNL to individual annoyance measured by percent highly annoyed (%HA).

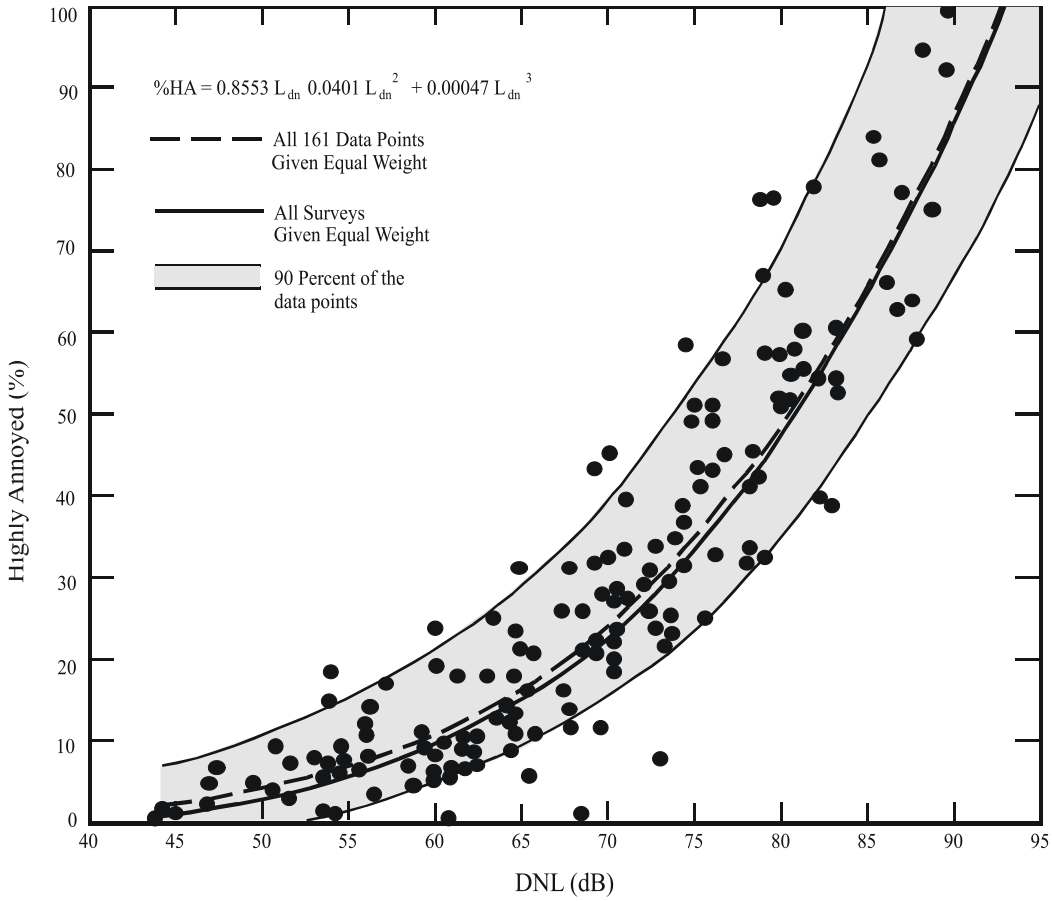


Figure E-10. Schultz Curve Relating Noise Annoyance to DNL (Schultz 1978)

Schultz's original synthesis included 161 data points. Figure E-11 compares revised fits of the Schultz data set with an expanded set of 400 data points collected through 1989 (Finegold *et al.* 1994). The new form is the preferred form in the US, endorsed by the Federal Interagency Committee on Aviation Noise (FICAN 1997). Other forms have been proposed, such as that of Fidell and Silvati (2004), but have not gained widespread acceptance.

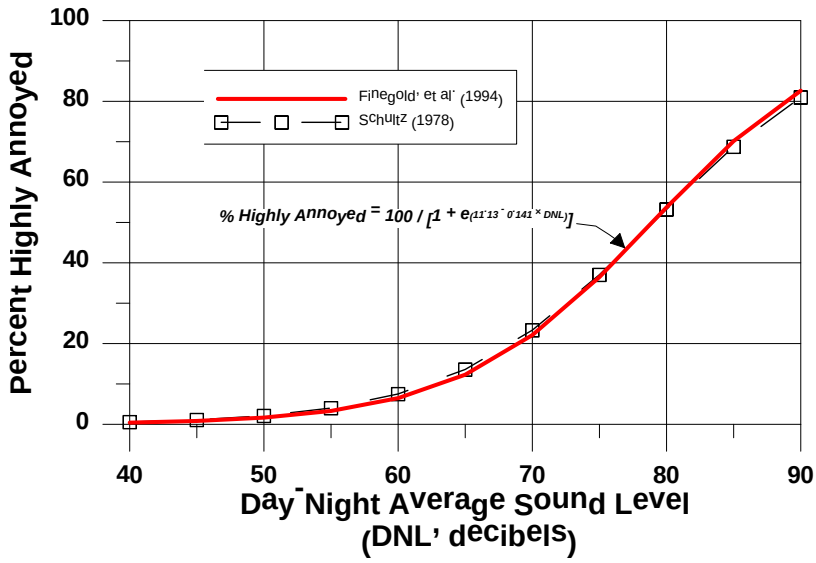


Figure E-11. Response of Communities to Noise; Comparison of Original Schultz (1978) with Finegold *et al.* (1994)

When the goodness of fit of the Schultz curve is examined, the correlation between groups of people is high, in the range of 85-90%. The correlation between individuals is lower, 50% or less. This is not surprising, given the personal differences between individuals. The surveys underlying the Schultz curve include results that show that annoyance to noise is also affected by non-acoustical factors. Newman and Beattie (1985) divided the non-acoustic factors into the emotional and physical variables shown in Table E-3.

Table E-3. Non-Acoustic Variables Influencing Aircraft Noise Annoyance

Emotional Variables
Feeling about the necessity or preventability of the noise;
Judgement of the importance and value of the activity that is producing the noise;
Activity at the time an individual hears the noise;
Attitude about the environment;
General sensitivity to noise;
Belief about the effect of noise on health; and
Feeling of fear associated with the noise.

Physical Variables
Type of neighborhood;
Time of day;
Season;
Predicitabiltiy of the noise;
Control over the noise source; and
Length of time individual is exposed to a noise.

Schreckenberg and Schuemer (2010) recently examined the importance of some of these factors on short term annoyance. Attitudinal factors were identified as having an effect on annoyance. In formal regression analysis, however, sound level (L_{eq}) was found to be more important than attitude.

A recent study by Plotkin *et al.* (2011) examined updating DNL to account for these factors. It was concluded that the data requirements for a general analysis were much greater than most existing studies. It was noted that the most significant issue with DNL is that it is not readily understood by the public, and that supplemental metrics such as TA and NA were valuable in addressing attitude when communicating noise analysis to communities (DoD 2009a).

A factor that is partially non-acoustical is the source of the noise. Miedema and Vos (1998) presented synthesis curves for the relationship between DNL and percentage “Annoyed” and percentage “Highly

Annoyed" for three transportation noise sources. Different curves were found for aircraft, road traffic, and railway noise. Table E-4 summarizes their results. Comparing the updated Schultz curve suggests that the percentage of people highly annoyed by aircraft noise may be higher than previously thought.

Table E-4. Percent Highly Annoyed for Different Transportation Noise Sources

DNL (dB)	*Percent Hightly Annoyed (%HA)*			
	Miedema and Vos			*Schultz Combined*
	Air	*Road*	*Rail*	
55	12	7	4	3
60	19	12	7	6
65	28	18	11	12
70	37	29	16	22
75	48	40	22	36

Source: Miedema and Vos 1998.

As noted by the World Health Organization (WHO), however, even though aircraft noise seems to produce a stronger annoyance response than road traffic, caution should be exercised when interpreting synthesized data from different studies (WHO 1999).

Consistent with WHO's recommendations, the Federal Interagency Committee on Noise (FICON 1992) considered the Schultz curve to be the best source of dose information to predict community response to noise, but recommended further research to investigate the differences in perception of noise from different sources.

Sonic boom exposure is assessed cumulatively with C-weighted DNL, denoted CDNL. Correlation between CDNL and annoyance has been established, based on community reaction to impulsive sounds (Committee on Hearing, Bioacoustics and Biomechanics 1981). Values of the C-weighted equivalent to the Schultz curve are different than that of the Schultz curve itself. Table E-5 shows the relation between annoyance, DNL, and CDNL.

Table E-5. Relation Between Annoyance, DNL and CDNL

DNL	*% Highly Annoyed*	*CDNL*
45	0.83	42
50	1.66	46
55	3.31	51
60	6.48	56
65	12.29	60
70	22.10	65

Interpretation of CDNL from impulsive noise is accomplished by using the CDNL versus annoyance values in Table E-3. CDNL can be interpreted in terms of an "equivalent annoyance" DNL. For example, CDNL of 52, 61, and 69 dB are equivalent to DNL of 55, 65, and 75 dB, respectively. If both continuous and impulsive noise occurs in the same area, impacts are assessed separately for each.

E.2.2 Land Use Compatibility

As noted above, the inherent variability between individuals makes it impossible to predict accurately how any individual will react to a given noise event. Nevertheless, when a community is considered as a whole, its overall reaction to noise can be represented with a high degree of confidence. As described above, the best noise exposure metric for this correlation is the DNL or Ldnmr for military overflights.

Impulsive noise can be assessed by relating CDNL to an "equivalent annoyance" DNL, as outlined in Section E.2.1.

In June 1980, an ad hoc Federal Interagency Committee on Urban Noise published guidelines (Federal Interagency Committee on Urban Noise 1980) relating DNL to compatible land uses. This committee was composed of representatives from DoD, Transportation, and Housing and Urban Development; USEPA; and the Veterans Administration. Since the issuance of these guidelines, federal agencies have generally adopted these guidelines for their noise analyses.

Following the lead of the committee, the DoD adopted the concept of land-use compatibility as the accepted measure of aircraft noise effect. Air Force guidelines are presented in Table E-6, along with the explanatory notes included in the regulation. These guidelines are not mandatory (note the footnote "*" in the table), rather they are recommendations to provide the best means for determining noise impact for communities adjacent to bases. Again, these are recommendations only; it is up to the city/county zoning and planning entities to determine what land uses are compatible and how they will deal with incompatibilities (e.g., what type of development is allowed, instituting residential buyouts, or whether noise attenuation efforts will be done in residential units). In general, residential land uses normally are not compatible with outdoor DNL values above 65 dB, and the extent of land areas and populations exposed to DNL of 65 dB and higher provides the best means for assessing the noise impacts of alternative aircraft actions. In some cases a change in noise level, rather than an absolute threshold, may be a more appropriate measure of impact.

Table E-6. Air Force Land Use Compatibility Recommendations

Land Uses		***Suggested Land Use Compatibility***				
SLUCM NO.	Category	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL >85
10	**Residential**					
11	Household units	N[1]	N[1]	N	N	N
11.11	Single units: detached	N[1]	N[1]	N	N	N
11.12	Single units: semidetached	N[1]	N[1]	N	N	N
11.13	Single units: attached row	N[1]	N[1]	N	N	N
11.21	Two units: side-by-side	N[1]	N[1]	N	N	N
11.22	Two units: one above the other	N[1]	N[1]	N	N	N
11.31	Apartments: walk-up	N[1]	N[1]	N	N	N
11.32	Apartment: elevator	N[1]	N[1]	N	N	N
12	Group quarters	N[1]	N[1]	N	N	N
13	Residential hotels	N[1]	N[1]	N	N	N
14	Mobile home parks or courts	N	N	N	N	N
15	Transient lodgings	N[1]	N[1]	N[1]	N	N
16	Other residential	N[1]	N[1]	N	N	N
20	**Manufacturing**					
21	Food and kindred products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
22	Textile mill products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
23	Apparel and other finished products; products made from fabrics, leather, and similar materials; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
24	Lumber and wood products (except furniture); manufacturing	Y	Y[2]	Y[3]	Y[4]	N
25	Furniture and fixtures; manufacturing	Y	Y[2]	Y[3]	Y[4]	N

Table E-6. Air Force Land Use Compatibility Recommendations

Land Uses		*Suggested Land Use Compatibility*				
SLUCM NO.	Category	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL >85
26	Paper and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
27	Printing, publishing, and allied industries	Y	Y[2]	Y[3]	Y[4]	N
28	Chemicals and allied products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
29	Petroleum refining and related industries	Y	Y[2]	Y[3]	Y[4]	N
30	**Manufacturing**					
31	Rubber and misc. plastic products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
32	Stone, clay and glass products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
33	Primary metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
34	Fabricated metal products; manufacturing	Y	Y[2]	Y[3]	Y[4]	N
35	Professional scientific, and controlling instruments; photographic and optical goods; watches and clocks	Y	25	30	N	N
39	Miscellaneous manufacturing	Y	Y[2]	Y[3]	Y[4]	N
40	**Transportation, Communication and Utilities**					
41	Railroad, rapid rail transit, and street railway transportation	Y	Y[2]	Y[3]	Y[4]	N
42	Motor vehicle transportation	Y	Y[2]	Y [3]	Y[4]	N
43	Aircraft transportation	Y	Y[2]	Y[3]	Y[4]	N
44	Marine craft transportation	Y	Y[2]	Y[3]	Y[4]	N
45	Highway and street right-of-way	Y	Y	Y	Y	N
46	Automobile parking	Y	Y	Y	Y	N
47	Communication	Y	25[5]	30[5]	N	N
48	Utilities	Y	Y[2]	Y[3]	Y[4]	N
49	Other transportation, communication and utilities	Y	25[5]	30[5]	N	N
50	**Trade**					
51	Wholesale trade	Y	Y[2]	Y[3]	Y[4]	N
52	Retail trade – building materials, hardware and farm equipment	Y	25	30	Y[4]	N
53	Retail trade – including shopping centers, discount clubs, home improvement stores, electronics superstores, etc.	Y	25	30	N	N
54	Retail trade – food	Y	25	30	N	N
55	Retail trade – automotive, marine craft, aircraft and accessories	Y	25	30	N	N
56	Retail trade – apparel and accessories	Y	25	30	N	N
57	Retail trade – furniture, home, furnishings and equipment	Y	25	30	N	N
58	Retail trade – eating and drinking establishments	Y	25	30	N	N
59	Other retail trade	Y	25	30	N	N

Table E-6. Air Force Land Use Compatibility Recommendations

Land Uses		*Suggested Land Use Compatibility*				
SLUCM NO.	Category	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL >85
60	**Services**					
61	Finance, insurance and real estate services	Y	25	30	N	N
62	Personal services	Y	25	30	N	N
62.4	Cemeteries	Y	Y[2]	Y[3]	Y[4,11]	Y[6,11]
63	Business services	Y	25	30	N	N
63.7	Warehousing and storage	Y	Y[2]	Y[3]	Y[4]	N
64	Repair services	Y	Y[2]	Y[3]	Y[4]	N
65	Professional services	Y	25	30	N	N
65.1	Hospitals, other medical facilities	25	30	N	N	N
65.16	Nursing homes	N[1]	N[1]	N	N	N
66	Contract construction services	Y	25	30	N	N
67	Government services	Y[1]	25	30	N	N
68	Educational services	25	30	N	N	N
68.1	Child care services, child development centers, and nurseries	25	30	N	N	N
69	Miscellaneous Services	Y	25	30	N	N
69.1	Religious activities (including places of worship)	Y	25	30	N	N
70	**Cultural, Entertainment and Recreational**					
71	Cultural activities	25	30	N	N	N
71.2	Nature exhibits	Y[1]	N	N	N	N
72	Public assembly	Y	N	N	N	N
72.1	Auditoriums, concert halls	25	30	N	N	N
72.11	Outdoor music shells, amphitheaters	N	N	N	N	N
72.2	Outdoor sports arenas, spectator sports	Y[7]	Y[7]	N	N	N
73	Amusements	Y	Y	N	N	N
74	Recreational activities (including golf courses, riding stables, water recreation)	Y	25	30	N	N
75	Resorts and group camps	Y	25	N	N	N
76	Parks	Y	25	N	N	N
79	Other cultural, entertainment and recreation	Y	25	N	N	N
80	**Resource Production and Extraction**					
81	Agriculture (except live- stock)	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
81.5-81.7	Agriculture-Livestock farming including grazing and feedlots	Y[8]	Y[9]	N	N	N
82	Agriculture related activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
83	Forestry activities	Y[8]	Y[9]	Y[10]	Y[10,11]	Y[10,11]
84	Fishing activities	Y	Y	Y	Y	Y
85	Mining activities	Y	Y	Y	Y	Y
89	Other resource production or extraction	Y	Y	Y	Y	Y

Table E-6. Air Force Land Use Compatibility Recommendations

Land Uses		*Suggested Land Use Compatibility*				
SLUCM NO.	Category	DNL 65-69	DNL 70-74	DNL 75-79	DNL 80-84	DNL >85

Legend:

SLUCM – Standard Land Use Coding Manual, U.S. Department of Transportation

Y (Yes) – Land use and related structures compatible without restrictions.

N (No) – Land use and related structures are not compatible and should be prohibited.

Y^x – Yes with restrictions. The land use and related structures generally are compatible. However, see note(s) indicated by the superscript.

N^x – No with exceptions. The land use and related structures are generally incompatible. However, see note(s) indicated by the superscript.

25, 30, or 35 – The numbers refer to noise level reduction (NLR) levels. NLR (outdoor to indoor) is achieved through the incorporation of noise attenuation into the design and construction of a structure. Land use and related structures are generally compatible; however, measures to achieve NLR of 25, 30, or 35 must be incorporated into design and construction of structures. However, measures to achieve an overall noise reduction do not necessarily solve noise difficulties outside the structure and additional evaluation is warranted. Also, see notes indicated by superscripts where they appear with one of these numbers.

DNL – Day-Night Average Sound Level.

CNEL – Community Noise Equivalent Level (normally within a very small decibel difference of DNL)

Ldn – Mathematical symbol for DNL.

Notes:

1. General

a. Although local conditions regarding the need for housing may require residential use in these zones, residential use is discouraged in DNL 65-69 and strongly discouraged in DNL 70-74. The absence of viable alternative development options should be determined and an evaluation should be conducted locally prior to local approvals indicating that a demonstrated community need for the residential use would not be met if development were prohibited in these zones. Existing residential development is considered as pre-existing, non-conforming land uses.

b. Where the community determines that these uses must be allowed, measures to achieve outdoor to indoor NLR of at least 25 decibels (dB) in DNL 65-69 and 30 dB in DNL 70-74 should be incorporated into building codes and be considered in individual approvals; for transient housing, an NLR of at least 35 dB should be incorporated in DNL 75-79.

c. Normal permanent construction can be expected to provide an NLR of 20 dB, thus the reduction requirements are often stated as 5, 10, or 15 dB over standard construction and normally assume mechanical ventilation, upgraded sound transmission class ratings in windows and doors, and closed windows year round. Additional consideration should be given to modifying NLR levels based on peak noise levels or vibrations.

d. NLR criteria will not eliminate outdoor noise problems. However, building location, site planning, design, and use of berms and barriers can help mitigate outdoor noise exposure particularly from ground level sources. Measures that reduce noise at a site should be used wherever practical in preference to measures that only protect interior spaces.

2. Measures to achieve NLR of 25 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
3. Measures to achieve NLR of 30 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
4. Measures to achieve NLR of 35 must be incorporated into the design and construction of portions of these buildings where the public is received, office areas, noise sensitive areas, or where the normal noise level is low.
5. If project or proposed development is noise sensitive, use indicated NLR; if not, land use is compatible without NLR.
6. Buildings are not permitted.
7. Land use is compatible provided special sound reinforcement systems are installed.
8. Residential buildings require an NLR of 25
9. Residential buildings require an NLR of 30.
10. Residential buildings are not permitted.
11. Land use that involves outdoor activities is not recommended, but if the community allows such activities, hearing protection devices should be worn when noise sources are present. Long-term exposure (multiple hours per day over many years) to high noise levels can cause hearing loss in some unprotected individuals.

E.2.3 Speech Interference

Speech interference from noise is a primary cause of annoyance for communities. Disruption of routine activities such as radio or television listening, telephone use, or conversation leads to frustration and annoyance. The quality of speech communication is important in classrooms and offices. In the workplace, speech interference from noise can cause fatigue and vocal strain in those who attempt to talk over the noise. In schools it can impair learning.

There are two measures of speech comprehension:

1. *Word Intelligibility* - the percent of words spoken and understood. This might be important for students in the lower grades who are learning the English language, and particularly for students who have English as a Second Language.
2. *Sentence Intelligibility* – the percent of sentences spoken and understood. This might be important for high-school students and adults who are familiar with the language, and who do not necessarily have to understand each word in order to understand sentences.

U.S. Federal Criteria for Interior Noise

In 1974, the USEPA identified a goal of an indoor $L_{eq(24)}$ of 45 dB to minimize speech interference based on sentence intelligibility and the presence of steady noise (USEPA 1974). Figure E-12 shows the effect of steady indoor background sound levels on sentence intelligibility. For an average adult with normal hearing and fluency in the language, steady background indoor sound levels of less than 45 dB L_{eq} are expected to allow 100% sentence intelligibility.

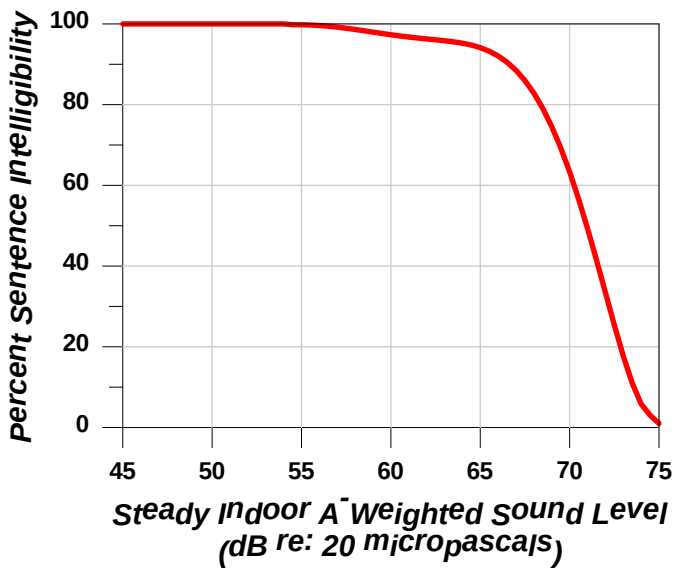


Figure E-12. Speech Intelligibility Curve (digitized from USEPA 1974)

The curve in Figure E-12 shows 99% intelligibility at L_{eq} below 54 dB, and less than 10% above 73 dB. Recalling that L_{eq} is dominated by louder noise events, the USEPA $L_{eq(24)}$ goal of 45 dB generally ensures that sentence intelligibility will be high most of the time.

Classroom Criteria

For teachers to be understood, their regular voice must be clear and uninterrupted. Background noise has to be below the teacher's voice level. Intermittent noise events that momentarily drown out the teacher's voice need to be kept to a minimum. It is therefore important to evaluate the steady background level, the level of voice communication, and the single-event level due to aircraft overflights that might interfere with speech.

Lazarus (1990) found that for listeners with normal hearing and fluency in the language, complete sentence intelligibility can be achieved when the signal-to-noise ratio (i.e., a comparison of the level of the sound to the level of background noise) is in the range of 15 to 18 dB. The initial ANSI classroom

noise standard (ANSI 2002) and American Speech-Language-Hearing Association (ASLHA 1995) guidelines concur, recommending at least a 15 dB signal-to-noise ratio in classrooms. If the teacher's voice level is at least 50 dB, the background noise level must not exceed an average of 35 dB. The National Research Council of Canada (Bradley 1993) and WHO (1999) agree with this criterion for background noise.

For eligibility for noise insulation funding, the Federal Aviation Administration (FAA) guidelines state that the design objective for a classroom environment is 45 dB L_{eq} during normal school hours (FAA 1985).

Most aircraft noise is not continuous. It consists of individual events like the one sketched in Figure E-7. Since speech interference in the presence of aircraft noise is caused by individual aircraft flyover events, a time-averaged metric alone, such as L_{eq}, is not necessarily appropriate. In addition to the background level criteria described above, single-event criteria that account for those noisy events are also needed.

A 1984 study by Wyle for the Port Authority of New York and New Jersey recommended using Speech Interference Level (SIL) for classroom noise criteria (Sharp and Plotkin 1984). SIL is based on the maximum sound levels in the frequency range that most affects speech communication (500-2,000 Hz). The study identified an SIL of 45 dB as the goal. This would provide 90% word intelligibility for the short time periods during aircraft overflights. While SIL is technically the best metric for speech interference, it can be approximated by an L_{max} value. An SIL of 45 dB is equivalent to an A-weighted L_{max} of 50 dB for aircraft noise (Wesler 1986).

Lind *et al.* (1998) also concluded that an L_{max} criterion of 50 dB would result in 90% word intelligibility. Bradley (1985) recommends SEL as a better indicator. His work indicates that 95% word intelligibility would be achieved when indoor SEL did not exceed 60 dB. For typical flyover noise this corresponds to an L_{max} of 50 dB. While WHO (1999) only specifies a background L_{max} criterion, they also note the SIL frequencies and that interference can begin at around 50 dB.

The United Kingdom Department for Education and Skills (UKDfES) established in its classroom acoustics guide a 30-minute time-averaged metric of $L_{eq(30min)}$ for background levels and the metric of $L_{A1,30min}$ for intermittent noises, at thresholds of 30-35 dB and 55 dB, respectively. $L_{A1,30min}$ represents the A-weighted sound level that is exceeded 1% of the time (in this case, during a 30-minute teaching session) and is generally equivalent to the L_{max} metric (UKDfES 2003).

Table E-7 summarizes the criteria discussed. Other than the FAA (1985) 45 dB L_{max} criterion, they are consistent with a limit on indoor background noise of 35-40 dB L_{eq} and a single event limit of 50 dB L_{max}. It should be noted that these limits were set based on students with normal hearing and no special needs. At-risk students may be adversely affected at lower sound levels.

Table E-7. Indoor Noise Level Criteria Based on Speech Intelligibility

Source	*Metric/Level (dB)*	*Effects and Notes*
U.S. FAA (1985)	$L_{eq(during\ school\ hours)}$ = 45 dB	Federal assistance criteria for school sound insulation; supplemental single-event criteria may be used.
Lind *et al.* (1998), Sharp and Plotkin (1984), Wesler (1986)	L_{max} = 50 dB / SIL 45	Single event level permissible in the classroom.
WHO (1999)	L_{eq} = 35 dB L_{max} = 50 dB	Assumes average speech level of 50 dB and recommends signal to noise ratio of 15 dB.
U.S. ANSI (2010)	L_{eq} = 35 dB, based on Room Volume (e.g., cubic feet)	Acceptable background level for continuous and intermittent noise.
U.K. DFES (2003)	$L_{eq(30min)}$ = 30-35 dB L_{max} = 55 dB	Minimum acceptable in classroom and most other learning environs.

E.2.4 Sleep Disturbance

Sleep disturbance is a major concern for communities exposed to aircraft noise at night. A number of studies have attempted to quantify the effects of noise on sleep. This section provides an overview of the major noise-induced sleep disturbance studies. Emphasis is on studies that have influenced U.S. federal noise policy. The studies have been separated into two groups:

1. Initial studies performed in the 1960s and 1970s, where the research was focused on sleep observations performed under laboratory conditions.
2. Later studies performed in the 1990s up to the present, where the research was focused on field observations.

Initial Studies

The relation between noise and sleep disturbance is complex and not fully understood. The disturbance depends not only on the depth of sleep and the noise level, but also on the non-acoustic factors cited for annoyance. The easiest effect to measure is the number of arousals or awakenings from noise events. Much of the literature has therefore focused on predicting the percentage of the population that will be awakened at various noise levels.

FICON's 1992 review of airport noise issues (FICON 1992) included an overview of relevant research conducted through the 1970s. Literature reviews and analyses were conducted from 1978 through 1989 using existing data (Griefahn 1978; Lukas 1978; Pearsons *et al.* 1989). Because of large variability in the data, FICON did not endorse the reliability of those results.

FICON did recommend, however, an interim dose-response curve, awaiting future research. That curve predicted the percent of the population expected to be awakened as a function of the exposure to SEL. This curve was based on research conducted for the U.S. Air Force (Finegold 1994). The data included most of the research performed up to that point, and predicted a 10% probability of awakening when exposed to an interior SEL of 58 dB. The data used to derive this curve were primarily from controlled laboratory studies.

Recent Sleep Disturbance Research – Field and Laboratory Studies

It was noted that early sleep laboratory studies did not account for some important factors. These included habituation to the laboratory, previous exposure to noise, and awakenings from noise other than aircraft. In the early 1990s, field studies in people's homes were conducted to validate the earlier laboratory work conducted in the 1960s and 1970s. The field studies of the 1990s found that 80-90% of sleep disturbances were not related to outdoor noise events, but rather to indoor noises and non-noise factors. The results showed that, in real life conditions, there was less of an effect of noise on sleep than had been previously reported from laboratory studies. Laboratory sleep studies tend to show more sleep disturbance than field studies because people who sleep in their own homes are used to their environment and, therefore, do not wake up as easily (FICAN 1997).

Federal Interagency Committee on Aviation Noise

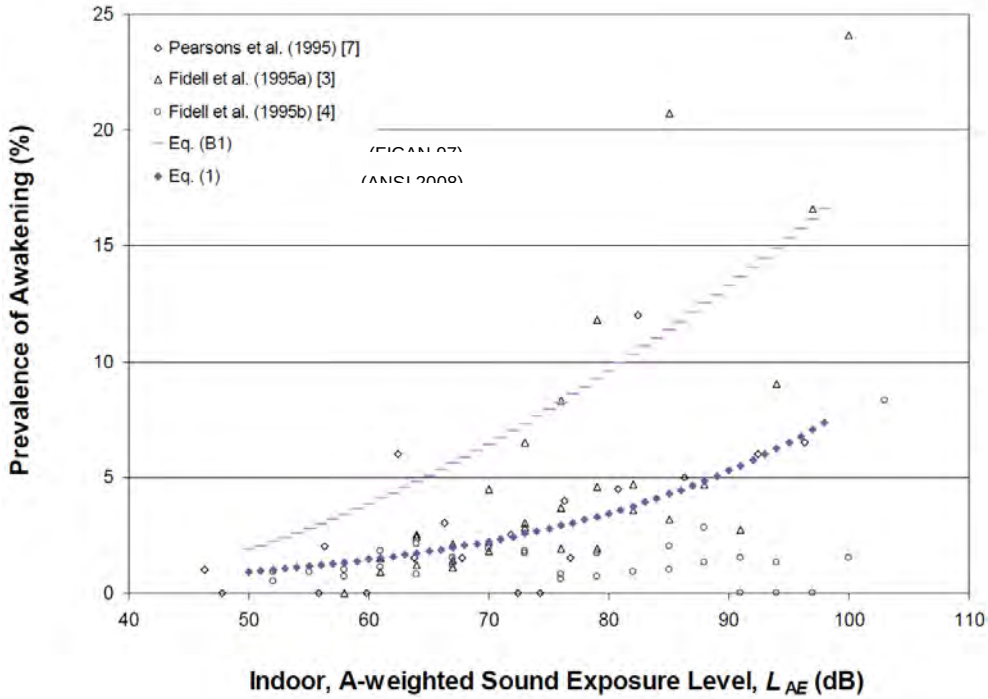
Based on this new information, in 1997 FICAN recommended a dose-response curve to use instead of the earlier 1992 FICON curve (FICAN 1997). Figure E-13 shows FICAN's curve, the red dashed line, which is based on the results of three field studies shown in the figure (Ollerhead *et al.* 1992; Fidell *et al.* 1994; Fidell *et al.* 1995a, 1995b), along with the data from six previous field studies.

The 1997 FICAN curve represents the upper envelope of the latest field data. It predicts the maximum percent awakened for a given residential population. According to this curve, a maximum of 3% of people would be awakened at an indoor SEL of 58 dB. An indoor SEL of 58 dB is equivalent to an outdoor SEL of 83 dB, with the windows closed (73 dB with windows open).

Number of Events and Awakenings

It is reasonable to expect that sleep disturbance is affected by the number of events. The German Aerospace Center (DLR Laboratory) conducted an extensive study focused on the effects of nighttime aircraft noise on sleep and related factors (Basner 2004). The DLR study was one of the largest studies to examine the link between aircraft noise and sleep disturbance. It involved both laboratory and in-home field research phases. The DLR investigators developed a dose-response curve that predicts the number of aircraft events at various values of L_{max} expected to produce one additional awakening over the course of a night. The dose-effect curve was based on the relationships found in the field studies.

A different approach was taken by an ANSI standards committee (ANSI 2008). The committee used the average of the data shown in Figure E-13 (i.e., the blue dashed line) rather than the upper envelope, to predict average awakening from one event. Probability theory is then used to project the awakening from multiple noise events.



Source: DoD 2009.

Figure E-13. Sleep Disturbance Dose-Response Relationship

Currently, there are no established criteria for evaluating sleep disturbance from aircraft noise, although recent studies have suggested a benchmark of an outdoor SEL of 90 dB as an appropriate tentative criterion when comparing the effects of different operational alternatives. The corresponding indoor SEL would be approximately 25 dB lower (at 65 dB) with doors and windows closed, and approximately 15 dB lower (at 75 dB) with doors or windows open. According to the ANSI (2008) standard, the probability of awakening from a single aircraft event at this level is between 1 and 2% for people habituated to the noise sleeping in bedrooms with windows closed, and 2-3% with windows open. The probability of the exposed population awakening at least once from multiple aircraft events at noise levels of 90 dB SEL is shown in Table E-8.

Table E-8. Probability of Awakening from NA90SEL

Number of Aircraft Events at 90 dB SEL for Average 9-Hour Night	***Minimum Probability of Awakening at Least Once***	
	Windows Closed	Windows Open
1	1%	2%
3	4%	6%
5	7%	10%
9 (1 per hour)	12%	18%
18 (2 per hour)	22%	33%
27 (3 per hour)	32%	45%

Source: DoD 2009.

In December 2008, FICAN recommended the use of this new standard. FICAN also recognized that more research is underway by various organizations, and that work may result in changes to FICAN's position. Until that time, FICAN recommends the use of the ANSI (2008) standard (FICAN 2008).

Summary

Sleep disturbance research still lacks the details to accurately estimate the population awakened for a given noise exposure. The procedure described in the ANSI (2008) Standard and endorsed by FICAN is based on probability calculations that have not yet been scientifically validated. While this procedure certainly provides a much better method for evaluating sleep awakenings from multiple aircraft noise events, the estimated probability of awakenings can only be considered approximate.

E.2.5 Noise-Induced Hearing Impairment

Residents in surrounding communities express concerns regarding the effects of aircraft noise on hearing. This section provides a brief overview of hearing loss caused by noise exposure. The goal is to provide a sense of perspective as to how aircraft noise (as experienced on the ground) compares to other activities that are often linked with hearing loss.

Hearing Threshold Shifts

Hearing loss is generally interpreted as a decrease in the ear's sensitivity or acuity to perceive sound (i.e., a shift in the hearing threshold to a higher level). This change can either be a Temporary Threshold Shift (TTS) or a Permanent Threshold Shift (PTS) (Berger *et al.* 1995).

TTS can result from exposure to loud noise over a given amount of time. An example of TTS might be a person attending a loud music concert. After the concert is over, there can be a threshold shift that may last several hours. While experiencing TTS, the person becomes less sensitive to low-level sounds, particularly at certain frequencies in the speech range (typically near 4,000 Hz). Normal hearing eventually returns, as long as the person has enough time to recover within a relatively quiet environment.

PTS usually results from repeated exposure to high noise levels, where the ears are not given adequate time to recover. A common example of PTS is the result of regularly working in a loud factory. A TTS can eventually become a PTS over time with repeated exposure to high noise levels. Even if the ear is given time to recover from TTS, repeated occurrence of TTS may eventually lead to permanent hearing loss. The point at which a TTS results in a PTS is difficult to identify and varies with a person's sensitivity.

Criteria for Permanent Hearing Loss

It has been well established that continuous exposure to high noise levels will damage human hearing (USEPA 1978). A large amount of data on hearing loss have been collected, largely for workers in manufacturing industries, and analyzed by the scientific/medical community. The Occupational Safety and Health Administration (OSHA) regulation of 1971 places the limit on workplace noise exposure at an average level of 90 dB over an 8-hour work period or 85 dB over a 16-hour period (U.S. Department of Labor 1971). Some hearing loss is still expected at those levels. The most protective criterion, with no measurable hearing loss after 40 years of exposure, is an average sound level of 70 dB over a 24-hour period.

The USEPA established 75 dB $L_{eq(8)}$ and 70 dB $L_{eq(24)}$ as the average noise level standard needed to protect 96% of the population from greater than a 5 dB PTS (USEPA 1978). The National Academy of Sciences Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) identified 75 dB as the lowest level at which hearing loss may occur (CHABA 1977). WHO concluded that environmental and

leisure-time noise below an $L_{eq(24)}$ value of 70 dB "will not cause hearing loss in the large majority of the population, even after a lifetime of exposure" (WHO 1999).

Hearing Loss and Aircraft Noise

The 1982 USEPA Guidelines report (USEPA 1982) addresses noise-induced hearing loss in terms of the "Noise-Induced Permanent Threshold Shift" (NIPTS). This defines the permanent change in hearing caused by exposure to noise. Numerically, the NIPTS is the change in threshold that can be expected from daily exposure to noise over a normal working lifetime of 40 years. A grand average of the NIPTS over time and hearing sensitivity is termed the Average NIPTS, or Ave. NIPTS for short. The Ave. NIPTS that can be expected for noise measured by the $L_{eq(24)}$ metric is given in Table E-9 and assumes exposure to the full outdoor noise throughout the 24 hours. When inside a building, the exposure will be less (Eldred and von Gierke 1993).

Table E-9. Average NIPTS and 10th Percentile NIPTS as a Function of DNL

DNL	*Ave. NIPTS dB**	*10th Percentile NIPTS dB**
75-76	1.0	4.0
76-77	1.0	4.5
77-78	1.6	5.0
78-79	2.0	5.5
79-80	2.5	6.0
80-81	3.0	7.0
81-82	3.5	8.0
82-83	4.0	9.0
83-84	4.5	10.0
84-85	5.5	11.0
85-86	6.0	12.0
86-87	7.0	13.5
87-88	7.5	15.0
88-89	8.5	16.5
89-90	9.5	18.0

Source: DoD 2012.
Note: *Rounded to the nearest 0.5 dB.

The Ave. NIPTS is estimated as an average over all people exposed to the noise. The actual value of NIPTS for any given person will depend on their physical sensitivity to noise – some will experience more hearing loss than others. The USEPA Guidelines provide information on this variation in sensitivity in the form of the NIPTS exceeded by 10% of the population, which is included in the Table E-9 in the "10th Percentile NIPTS" column (USEPA 1982). For individuals exposed to $L_{eq(24)}$ of 80 dB, the most sensitive of the population would be expected to show degradation to their hearing of 7 dB over time.

To put these numbers in perspective, changes in hearing level of less than 5 dB are generally not considered noticeable or significant. Furthermore, there is no known evidence that a NIPTS of 5 dB is perceptible or has any practical significance for the individual. Lastly, the variability in audiometric testing is generally assumed to be ±5 dB (USEPA 1974).

The scientific community has concluded that noise exposure from civil airports has little chance of causing permanent hearing loss (Newman and Beattie 1985). For military airbases, DoD policy requires that hearing risk loss be estimated for population exposed to $L_{eq(24)}$ of 80 dB or higher (DoD 2012), including residents of on-base housing. Exposure of workers inside the base boundary is assessed using DoD regulations for occupational noise exposure.

Noise in low-altitude military airspace, especially along MTRs where L_{max} can exceed 115 dB, is of concern. That is the upper limit used for occupational noise exposure (e.g., U.S. Department of Labor 1971). One laboratory study (Ising *et al.* 1999) concluded that events with L_{max} above 114 dB have the potential to cause hearing loss. Another laboratory study of participants exposed to levels between 115 and 130 dB (Nixon *et al.* 1993), however, showed conflicting results. For an exposure to four events across that range, half the subjects showed no change in hearing, a quarter showed a temporary 5 dB decrease in sensitivity, and a quarter showed a temporary 5 dB increase in sensitivity. For exposure to eight events of 130 dB, subjects showed an increase in sensitivity of up to 10 dB (Nixon *et al.* 1993).

Summary

Aviation noise levels are not comparable to the occupational noise levels associated with hearing loss of workers in manufacturing industries. There is little chance of hearing loss at levels less than 75 dB DNL. Noise levels equal to or greater than 75 dB DNL can occur near military airbases, and DoD policy specifies that NIPTS be evaluated when exposure exceeds 80 dB $L_{eq(24)}$ (DoD 2009c). There is some concern about L_{max} exceeding 115 dB in low altitude military airspace, but no research results to date have definitely related permanent hearing impairment to aviation noise.

E.2.6 Non-Auditory Health Effects

Studies have been performed to see whether noise can cause health effects other than hearing loss. The premise is that annoyance causes stress. Prolonged stress is known to be a contributor to a number of health disorders. Cantrell (1974) confirmed that noise can provoke stress, but noted that results on cardiovascular health have been contradictory. Some studies have found a connection between aircraft noise and blood pressure (e.g., Michalak *et al.* 1990; Rosenlund *et al.* 2001), while others have not (e.g., Pulles *et al.* 1990).

Kryter and Poza (1980) noted, “It is more likely that noise related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everyday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body.”

The connection from annoyance to stress to health issues requires careful experimental design. Some highly publicized reports on health effects have, in fact, been rooted in poorly done science. Meecham and Shaw (1979) apparently found a relation between noise levels and mortality rates in neighborhoods under the approach path to Los Angeles International Airport. When the same data were analyzed by others (Frerichs *et al.* 1980) no relationship was found. Jones and Tauscher (1978) found a high rate of birth defects for the same neighborhood. But when the Centers For Disease Control performed a more thorough study near Atlanta’s Hartsfield International Airport, no relationships were found for levels above 65 dB (Edmonds *et al.* 1979).

A carefully designed study, Hypertension and Exposure to Noise near Airports (HYENA), was conducted around six European airports from 2002 through 2006 (Jarup *et al.* 2005, 2008). There were 4,861 subjects, aged between 45 and 70. Blood pressure was measured, and questionnaires administered for health, socioeconomic and lifestyle factors, including diet and physical exercise. Hypertension was defined by WHO blood pressure thresholds (WHO 2003). Noise from aircraft and highways was predicted from models.

The HYENA results were presented as an odds ratio (OR). An OR of 1 means there is no added risk, while an OR of 2 would mean risk doubles. An OR of 1.14 was found for nighttime aircraft noise, measured by L_{night}, the L_{eq} for nighttime hours. For daytime aircraft noise, measured by $L_{eq(16)}$, the OR was 0.93. For road traffic noise, measured by the full day $L_{eq(24)}$, the OR was 1.1.

Note that OR is a statistical measure of change, not the actual risk. Risk itself and the measured effects were small, and not necessarily distinct from other events. Haralabidis *et al.* (2008) reported an increase in systolic blood pressure of 6.2 millimeters of mercury (mmHg) for aircraft noise, and an increase of 7.4 mmHg for other indoor noises such as snoring.

It is interesting that aircraft noise was a factor only at night, while traffic noise is a factor for the full day. Aircraft noise results varied among the six countries so that result is pooled across all data. Traffic noise results were consistent across the six countries.

One interesting conclusion from a 2013 study of the HYENA data (Babisch *et al.* 2013) states there is some indication that noise level is a stronger predictor of hypertension than annoyance. That is not consistent with the idea that annoyance is a link in the connection between noise and stress. Babisch *et al.* (2012) present interesting insights on the relationship of the results to various modifiers.

Two recent studies examined the correlation of aircraft noise with hospital admissions for cardiovascular disease. Hansell *et al.* (2013) examined neighborhoods around London's Heathrow airport. Correia *et al.* (2013) examined neighborhoods around 89 airports in the United States. Both studies included areas of various noise levels. They found associations that were consistent with the HYENA results. The authors of these studies noted that further research is needed to refine the associations and the causal interpretation with noise or possible alternative explanations.

Summary

The current state of scientific knowledge cannot yet support inference of a causal or consistent relationship between aircraft noise exposure and non-auditory health consequences for exposed residents. The large scale HYENA study, and the recent studies by Hansell *et al.* (2013) and Correia *et al.* (2013) offer indications, but it is not yet possible to establish a quantitative cause and effect based on the currently available scientific evidence.

E.2.7 Performance Effects

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have found links between continuous high noise levels and performance loss. Noise-induced performance losses are most frequently reported in studies where noise levels are above 85 dB. Little change has been found in low-noise cases. Moderate noise levels appear to act as a stressor for more sensitive individuals performing a difficult psychomotor task.

While the results of research on the general effect of periodic aircraft noise on performance have yet to yield definitive criteria, several general trends have been noted including:

- A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- Noise is more inclined to affect the quality than the quantity of work.
- Noise is more likely to impair the performance of tasks that place extreme demands on workers.

E.2.8 Noise Effects on Children

Recent studies on school children indicate a potential link between aircraft noise and both reading comprehension and learning motivation. The effects may be small but may be of particular concern for children who are already scholastically challenged.

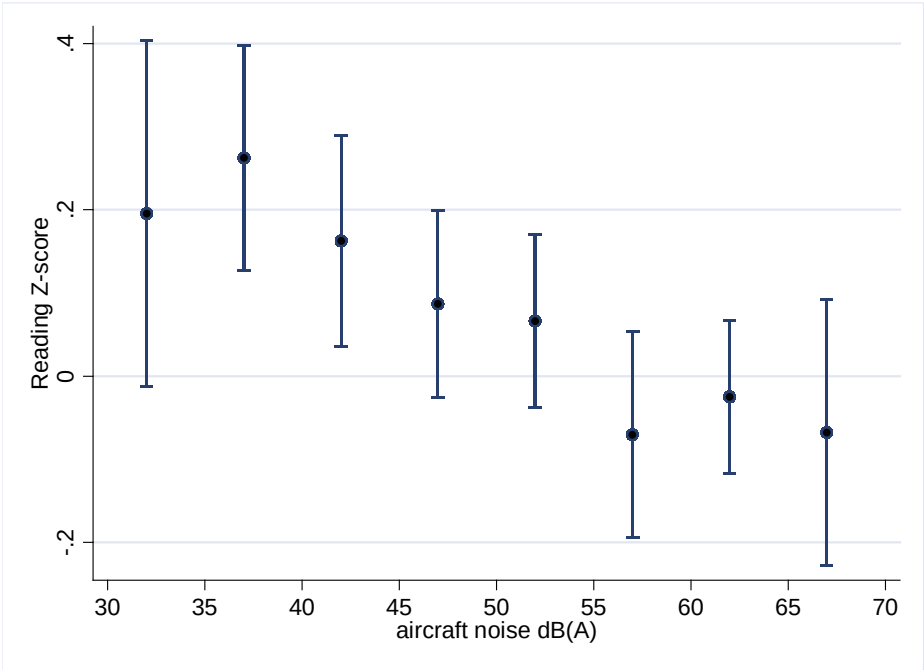
E.2.8.1 Effects on Learning and Cognitive Abilities

Early studies in several countries (Cohen *et al.* 1973, 1980, 1981; Bronzaft and McCarthy 1975; Green *et al.* 1982; Evans *et al.* 1998; Haines *et al.* 2002; Lercher *et al.* 2003) showed lower reading scores for children living or attending school in noisy areas than for children away from those areas. In some studies noise exposed children were less likely to solve difficult puzzles or more likely to give up.

More recently, the Road Traffic and Aircraft Noise Exposure and Children's Cognition and Health (RANCH) study (Stansfeld *et al.* 2005; Clark *et al.* 2005) compared the effect of aircraft and road traffic noise on over 2.000 children in three countries. This was the first study to derive exposure-effect associations for a range of cognitive and health effects, and was the first to compare effects across countries.

The study found a linear relation between chronic aircraft noise exposure and impaired reading comprehension and recognition memory. No associations were found between chronic road traffic noise exposure and cognition. Conceptual recall and information recall surprisingly showed better performance in high road traffic noise areas. Neither aircraft noise nor road traffic noise affected attention or working memory (Stansfeld *et al.* 2005; Clark *et al.* 2006).

Figure E-14 shows RANCH's result relating noise to reading comprehension. It shows that reading falls below average (a z-score of 0) at L_{eq} greater than 55 dB. Because the relationship is linear, reducing exposure at any level should lead to improvements in reading comprehension.



Sources: Stansfeld *et al.* 2005; Clark *et al.* 2006.

Figure E-14. RANCH Study Reading Scores Varying with L_{eq}

An observation of the RANCH study was that children may be exposed to aircraft noise for many of their childhood years and the consequences of long-term noise exposure were unknown. A follow-up study of the children in the RANCH project is being analyzed to examine the long-term effects on children's reading comprehension (Clark *et al.* 2009). Preliminary analysis indicated a trend for reading comprehension to be poorer at 15-16 years of age for children who attended noise-exposed primary schools. There was also a trend for reading comprehension to be poorer in aircraft noise exposed secondary schools. Further analysis adjusting for confounding factors is ongoing, and is needed to confirm these initial conclusions.

FICAN funded a pilot study to assess the relationship between aircraft noise reduction and standardized test scores (Eagan *et al.* 2004; FICAN 2007). The study evaluated whether abrupt aircraft noise reduction within classrooms, from either airport closure or sound insulation, was associated with improvements in test scores. Data were collected in 35 public schools near three airports in Illinois and Texas. The study used several noise metrics. These were, however, all computed indoor levels, which makes it hard to compare with the outdoor levels used in most other studies.

The FICAN study found a significant association between noise reduction and a decrease in failure rates for high school students, but not middle or elementary school students. There were some weaker associations between noise reduction and an increase in failure rates for middle and elementary schools. Overall the study found that the associations observed were similar for children with or without learning difficulties, and between verbal and math/science tests. As a pilot study, it was not expected to obtain final answers, but provided useful indications (FICAN 2007).

While there are many factors that can contribute to learning deficits in school-aged children, there is increasing awareness that chronic exposure to high aircraft noise levels may impair learning. This awareness has led WHO and a North Atlantic Treaty Organization (NATO) working group to conclude that daycare centers and schools should not be located near major sources of noise, such as highways, airports, and industrial sites (NATO 2000; WHO 1999). The awareness has also led to the classroom noise standard discussed earlier (ANSI 2002).

E.2.8.2 Health Effects

A number of studies, including some of the cognitive studies discussed above, have examined the potential for effects on children's health. Health effects include annoyance, psychological health, coronary risk, stress hormones, sleep disturbance and hearing loss.

Annoyance. Chronic noise exposure causes annoyance in children (Bronzaft and McCarthy 1975; Evans *et al.* 1995). Annoyance among children tends to be higher than for adults, and there is little habituation (Haines *et al.* 2001a). The RANCH study found annoyance may play a role in how noise affects reading comprehension (Clark *et al.* 2005).

Psychological Health. Lercher *et al.* (2002) found an association between noise and teacher ratings of psychological health, but only for children with biological risk defined by low birth weight and/or premature birth. Haines *et al.* (2001b) found that children exposed to aircraft noise had higher levels of psychological distress and hyperactivity. Stansfeld *et al.* (2009) replicated the hyperactivity result, but not distress.

As with studies of adults, the evidence suggests that chronic noise exposure is probably not associated with serious psychological illness, but there may be effects on well-being and quality of life. Further

research is needed, particularly on whether hyperactive children are more susceptible to stressors such as aircraft noise.

Coronary Risk. The HYENA study discussed earlier indicated a possible relation between noise and hypertension in older adults. Cohen *et al.* (1980, 1981) found some increase in blood pressure among school children, but within the normal range and not indicating hypertension. Hygge *et al.* (2002) found mixed effects. The RANCH study found some effect for children at home and at night, but not at school. Overall the evidence for noise effects on children's blood pressure is mixed, and less certain than for older adults.

Stress Hormones. Some studies investigated hormonal levels between groups of children exposed to aircraft noise compared to those in a control group. Two studies analyzed cortisol and urinary catecholamine levels in school children as measurements of stress response to aircraft noise (Haines *et al.* 2001a, 2001b). In both instances, there were no differences between the aircraft-noise-exposed children and the control groups.

Sleep Disturbance. A sub-study of RANCH in a Swedish sample used sleep logs and the monitoring of rest/activity cycles to compare the effect of road traffic noise on child and parent sleep (Ohrstrom *et al.* 2006). An exposure-response relationship was found for sleep quality and daytime sleepiness for children. While this suggests effects of noise on children's sleep disturbance, it is difficult to generalize from one study.

Hearing loss. A few studies have examined hearing loss from exposure to aircraft noise. Noise-induced hearing loss for children who attended a school located under a flight path near a Taiwan airport was greater than for children at another school far away (Chen *et al.* 1997). Another study reported that hearing ability was reduced significantly in individuals who lived near an airport and were frequently exposed to aircraft noise (Chen and Chen 1993). In that study, noise exposure near the airport was greater than 75 dB DNL and L_{max} were about 87 dB during overflights. Conversely, several other studies reported no difference in hearing ability between children exposed to high levels of airport noise and children located in quieter areas (Andrus *et al.* 1975; Fisch 1977; Wu *et al.* 1995). It is not clear from those results whether children are at higher risk than adults, but the levels involved are higher than those desirable for learning and quality of life.

Ludlow and Sixsmith (1999) conducted a cross-sectional pilot study to examine the hypothesis that military jet noise exposure early in life is associated with raised hearing thresholds. The authors concluded that there were no significant differences in audiometric test results between military personnel who as children had lived in or near stations where fast jet operations were based, and a similar group who had no such exposure as children.

E.2.9 Property Values

Noise can affect the value of homes. Economic studies of property values based on selling prices and noise have been conducted to find a direct relation.

The value-noise relation is usually presented as the Noise Depreciation Index (NDI) or Noise Sensitivity Depreciation Index (NSDI), the percent loss of value per dB (measured by the DNL metric). An early study by Nelson (1978) at three airports found an NDI of 1.8-2.3% per dB. Nelson also noted a decline in NDI over time which he theorized could be due to either a change in population or the increase in

commercial value of the property near airports. Crowley (1978) reached a similar conclusion. A larger study by Nelson (1980) looking at 18 airports found an NDI from 0.5 to 0.6% per dB.

In a review of property value studies, Newman and Beattie (1985) found a range of NDI from 0.2 to 2% per dB. They noted that many factors other than noise affected values.

Fidell *et al.* (1996) studied the influence of aircraft noise on actual sale prices of residential properties in the vicinity of a military base in Virginia and one in Arizona. They found no meaningful effect on home values. Their results may have been due to non-noise factors, especially the wide differences in homes between the two study areas.

Recent studies of noise effects on property values have recognized the need to account for non-noise factors. Nelson (2004) analyzed data from 33 airports, and discussed the need to account for those factors and the need for careful statistics. His analysis showed NDI from 0.3 to 1.5% per dB, with an average of about 0.65% per dB. Nelson (2007) and Andersson *et al.* (2013) discuss statistical modeling in more detail.

Enough data are available to conclude that aircraft noise has a real effect on property values. This effect falls in the range of 0.2 to 2.0% per dB, with the average on the order of 0.5% per dB. The actual value varies from location to location, and is very often small compared to non-noise factors.

E.2.10 Noise-Induced Vibration Effects on Structures and Humans

High noise levels can cause buildings to vibrate. If high enough, building components can be damaged. The most sensitive components of a building are the windows, followed by plaster walls and ceilings. Possibility of damage depends on the peak sound pressures and the resonances of the building. In general, damage is possible only for sounds lasting more than one second above an unweighted sound level of 130 dB (CHABA 1977). That is higher than expected from normal aircraft operations. Even low altitude flyovers of heavy aircraft do not reach the potential for damage (Sutherland 1990a).

Noise-induced structural vibration may cause annoyance to dwelling occupants because of induced secondary vibrations, or "rattle", of objects within the dwelling – hanging pictures, dishes, plaques, and bric-a-brac. Loose window panes may also vibrate noticeably when exposed to high levels of airborne noise, causing homeowners to fear breakage. In general, rattling occurs at peak unweighted sound levels that last for several seconds at levels above 110 dB, which is well above that considered normally compatible with residential land use Thus, assessments of noise exposure levels for compatible land use will also be protective of noise-induced rattle.

The sound from an aircraft overflight travels from the exterior to the interior of the house in one of two ways: through the solid structural elements and directly through the air. Figure E-15 illustrates the sound transmission through a wall constructed with a brick exterior, stud framing, interior finish wall, and absorbent material in the cavity. The sound transmission starts with noise impinging on the wall exterior. Some of this sound energy will be reflected away and some will make the wall vibrate. The vibrating wall radiates sound into the airspace, which in turn sets the interior finish surface vibrating, with some energy lost in the airspace. This surface then radiates sound into the dwelling interior. As the figure shows, vibrational energy also bypasses the air cavity by traveling through the studs and edge connections.

Normally, the most sensitive components of a structure to airborne noise are the windows, followed by plastered walls and ceilings. An evaluation of the peak sound pressures impinging on the structure is normally sufficient to determine the possibility of damage. In general, at unweighted sound levels above 130 dB, there is the possibility of structural damage. While certain frequencies (such as 30 Hertz for window breakage) may be of more concern than other frequencies, conservatively, only sounds lasting more than one second above a unweighted sound level of 130 dB are potentially damaging to structural components (von Gierke and Ward 1991).

In the assessment of vibration on humans, the following factors determine if a person will perceive and possibly react to building vibrations:

1. Type of excitation: steady state, intermittent, or impulsive vibration.
2. Frequency of the excitation. International Organization for Standardization (ISO) standard 2631-2 (ISO 1989) recommends a frequency range of 1 to 80 Hz for the assessment of vibration on humans.
3. Orientation of the body with respect to the vibration.
4. The use of the occupied space (i.e., residential, workshop, hospital).
5. Time of day.

Table E-10 lists the whole-body vibration criteria from ISO 2631-2 for one-third octave frequency bands from 1 to 80 Hz.

Table E-10. Vibration Criteria for the Evaluation of Human Exposure to Whole-Body Vibration

Frequency (Hz)	***RMS Acceleration (m/s/s)***		
	Combined Criteria Base Curve	*Residential Night*	*Residential Day*
1.00	0.0036	0.0050	0.0072
1.25	0.0036	0.0050	0.0072
1.60	0.0036	0.0050	0.0072
2.00	0.0036	0.0050	0.0072
2.50	0.0037	0.0052	0.0074
3.15	0.0039	0.0054	0.0077
4.00	0.0041	0.0057	0.0081
5.00	0.0043	0.0060	0.0086
6.30	0.0046	0.0064	0.0092
8.00	0.0050	0.0070	0.0100
10.00	0.0063	0.0088	0.0126
12.50	0.0078	0.0109	0.0156
16.00	0.0100	0.0140	0.0200
20.00	0.0125	0.0175	0.0250
25.00	0.0156	0.0218	0.0312
31.50	0.0197	0.0276	0.0394
40.00	0.0250	0.0350	0.0500
50.00	0.0313	0.0438	0.0626
63.00	0.0394	0.0552	0.0788
80.00	0.0500	0.0700	0.1000

Source: ISO 1989.

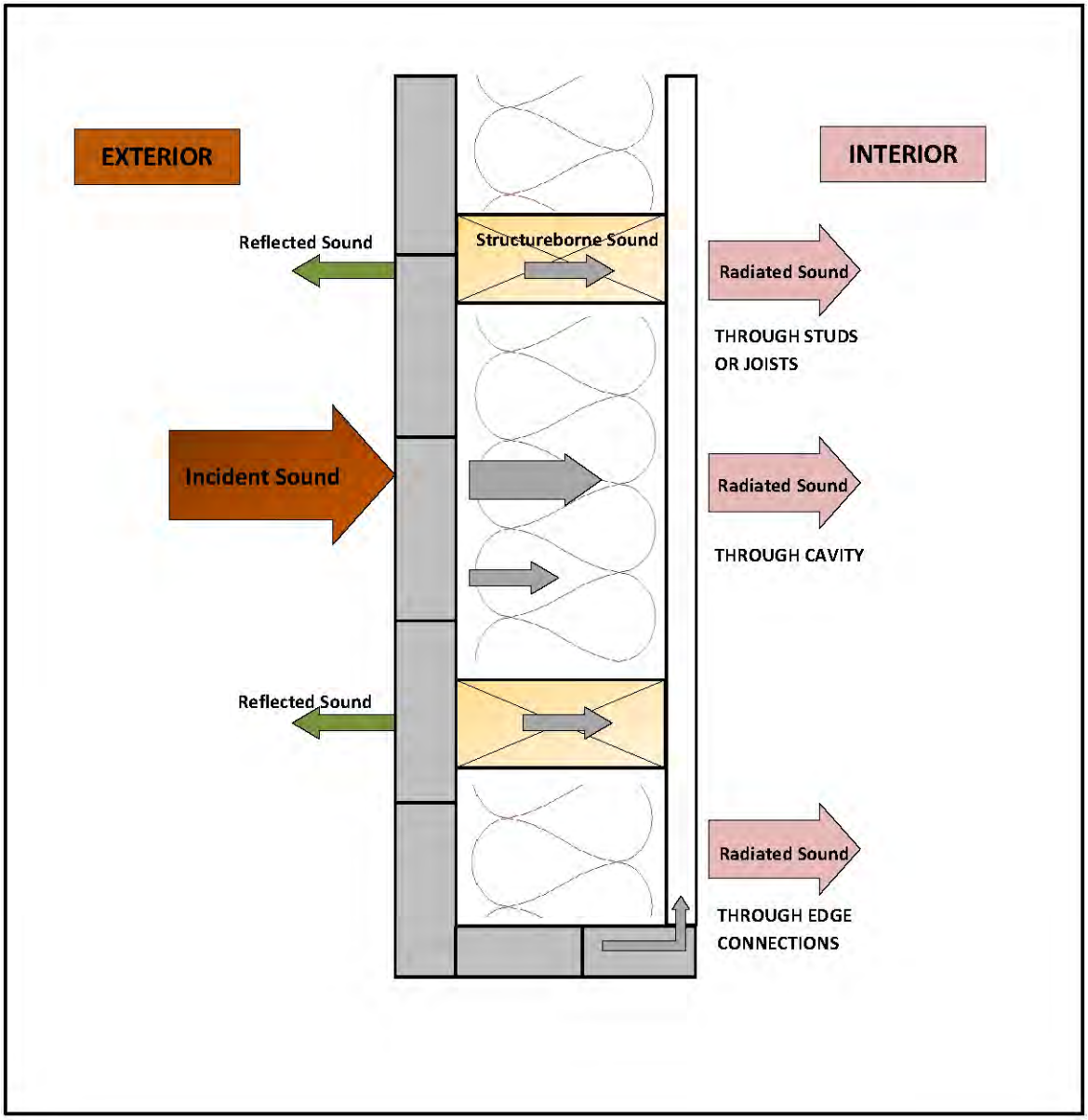


Figure E-15. Depiction of Sound Transmission through Built Construction

E.2.11 Sonic Booms

Sonic booms are commonly associated with structural damage. Most damage claims are for brittle objects, such as glass and plaster. Table E-11 summarizes the threshold of damage that might be expected at various overpressures. There is a large degree of variability in damage experience, and much damage depends on the pre-existing condition of a structure. Breakage data for glass, for example, spans a range of two to three orders of magnitude at a given overpressure. At 1 psf, the probability of a window breaking ranges from one in a billion (Sutherland 1990b) to one in a million (Hershey and Higgins 1976). These damage rates are associated with a combination of boom load and glass condition. At 10 psf, the probability of breakage is between one in a hundred and one in a thousand. Laboratory tests of glass (White 1972) have shown that properly installed window glass will not break at overpressures below 10 psf, even when subjected to repeated booms, but in the real world glass is not in pristine condition.

Table E-11. Possible Damage to Structures From Sonic Booms

Sonic Boom Overpressure Nominal (psf)	*Type of Damage*	*Item Affected*
0.5 - 2	Plaster	Fine cracks; extension of existing cracks; more in ceilings; over door frames; between some plaster boards.
	Glass	Rarely shattered; either partial or extension of existing.
	Roof	Slippage of existing loose tiles/slates; sometimes new cracking of old slates at nail hole.
	Damage to outside walls	Existing cracks in stucco extended.
	Bric-a-brac	Those carefully balanced or on edges can fall; fine glass, such as large goblets, can fall and break.
	Other	Dust falls in chimneys.
2 - 4	Glass, plaster, roofs, ceilings	Failures show that would have been difficult to forecast in terms of their existing localized condition. Nominally in good condition.
4 - 10	Glass	Regular failures within a population of well-installed glass; industrial as well as domestic greenhouses.
	Plaster	Partial ceiling collapse of good plaster; complete collapse of very new, incompletely cured, or very old plaster.
	Roofs	High probability rate of failure in nominally good state, slurry-wash; some chance of failures in tiles on modern roofs; light roofs (bungalow) or large area can move bodily.
	Walls (out)	Old, free standing, in fairly good condition can collapse.
	Walls (in)	Inside (“party”) walls known to move at 10 psf.
Greater than 10	Glass	Some good glass will fail regularly to sonic booms from the same direction. Glass with existing faults could shatter and fly. Large window frames move.
	Plaster	Most plaster affected.
	Ceilings	Plaster boards displaced by nail popping.
	Roofs	Most slate/slurry roofs affected, some badly; large roofs having good tile can be affected; some roofs bodily displaced causing gale-end and will-plate cracks; domestic chimneys dislodged if not in good condition.
	Walls	Internal party walls can move even if carrying fittings such as hand basins or taps; secondary damage due to water leakage.
	Bric-a-brac	Some nominally secure items can fall; e.g., large pictures, especially if fixed to party walls.

Source: Haber and Nakaki 1989.

Damage to plaster occurs at similar ranges to glass damage. Plaster has a compounding issue in that it will often crack due to shrinkage while curing, or from stresses as a structure settles, even in the absence of outside loads. Sonic boom damage to plaster often occurs when internal stresses are high from these factors.

Some degree of damage to glass and plaster should thus be expected whenever there are sonic booms, but usually at the low rates noted above. In general, structural damage from sonic booms should be expected only for overpressures above 10 psf.

E.2.12 Noise and Sonic Boom Effects on Terrain

It has been suggested that noise levels associated with low-flying aircraft may affect the terrain under the flight path by disturbing fragile soil or snow, especially in mountainous areas, causing landslides or avalanches. There are no known instances of such events. It is improbable that such effects would result from routine subsonic aircraft operations.

In contrast to subsonic noise, sonic booms are considered to be a potential trigger for snow avalanches. Avalanches are highly dependent on the physical status of the snow, and do occur spontaneously. They can be triggered by minor disturbances, and there are documented accounts of sonic booms triggering avalanches. Switzerland routinely restricts supersonic flight during avalanche season. Landslides are not an issue for sonic booms. There was one anecdotal report of a minor landslide from a sonic boom generated by the Space Shuttle during landing, but there is no credible mechanism or consistent pattern of reports.

E.2.13 Noise Effects on Historical and Archaeological Sites

Historical buildings and sites can have elements that are more fragile than conventional structures. Aircraft noise may affect such sites more severely than newer, modern structures. In older structures, seemingly insignificant surface cracks caused by vibrations from aircraft noise may lead to greater damage from natural forces (Hanson *et al.* 1991). There are few scientific studies of such effects to provide guidance for their assessment.

For example, one study involved measurements of noise and vibration in a restored plantation house, originally built in 1795. It is located 1,500 feet from the centerline at the departure end of Runway 19L at Washington Dulles International Airport. The aircraft measured was the Concorde. There was special concern for the building's windows, since roughly half of the 324 panes were original. No instances of structural damage were found. Interestingly, despite the high levels of noise during Concorde takeoffs, the induced structural vibration levels were actually less than those induced by touring groups and vacuum cleaning (Wesler 1977).

As for conventional structures, noise exposure levels for normally compatible land uses should also be protective of historic and archaeological sites. Unique sites should, of course, be analyzed for specific exposure.

E.2.14 Effects on Domestic Animals and Wildlife

Domestic animals and wildlife have different hearing thresholds, frequency response, and tolerance characteristics than do humans. There is a large difference in response even among different animal species. Evaluation of noise impacts on wildlife using metrics primarily intended for human impact should be done with caution and makes evaluation of impacts on wildlife even more difficult. As such,

evaluations in this appendix have been based primarily on historical response to sounds rather than to absolute sound levels.

Hearing is critical to an animal's ability to react, compete, reproduce, hunt, forage, and survive in its environment. While the existing literature does include studies on possible effects of jet aircraft noise and sonic booms on wildlife, there appears to have been little concerted effort in developing quantitative comparisons of aircraft noise effects on normal auditory characteristics. Behavioral effects have been relatively well described, but the larger ecological context issues, and the potential for drawing conclusions regarding effects on populations, has not been well developed.

The relationships between potential auditory/physiological effects and species interactions with their environments are not well understood. Manci *et al.* (1988), assert that the consequences that physiological effects may have on behavioral patterns are vital to understanding the long-term effects of noise on wildlife. Questions regarding the effects (if any) on predator-prey interactions, reproductive success, and intra-inter specific behavior patterns remain.

The following discussion provides an overview of the existing literature on noise effects (particularly jet aircraft noise) on animal species. The literature reviewed here involves those studies that have focused on the observations of the behavioral effects that jet aircraft and sonic booms have on animals.

A great deal of research was conducted in the 1960s and 1970s on the effects of aircraft noise on the public and the potential for adverse ecological impacts. These studies were largely completed in response to the increase in air travel and as a result of the introduction of supersonic jet aircraft. According to Manci *et al.* (1988), the foundation of information created from that focus does not necessarily correlate or provide information specific to the impacts to wildlife in areas overflown by aircraft at supersonic speed or at low altitudes.

The abilities to hear sounds and noise and to communicate assist wildlife in maintaining group cohesiveness and survivorship. Social species communicate by transmitting calls of warning, introduction, and other types that are subsequently related to an individual's or group's responsiveness.

Animal species differ greatly in their responses to noise. Noise effects on domestic animals and wildlife are classified as primary, secondary, and tertiary. Primary effects are direct, physiological changes to the auditory system, and most likely include the masking of auditory signals. Masking is defined as the inability of an individual to hear important environmental signals that may arise from mates, predators, or prey. There is some potential that noise could disrupt a species' ability to communicate or could interfere with behavioral patterns (Manci *et al.* 1988). Although the effects are likely temporal, aircraft noise may cause masking of auditory signals within exposed faunal communities. Animals rely on hearing to avoid predators, obtain food, and communicate with, and attract, other members of their species. Aircraft noise may mask or interfere with these functions. Other primary effects, such as ear drum rupture or temporary and permanent hearing threshold shifts, are not as likely given the subsonic noise levels produced by aircraft overflights.

Secondary effects may include non-auditory effects such as stress and hypertension; behavioral modifications; interference with mating or reproduction; and impaired ability to obtain adequate food, cover, or water. Tertiary effects are the direct result of primary and secondary effects, and include population decline and habitat loss. Most of the effects of noise are mild enough that they may never be detectable as variables of change in population size or population growth against the background of

normal variation (Bowles 1995). Other environmental variables (e.g., predators, weather, changing prey base, ground-based disturbance) also influence secondary and tertiary effects, and confound the ability to identify the ultimate factor in limiting productivity of a certain nest, area, or region (Smith *et al.* 1988). Overall, the literature suggests that species differ in their response to various types, durations, and sources of noise (Manci *et al.* 1988).

Many scientific studies have investigated the effects of aircraft noise on wildlife, and some have focused on wildlife "flight" due to noise. Animal responses to aircraft are influenced by many variables, including size, speed, proximity (both height above the ground and lateral distance), engine noise, color, flight profile, and radiated noise. The type of aircraft (e.g., fixed wing versus rotor-wing [helicopter]) and type of flight mission may also produce different levels of disturbance, with varying animal responses (Smith *et al.* 1988). Consequently, it is difficult to generalize animal responses to noise disturbances across species.

One result of the Manci *et al.* (1988) literature review was the conclusion that, while behavioral observation studies were relatively limited, a general behavioral reaction in animals from exposure to aircraft noise is the startle response. The intensity and duration of the startle response appears to be dependent on which species is exposed, whether there is a group or an individual, and whether there have been some previous exposures. Responses range from flight, trampling, stampeding, jumping, or running, to movement of the head in the apparent direction of the noise source. Manci *et al.* (1988) reported that the literature indicated that avian species may be more sensitive to aircraft noise than mammals.

E.2.14.1 Domestic Animals

Although some studies report that the effects of aircraft noise on domestic animals is inconclusive, a majority of the literature reviewed indicates that domestic animals exhibit some behavioral responses to military overflights but generally seem to habituate to the disturbances over a period of time. Mammals in particular appear to react to noise at sound levels higher than 90 dB, with responses including the startle response, freezing (i.e., becoming temporarily stationary), and fleeing from the sound source. Many studies on domestic animals suggest that some species appear to acclimate to some forms of sound disturbance (Manci *et al.* 1988). Some studies have reported such primary and secondary effects as reduced milk production and rate of milk release, increased glucose concentrations, decreased levels of hemoglobin, increased heart rate, and a reduction in thyroid activity. These latter effects appear to represent a small percentage of the findings occurring in the existing literature.

Some reviewers have indicated that earlier studies, and claims by farmers linking adverse effects of aircraft noise on livestock, did not necessarily provide clear-cut evidence of cause and effect (Cottereau 1978). In contrast, many studies conclude that there is no evidence that aircraft overflights affect feed intake, growth, or production rates in domestic animals.

Cattle

In response to concerns about overflight effects on pregnant cattle, milk production, and cattle safety, the U.S. Air Force prepared a handbook for environmental protection that summarized the literature on the impacts of low-altitude flights on livestock (and poultry) and includes specific case studies conducted in numerous airspaces across the country. Adverse effects have been found in a few studies but have not been reproduced in other similar studies. One such study, conducted in 1983, suggested that 2 of 10 cows in late pregnancy aborted after showing rising estrogen and falling progesterone levels. These increased

hormonal levels were reported as being linked to 59 aircraft overflights. The remaining eight cows showed no changes in their blood concentrations and calved normally. A similar study reported abortions occurred in three out of five pregnant cattle after exposing them to flyovers by six different aircraft. Another study suggested that feedlot cattle could stampede and injure themselves when exposed to low-level overflights (U.S. Air Force 1994a).

A majority of the studies reviewed suggests that there is little or no effect of aircraft noise on cattle. Studies presenting adverse effects to domestic animals have been limited. A number of studies (Parker and Bayley 1960; Casady and Lehmann 1967; Kovalcik and Sottnik 1971) investigated the effects of jet aircraft noise and sonic booms on the milk production of dairy cows. Through the compilation and examination of milk production data from areas exposed to jet aircraft noise and sonic boom events, it was determined that milk yields were not affected. This was particularly evident in those cows that had been previously exposed to jet aircraft noise.

A study examined the causes of 1,763 abortions in Wisconsin dairy cattle over a 1-year time period and none were associated with aircraft disturbances (U.S. Air Force 1993). In 1987, researchers contacted seven livestock operators for production data, and no effects of low-altitude and supersonic flights were noted. Of the 43 cattle previously exposed to low-altitude flights, 3 showed a startle response to an F/A-18 aircraft flying overhead at 500 feet above ground level (AGL) and 400 knots by running less than 10 meters (m). They resumed normal activity within 1 minute (U.S. Air Force 1994a). Beyer (1983) found that helicopters caused more reaction than other low-aircraft overflights, and that the helicopters at 30-60 feet overhead did not affect milk production and pregnancies of 44 cows in a 1964 study (U.S. Air Force 1994a).

Additionally, Beyer (1983) reported that five pregnant dairy cows in a pasture did not exhibit fright-flight tendencies or disturb their pregnancies after being overflown by 79 low-altitude helicopter flights and 4 low-altitude, subsonic jet aircraft flights. A 1956 study found that the reactions of dairy and beef cattle to noise from low-altitude, subsonic aircraft were similar to those caused by paper blowing about, strange persons, or other moving objects (U.S. Air Force 1994a).

In a report to Congress, the U. S. Forest Service concluded that “evidence both from field studies of wild ungulates and laboratory studies of domestic stock indicate that the risks of damage are small (from aircraft approaches of 50-100 m), as animals take care not to damage themselves (U.S. Forest Service 1992). If animals are overflown by aircraft at altitudes of 50-100 m, there is no evidence that mothers and young are separated, that animals collide with obstructions (unless confined) or that they traverse dangerous ground at too high a rate.” These varied study results suggest that, although the confining of cattle could magnify animal response to aircraft overflight, there is no proven cause-and-effect link between startling cattle from aircraft overflights and abortion rates or lower milk production.

Horses

Horses have also been observed to react to overflights of jet aircraft. Several of the studies reviewed reported a varied response of horses to low-altitude aircraft overflights. Observations made in 1966 and 1968 noted that horses galloped in response to jet flyovers (U.S. Air Force 1993). Bowles (1995) cites Kruger and Erath as observing horses exhibiting intensive flight reactions, random movements, and biting/kicking behavior. However, no injuries or abortions occurred, and there was evidence that the mares adapted somewhat to the flyovers over the course of a month (U.S. Air Force 1994a). Although horses were observed noticing the overflights, it did not appear to affect either survivability or

reproductive success. There was also some indication that habituation to these types of disturbances was occurring.

LeBlanc *et al.* (1991), studied the effects of F-14 jet aircraft noise on pregnant mares. They specifically focused on any changes in pregnancy success, behavior, cardiac function, hormonal production, and rate of habituation. Their findings reported observations of "flight-fright" reactions, which caused increases in heart rates and serum cortisol concentrations. The mares, however, did habituate to the noise. Levels of anxiety and mass body movements were the highest after initial exposure, with intensities of responses decreasing thereafter. There were no differences in pregnancy success when compared to a control group.

Swine

Generally, the literature findings for swine appear to be similar to those reported for cows and horses. While there are some effects from aircraft noise reported in the literature, these effects are minor. Studies of continuous noise exposure (i.e., 6 hours, 72 hours of constant exposure) reported influences on short-term hormonal production and release. Additional constant exposure studies indicated the observation of stress reactions, hypertension, and electrolyte imbalances (Dufour 1980). A study by Bond *et al.* (1963), demonstrated no adverse effects on the feeding efficiency, weight gain, ear physiology, or thyroid and adrenal gland condition of pigs subjected to observed aircraft noise. Observations of heart rate increase were recorded; noting that cessation of the noise resulted in the return to normal heart rates. Conception rates and offspring survivorship did not appear to be influenced by exposure to aircraft noise.

Similarly, simulated aircraft noise at levels of 100-135 dB had only minor effects on the rate of feed utilization, weight gain, food intake, or reproduction rates of boars and sows exposed, and there were no injuries or inner ear changes observed (Gladwin *et al.* 1988; Manci *et al.* 1988).

Domestic Fowl

According to a 1994 position paper by the U.S. Air Force on effects of low-altitude overflights (below 1,000 feet) on domestic fowl, overflight activity has negligible effects (U.S. Air Force 1994b). The paper did recognize that given certain circumstances, adverse effects can be serious. Some of the effects can be panic reactions, reduced productivity, and effects on marketability (e.g., bruising of the meat caused during "pile-up" situations).

The typical reaction of domestic fowl after exposure to sudden, intense noise is a short-term startle response. The reaction ceases as soon as the stimulus is ended, and within a few minutes all activity returns to normal. More severe responses are possible depending on the number of birds, the frequency of exposure, and environmental conditions. Large crowds of birds, and birds not previously exposed, are more likely to pile up in response to a noise stimulus (U.S. Air Force 1994b). According to studies and interviews with growers, it is typically the previously unexposed birds that incite panic crowding, and the tendency to do so is markedly reduced within five exposures to the stimulus (U.S. Air Force 1994b). This suggests that the birds habituate relatively quickly. Egg productivity was not adversely affected by infrequent noise bursts, even at exposure levels as high as 120-130 dB.

Between 1956 and 1988, there were 100 recorded claims against the Navy for alleged damage to domestic fowl. The number of claims averaged three per year, with peak numbers of claims following publications of studies on the topic in the early 1960s. Many of the claims were disproved or did not have sufficient supporting evidence. The claims were filed for the following alleged damages: 55% for panic reactions,

31% for decreased production, 6% for reduced hatchability, 6% for weight loss, and less than 1% for reduced fertility (U.S. Air Force 1994b).

E2.14.2 Wildlife

Studies on the effects of overflights and sonic booms on wildlife have been focused mostly on avian species and ungulates such as caribou and bighorn sheep. Few studies have been conducted on marine mammals, small terrestrial mammals, reptiles, amphibians, and carnivorous mammals. Generally, species that live entirely below the surface of the water have also been ignored due to the fact they do not experience the same level of sound as terrestrial species (National Park Service 1994). Wild ungulates appear to be much more sensitive to noise disturbance than domestic livestock. This may be due to previous exposure to disturbances. One common factor appears to be that low-altitude flyovers seem to be more disruptive in terrain where there is little cover (Manci *et al.* 1988).

Mammals

TERRESTRIAL MAMMALS

Studies of terrestrial mammals have shown that noise levels of 120 dB can damage mammals' ears, and levels at 95 dB can cause temporary loss of hearing acuity. Noise from aircraft has affected other large carnivores by causing changes in home ranges, foraging patterns, and breeding behavior. One study recommended that aircraft not be allowed to fly at altitudes below 2,000 feet AGL over important grizzly and polar bear habitat. Wolves have been frightened by low-altitude flights that were 25-1,000 feet AGL. However, wolves have been found to adapt to aircraft overflights and noise as long as they were not being hunted from aircraft (Dufour 1980).

Wild ungulates (American bison, caribou, bighorn sheep) appear to be much more sensitive to noise disturbance than domestic livestock (Weisenberger *et al.* 1996). Behavioral reactions may be related to the past history of disturbances by such things as humans and aircraft. Common reactions of reindeer kept in an enclosure exposed to aircraft noise disturbance were a slight startle response, rising of the head, pricking ears, and scenting of the air. Panic reactions and extensive changes in behavior of individual animals were not observed. Observations of caribou in Alaska exposed to fixed-wing aircraft and helicopters showed running and panic reactions occurred when overflights were at an altitude of 200 feet or less. The reactions decreased with increased altitude of overflights, and, with more than 500 feet in altitude, the panic reactions stopped. Also, smaller groups reacted less strongly than larger groups. One negative effect of the running and avoidance behavior is increased expenditure of energy. For a 90-kilogram animal, the calculated expenditure due to aircraft harassment is 64 kilocalories per minute when running and 20 kilocalories per minute when walking. When conditions are favorable, this expenditure can be counteracted with increased feeding; however, during harsh winter conditions, this may not be possible. Incidental observations of wolves and bears exposed to fixed-wing aircraft and helicopters in the northern regions suggested that wolves are less disturbed than wild ungulates, while grizzly bears showed the greatest response of any animal species observed (Weisenberger *et al.* 1996).

It has been proven that low-altitude overflights do induce stress in animals. Increased heart rates, an indicator of excitement or stress, have been found in pronghorn antelope, elk, and bighorn sheep. As such reactions occur naturally as a response to predation, infrequent overflights may not, in and of themselves, be detrimental. However, flights at high frequencies over a long period of time may cause harmful effects. The consequences of this disturbance, while cumulative, are not additive. It may be that aircraft

disturbance may not cause obvious and serious health effects, but coupled with a harsh winter, it may have an adverse impact. Research has shown that stress induced by other types of disturbances produces long-term decreases in metabolism and hormone balances in wild ungulates.

Behavioral responses can range from mild to severe. Mild responses include head raising, body shifting, or turning to orient toward the aircraft. Moderate disturbance may be nervous behaviors, such as trotting a short distance. Escape is the typical severe response.

BIRDS

Auditory research conducted on birds indicates that they fall between the reptiles and the mammals relative to hearing sensitivity. According to Dooling (1978), within the range of 1,000 to 5,000 Hz, birds show a level of hearing sensitivity similar to that of the more sensitive mammals. In contrast to mammals, bird sensitivity falls off at a greater rate to increasing and decreasing frequencies. Passive observations and studies examining aircraft bird strikes indicate that birds nest and forage near airports. Aircraft noise in the vicinity of commercial airports apparently does not inhibit bird presence and use.

High-noise events (like a low-altitude aircraft overflight) may cause birds to engage in escape or avoidance behaviors, such as flushing from perches or nests (Ellis *et al.* 1991). These activities impose an energy cost on the birds that, over the long term, may affect survival or growth. In addition, the birds may spend less time engaged in necessary activities like feeding, preening, or caring for their young because they spend time in noise-avoidance activity. However, the long-term significance of noise-related impacts is less clear. Several studies on nesting raptors have indicated that birds become habituated to aircraft overflights and that long-term reproductive success is not affected (Ellis *et al.* 1991; Grubb and King 1991). Threshold noise levels for significant responses range from 62 dB for Pacific black brant to 85 dB for crested tern (Brown 1990; Ward and Stehn 1990).

Songbirds were observed to become silent prior to the onset of a sonic boom event (F-111 jets), followed by “raucous discordant cries.” There was a return to normal singing within 10 seconds after the boom (Higgins 1974 in Manci *et al.* 1988). Ravens responded by emitting protestation calls, flapping their wings, and soaring.

Manci *et al.* (1988), reported a reduction in reproductive success in some small territorial passerines (i.e., perching birds or songbirds) after exposure to low-altitude overflights. However, it has been observed that passerines are not driven any great distance from a favored food source by a nonspecific disturbance, such as aircraft overflights (U.S. Forest Service 1992). Further study may be warranted.

A cooperative study between the DoD and the U.S. Fish and Wildlife Service (USFWS), assessed the response of the red-cockaded woodpecker to a range of military training noise events, including artillery, small arms, helicopter, and maneuver noise (Pater *et al.* 1999). The project findings show that the red-cockaded woodpecker successfully acclimates to military noise events. Depending on the noise level that ranged from innocuous to very loud, the birds responded by flushing from their nest cavities. When the noise source was closer and the noise level was higher, the number of flushes increased proportionately. In all cases, however, the birds returned to their nests within a relatively short period of time (usually within 12 minutes). Additionally, the noise exposure did not result in any mortality or statistically detectable changes in reproductive success (Pater *et al.* 1999). Red-cockaded woodpeckers did not flush when artillery simulators were more than 122 m away and SELs were 70 dB.

Lynch and Speake (1978) studied the effects of both real and simulated sonic booms on the nesting and brooding eastern wild turkey in Alabama. Hens at four nest sites were subjected to between 8 and 11 combined real and simulated sonic booms. All tests elicited similar responses, including quick lifting of the head and apparent alertness for 10-20 seconds. No apparent nest failure occurred as a result of the sonic booms. Twenty-one brood groups were also subjected to simulated sonic booms. Reactions varied slightly between groups, but the largest percentage of groups reacted by standing motionless after the initial blast. Upon the sound of the boom, the hens and poults fled until reaching the edge of the woods (approximately 4-8 m). Afterward, the poults resumed feeding activities while the hens remained alert for a short period of time (approximately 15-20 seconds). In no instances were poults abandoned, nor did they scatter and become lost. Every observation group returned to normal activities within a maximum of 30 seconds after a blast.

RAPTORS

In a literature review of raptor responses to aircraft noise, Manci *et al.* (1988) found that most raptors did not show a negative response to overflights. When negative responses were observed they were predominantly associated with rotor-winged aircraft or jet aircraft that were repeatedly passing within 0.5 mile of a nest.

Ellis *et al.* (1991), performed a study to estimate the effects of low-level military jet aircraft and mid- to high-altitude sonic booms (both actual and simulated) on nesting peregrine falcons and seven other raptors (common black-hawk, Harris' hawk, zone-tailed hawk, red-tailed hawk, golden eagle, prairie falcon, bald eagle). They observed responses to test stimuli, determined nest success for the year of the testing, and evaluated site occupancy the following year. Both long- and short-term effects were noted in the study. The results reported the successful fledging of young in 34 of 38 nest sites (all eight species) subjected to low-level flight and/or simulated sonic booms. Twenty-two of the test sites were revisited in the following year, and observations of pairs or lone birds were made at all but one nest. Nesting attempts were underway at 19 of 20 sites that were observed long enough to be certain of breeding activity. Reoccupancy and productivity rates were within or above expected values for self-sustaining populations.

Short-term behavior responses were also noted. Overflights at a distance of 150 m or less produced few significant responses and no severe responses. Typical responses consisted of crouching or, very rarely, flushing from the perch site. Significant responses were most evident before egg laying and after young were "well grown." Incubating or brooding adults never burst from the nest, thus preventing egg breaking or knocking chicks out of the nest. Jet passes and sonic booms often caused noticeable alarm; however, significant negative responses were rare and did not appear to limit productivity or re-occupancy. Due to the locations of some of the nests, some birds may have been habituated to aircraft noise. There were some test sites located at distances far from zones of frequent military aircraft usage, and the test stimuli were often closer, louder, and more frequent than would be likely for a normal training situation (Ellis *et al.* 1991).

Manci *et al.* (1988), noted that a female northern harrier was observed hunting on a bombing range in Mississippi during bombing exercises. The harrier was apparently unfazed by the exercises, even when a bomb exploded within 200 feet. In a similar case of habituation/non-disturbance, a study on the Florida snail-kite stated the greatest reaction to overflights (approximately 98 dB) was "watching the aircraft fly by." No detrimental impacts to distribution, breeding success, or behavior were noted.

Bald Eagle. A study by Grubb and King (1991) on the reactions of the bald eagle to human disturbances showed that terrestrial disturbances elicited the greatest response, followed by aquatic (i.e., boats) and aerial disturbances. The disturbance regime of the area where the study occurred was predominantly characterized by aircraft noise. The study found that pedestrians consistently caused responses that were greater in both frequency and duration. Helicopters elicited the highest level of aircraft-related responses. Aircraft disturbances, although the most common form of disturbance, resulted in the lowest levels of response. This low response level may have been due to habituation; however, flights less than 170 m away caused reactions similar to other disturbance types. Ellis *et al.* (1991) showed that eagles typically respond to the proximity of a disturbance, such as a pedestrian or aircraft within 100 m, rather than the noise level. Fleischner and Weisberg (1986) stated that reactions of bald eagles to commercial jet flights, although minor (e.g., looking), were twice as likely to occur when the jets passed at a distance of 0.5 mile or less. They also noted that helicopters were four times more likely to cause a reaction than a commercial jet and 20 times more likely to cause a reaction than a propeller plane.

The USFWS advised Cannon AFB that flights at or below 2,000 feet AGL from October 1 through March 1 could result in adverse impacts to wintering bald eagles (USFWS 1998). However, Fraser *et al.* (1985), suggested that raptors habituate to overflights rapidly, sometimes tolerating aircraft approaches of 65 feet or less.

Golden Eagle. In their guidelines for aerial surveys, USFWS (Pagel *et al.* 2010) summarized past studies by stating that most golden eagles respond to survey aircraft (fixed- and rotary-wing) by remaining on their nests, and continuing to incubate or roost. Surveys take place generally as close as 10 to 20 meters from cliffs (including hovering less than 30 seconds if necessary to count eggs) and no farther than 200 meters from cliffs depending on safety (Pagel *et al.* 2010).

Grubb *et al.* (2007) experimented with multiple exposure to two helicopter types and concluded that flights with a variety of approach distances (800, 400, 200, and 100 meters) had no effect on golden eagle nesting success or productivity rates within the same year or on rates of renewed nesting activity the following year when compared to the corresponding figures for the larger population of non-manipulated nest sites (Grubb *et al.* 2007). They found no significant, detrimental, or disruptive responses in 303 helicopter passes near eagles. In 227 AH-64 Apache helicopter experimental passes (considered twice as loud as a civilian helicopter also tested) at test distances of 0–800 meters from nesting golden eagles, 96 percent resulted in no more response than watching the helicopter pass. No greater reactions occurred until after hatching when individual golden eagles exhibited five flatten and three fly behaviors at three nest sites. The flight responses occurred at approach distances of 200 meters or less. No evidence was found of an effect on subsequent nesting activity or success, despite many of the helicopter flights occurring during early courtship and nest repair. None of these responding pairs failed to successfully fledge young, except for one nest that fell later in the season. Excited, startled, avoidance reactions were never observed. Non-attending eagles or those perched away from the nests were more likely to fly than attending eagles, but also with less potential consequence to nesting success (Grubb *et al.* 2007). Golden eagles appeared to become less responsive with successive exposures. Much of helicopter sound energy may be at a lower frequency than golden eagles can hear, thus reducing expected impacts. Grubb *et al.* (2007) found no relationship between helicopter sound levels and corresponding eagle ambient behaviors or limited responses, which occurred throughout recorded test levels (76.7–108.8 dB, unweighted). The authors thought that the lower than expected behavioral responses may be partially due to the fact that the golden eagles in the area appear acclimated to the current high levels of outdoor recreational, including

aviation, activities. Based on the results of this study, the authors recommended reduction of existing buffers around nest sites to 100 meters (325 feet) for helicopter activity.

Richardson and Miller (1997) reviewed buffers as protection for raptors against disturbance from ground-based human activities. No consideration of aircraft activity was included. They stressed a clear line of sight as an important factor in a raptor's response to a particular disturbance, with visual screening allowing a closer approach of humans without disturbing a raptor. A GIS-assisted viewshed approach combined with a designated buffer zone distance was found to be an effective tool for reducing potential disturbance to golden eagles from ground-based activities (Richardson and Miller 1997). They summarized recommendations that included a median 0.5-mile (800-meter) buffer (range = 200-1,600 m, n = 3) to reduce human disturbances (from ground-based activities such as rock climbing, shooting, vehicular activity) around active golden eagle nests from February 1 to August 1 based on an extensive review of other studies (Richardson and Miller 1997). Physical characteristics (i.e., screening by topography or vegetation) are important variables to consider when establishing buffer zones based on raptors' visual- and auditory-detection distances (Richardson and Miller 1997).

Osprey. A study by Trimper *et al.* (1998), in Goose Bay, Labrador, Canada, focused on the reactions of nesting osprey to military overflights by CF-18 Hornets. Reactions varied from increased alertness and focused observation of planes to adjustments in incubation posture. No overt reactions (e.g., startle response, rapid nest departure) were observed as a result of an overflight. Young nestlings crouched as a result of any disturbance until 1 to 2 weeks prior to fledging. Helicopters, human presence, float planes, and other ospreys elicited the strongest reactions from nesting ospreys. These responses included flushing, agitation, and aggressive displays. Adult osprey showed high nest occupancy rates during incubation regardless of external influences. The osprey observed occasionally stared in the direction of the flight before it was audible to the observers. The birds may have been habituated to the noise of the flights; however, overflights were strictly controlled during the experimental period. Strong reactions to float planes and helicopter may have been due to the slower flight and therefore longer duration of visual stimuli rather than noise-related stimuli.

Red-tailed Hawk. Anderson *et al.* (1989), conducted a study that investigated the effects of low-level helicopter overflights on 35 red-tailed hawk nests. Some of the nests had not been flown over prior to the study. The hawks that were naïve (i.e., not previously exposed) to helicopter flights exhibited stronger avoidance behavior (9 of 17 birds flushed from their nests) than those that had experienced prior overflights. The overflights did not appear to affect nesting success in either study group. These findings were consistent with the belief that red-tailed hawks habituate to low-level air traffic, even during the nesting period.

UPLAND GAME BIRDS

Greater Sage-grouse. The greater sage-grouse was recently designated as a candidate species for protection under the Endangered Species Act after many years of scrutiny and research (USFWS 2010). This species is a widespread and characteristic species of the sagebrush ecosystems in the Intermountain West. Greater sage-grouse, like most bird species, rely on auditory signals as part of mating. Sage-grouse are known to select their leks based on acoustic properties and depend on auditory communication for mating behavior (Braun 2006). Although little specific research has been completed to determine what, if any, effects aircraft overflight and sonic booms would have on the breeding behavior of this species,

factors that may be important include season and time of day, altitude, frequency, and duration of overflights, and frequency and loudness of sonic booms.

Booth in 2009 found, while attempting to count sage-grouse at leks (breeding grounds) using light sport aircraft at 150 meters (492 feet) to 200 meters (650 feet) AGL, that sage-grouse flushed from leks on 12 of 14 approaches when the airplane was within 656 to 984 feet (200–300 meters) of the lek (Booth *et al.* 2009). In the other two instances, male grouse stopped exhibiting breeding behavior and crouched but stayed on the lek. The time to resumption of normal behavior after disturbance was not provided in this study. Strutting ceased around the time when observers on the ground heard the aircraft. The light sport aircraft could be safely operated at very low speed (68 kilometers/hour or 37 nautical miles/hour) and was powered by either a two-stroke or a four-stroke engine. It is unclear how the response to the slow-flying light sport aircraft used in the study would compare to overflight by military jets, operating at speeds 10 to 12 times as great as the aircraft used in the study. It is possible that response of the birds was related to the slow speed of the light sport aircraft causing it to resemble an aerial predator.

Other studies have found disturbance from energy operations and other nearby development have adversely affected breeding behavior of greater sage-grouse (Holloran 2005; Doherty 2008; Walker *et al.* 2007; Harju *et al.* 2010). These studies do not specifically address overflight and do not isolate noise disturbance from other types (e.g., visual, human presence) nor do they generally provide noise levels or qualification of the noise source (e.g., continuous or intermittent, frequency, duration).

Because so few studies have been done on greater sage-grouse response to overflights or sonic booms, research on related species may be applicable. Observations on other upland game bird species include those on the behavior of four wild turkey (Meleagris gallapavo) hens on their nests during real and simulated sonic booms (Manci *et al.* 1988). Simulated sonic booms were produced by firing 5-centimeter mortar shells, 300 to 500 feet from the nest of each hen. Recordings of pressure for both types of booms measured 0.4 to 1.0 pounds per square foot (psf) at the observer's location.

Turkey hens exhibited only a few seconds of head alert behavior at the sound of the sonic boom. No hens were flushed off the nests, and productivity estimates revealed no effect from the booms. Twenty brood groups were also subjected to simulated sonic booms. In no instance did the hens desert any poults (young birds), nor did the poults scatter or desert the rest of the brood group. In every observation, the brood group returned to normal activity within 30 seconds after a simulated sonic boom. Similarly, researchers cited in Manci *et al.* (1988) observed no difference in hatching success of bobwhite quail (Colinus virginianus) exposed to simulated sonic booms of 100 to 250 micronewtons per square meter.

MIGRATORY WATERFOWL

Fleming *et al.* (1996) conducted a study of caged American black ducks found that noise had negligible energetic and physiologic effects on adult waterfowl. Measurements included body weight, behavior, heart rate, and enzymatic activity. Experiments also showed that adult ducks exposed to high noise events acclimated rapidly and showed no effects.

The study also investigated the reproductive success of captive ducks, which indicated that duckling growth and survival rates at Piney Island, North Carolina, were lower than those at a background location. In contrast, observations of several other reproductive indices (i.e., pair formation, nesting, egg production, and hatching success) showed no difference between Piney Island and the background location. Potential effects on wild duck populations may vary, as wild ducks at Piney Island have

presumably acclimated to aircraft overflights. It was not demonstrated that noise was the cause of adverse impacts. A variety of other factors, such as weather conditions, drinking water and food availability and variability, disease, and natural variability in reproduction, could explain the observed effects. Fleming noted that drinking water conditions (particularly at Piney Island) deteriorated during the study, which could have affected the growth of young ducks. Further research would be necessary to determine the cause of any reproductive effects (Fleming *et al.* 1996).

Another study by Conomy *et al.* (1998) exposed previously unexposed ducks to 71 noise events per day that equaled or exceeded 80 dB. It was determined that the proportion of time black ducks reacted to aircraft activity and noise decreased from 38% to 6% in 17 days and remained stable at 5.8% thereafter. In the same study, the wood duck did not appear to habituate to aircraft disturbance. This supports the notion that animal response to aircraft noise is species-specific. Because a startle response to aircraft noise can result in flushing from nests, migrants and animals living in areas with high concentrations of predators would be the most vulnerable to experiencing effects of lowered birth rates and recruitment over time. Species that are subjected to infrequent overflights do not appear to habituate to overflight disturbance as readily.

Black brant studied in the Alaska Peninsula were exposed to jets and propeller aircraft, helicopters, gunshots, people, boats, and various raptors. Jets accounted for 65% of all the disturbances. Humans, eagles, and boats caused a greater percentage of brant to take flight. There was markedly greater reaction to Bell-206-B helicopter flights than fixed wing, single-engine aircraft (Ward *et al.* 1986).

The presence of humans and low-flying helicopters in the Mackenzie Valley North Slope area did not appear to affect the population density of Lapland longspurs, but the experimental group was shown to have reduced hatching and fledging success and higher nest abandonment. Human presence appeared to have a greater impact on the incubating behavior of the black brant, common eider, and Arctic tern than fixed-wing aircraft (Gunn and Livingston 1974).

Gunn and Livingston (1974) found that waterfowl and seabirds in the Mackenzie Valley and North Slope of Alaska and Canada became acclimated to float plane disturbance over the course of three days. Additionally, it was observed that potential predators (bald eagle) caused a number of birds to leave their nests. Non-breeding birds were observed to be more reactive than breeding birds. Waterfowl were affected by helicopter flights, while snow geese were disturbed by Cessna 185 flights. The geese flushed when the planes were less than 1,000 feet, compared to higher flight elevations. An overall reduction in flock sizes was observed. It was recommended that aircraft flights be reduced in the vicinity of premigratory staging areas.

Manci *et al.* 1988, reported that waterfowl were particularly disturbed by aircraft noise. The most sensitive appeared to be snow geese. Canada geese and snow geese were thought to be more sensitive than other animals such as turkey vultures, coyotes, and raptors (Edwards *et al.* 1979).

WADING AND SHOREBIRDS

Black *et al.* (1984), studied the effects of low-altitude (less than 500 feet AGL) military training flights with sound levels from 55 to 100 dB on wading bird colonies (i.e., great egret, snowy egret, tricolored heron, and little blue heron). The training flights involved three or four aircraft, which occurred once or twice per day. This study concluded that the reproductive activity—including nest success, nestling survival, and nestling chronology—was independent of F-16 overflights. Dependent variables were more

strongly related to ecological factors, including location and physical characteristics of the colony and climatology.

Another study on the effects of circling fixed-wing aircraft and helicopter overflights on wading bird colonies found that at altitudes of 195 to 390 feet, there was no reaction in nearly 75% of the 220 observations. Approximately 90% displayed no reaction or merely looked toward the direction of the noise source. Another 6% stood up, 3% walked from the nest, and 2% flushed (but were without active nests) and returned within 5 minutes (Kushlan 1978). Apparently, non-nesting wading birds had a slightly higher incidence of reacting to overflights than nesting birds. Seagulls observed roosting near a colony of wading birds in another study remained at their roosts when subsonic aircraft flew overhead (Burger 1981). Colony distribution appeared to be most directly correlated to available wetland community types and was found to be distributed randomly with respect to military training routes. These results suggest that wading bird species presence was most closely linked to habitat availability and that they were not affected by low-level military overflights (U.S. Air Force 2000).

Burger (1986) studied the response of migrating shorebirds to human disturbance and found that shorebirds did not fly in response to aircraft overflights, but did flush in response to more localized intrusions (i.e., humans and dogs on the beach). Burger (1981) studied the effects of noise from JFK Airport in New York on herring gulls that nested less than 1 kilometer from the airport. Noise levels over the nesting colony were 85-100 dB on approach and 94-105 dB on takeoff. Generally, there did not appear to be any prominent adverse effects of subsonic aircraft on nesting, although some birds flushed when the Concorde flew overhead and, when they returned, engaged in aggressive behavior. Groups of gulls tended to loaf in the area of the nesting colony, and these birds remained at the roost when the Concorde flew overhead. Up to 208 of the loafing gulls flew when supersonic aircraft flew overhead. These birds would circle around and immediately land in the loafing flock (U.S. Air Force 2000).

In 1970, sonic booms were potentially linked to a mass hatch failure of sooty terns on the Dry Tortugas (Austin *et al.* 1970). The cause of the failure was not certain, but it was conjectured that sonic booms from military aircraft or an overgrowth of vegetation were factors. In the previous season, sooty terns were observed to react to sonic booms by rising in a “panic flight,” circling over the island, then usually settling down on their eggs again. Hatching that year was normal. Following the 1969 hatch failure, excess vegetation was cleared and measures were taken to reduce supersonic activity. The 1970 hatch appeared to proceed normally. A colony of noddies on the same island hatched successfully in 1969, the year of the sooty tern hatch failure.

Subsequent laboratory tests of exposure of eggs to sonic booms and other impulsive noises (Cottereau 1972; Cogger and Zegarra 1980; Bowles *et al.* 1991, 1994) failed to show adverse effects on hatching of eggs. A structural analysis by Ting *et al.* (2002) showed that, even under extraordinary circumstances, sonic booms would not damage an avian egg.

Burger (1981) observed no effects of subsonic aircraft on herring gulls in the vicinity of JFK International Airport. The Concorde aircraft did cause more nesting gulls to leave their nests (especially in areas of higher density of nests), causing the breakage of eggs and the scavenging of eggs by intruder prey. Clutch sizes were observed to be smaller in areas of higher-density nesting (presumably due to the greater tendency for panic flight) than in areas where there were fewer nests.

Fish and Amphibians

The effects of overflight noise on fish and amphibians have not been well studied, but conclusions regarding their expected responses have involved speculation based upon known physiologies and behavioral traits of these taxa (Gladwin *et al.* 1988). Although fish do startle in response to low-flying aircraft noise, and probably to the shadows of aircraft, they have been found to habituate to the sound and overflights. Amphibians that respond to low frequencies and those that respond to ground vibration, such as spadefoot toads, may be affected by noise.

Summary

Some physiological/behavioral responses such as increased hormonal production, increased heart rate, and reduction in milk production have been described in a small percentage of studies. A majority of the studies focusing on these types of effects have reported short-term or no effects.

The relationships between physiological effects and how species interact with their environments have not been thoroughly studied. Therefore, the larger ecological context issues regarding physiological effects of jet aircraft noise (if any) and resulting behavioral pattern changes are not well understood.

Animal species exhibit a wide variety of responses to noise. It is therefore difficult to generalize animal responses to noise disturbances or to draw inferences across species, as reactions to jet aircraft noise appear to be species-specific. Consequently, some animal species may be more sensitive than other species and/or may exhibit different forms or intensities of behavioral responses. For instance, wood ducks appear to be more sensitive and more resistant to acclimation to jet aircraft noise than Canada geese in one study. Similarly, wild ungulates seem to be more easily disturbed than domestic animals.

The literature does suggest that common responses include the “startle” or “fright” response and, ultimately, habituation. It has been reported that the intensities and durations of the startle response decrease with the numbers and frequencies of exposures, suggesting no long-term adverse effects. The majority of the literature suggests that domestic animal species (cows, horses, chickens) and wildlife species exhibit adaptation, acclimation, and habituation after repeated exposure to jet aircraft noise and sonic booms.

Animal responses to aircraft noise appear to be somewhat dependent on, or influenced by, the size, shape, speed, proximity (vertical and horizontal), engine noise, color, and flight profile of planes. Helicopters also appear to induce greater intensities and durations of disturbance behavior as compared to fixed-wing aircraft. Some studies showed that animals that had been previously exposed to jet aircraft noise exhibited greater degrees of alarm and disturbance to other objects creating noise, such as boats, people, and objects blowing across the landscape. Other factors influencing response to jet aircraft noise may include wind direction, speed, and local air turbulence; landscape structures (i.e., amount and type of vegetative cover); and, in the case of bird species, whether the animals are in the incubation/nesting phase.

E.3 OPERATIONAL DATA AND NOISE MODELING METHODOLOGIES

E.3.1 Base

Tables E-12 through E-14 present the Eielson AFB aircraft operations modeled and Tables E-15 through E-17 provide the run-up data, everything is provided for baseline, No-Action Alternative, and the Proposed Action Alternative. Figure E-16 shows the locations of the run-up sites. It is important to note that all of the noise models draw from a database of actual aircraft noise measurements and sonic booms. These models are most appropriate for comparing "before-and-after" noise impacts, which would result from proposed changes or alternative actions, when the calculations are made in a consistent manner. The models allow noise predictions without the need for actual implementation or noise monitoring for the proposed action and alternatives.

For environments where DNL or L_{dnmr} are calculated to be less than 45 dB, the noise levels are stated as "<45." This annotation is used because in calculating time-averaged sound levels, the reliability of the results varies at lower levels. This arises from the increasing variability of individual aircraft sound levels at the longer distances (greater than a mile versus less than a mile) due to atmospheric effects on sound propagation and the presence of other ambient sources of noise. Time-average outdoor sound levels less than 45 dB are substantially less than any currently accepted guidelines for aircraft noise compatibility. As discussed under land use, most of the guidelines for the acceptability of aircraft noise are on the order of 65 dB (DNL or L_{dnmr}) and greater.

Table E-12. Annual Airfield Flight Operations for Baseline (CY14)

Category	Representing Squadron/ Group	Aircraft in Squadron/ Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Departure			Departure - Min Risk		
							Day (0700-2200)	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*
Based		n/a	0	F-35A					-			-
	18 AGRS		18	F-16C	F110-GE-100	1	2,940	35	2,975	525		525
	168 ARW		8	KC-135R			361	105	466	-	-	-
	CAP		5	GASEPF		3	122	-	122	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			1,008	-	1,008	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A			33	-	33			-
		AV-8		AV-8B	F402-RR-408		8	-	8			-
		F-15		F-15E	F100-PW-229	4, 6	34	2	36			-
		F-16, Typhoon		F-16C	F110-GE-100	4	115	2	117			-
		F-18		FA-18C/D		4	12	-	12	-	-	-
				FA-18E/F		4, 5	12	-	12	-	-	-
		EA-6B		EA-6B			4	-	4			-
		Tornado		TORNADO			3	-	3			-
		F-22		F-22		4, 5	7	-	7			-
	Bomber	B-52, B-2		B-52H		5	6	-	6			-
	Large Jet	737, C-40, 757, C-32, A-320		737-700		5	20	2	22			-
		747, A-340		747-400		5	12	1	13			-
		767, 777, A-330, A-310		767-CF6		5	23	2	25			-
		C-9		C-9A			1	-	1			-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			54	4	58			-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			141	11	152			-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			83	2	85			-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			12	-	12			-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H &N&P			81	-	81			-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			58	-	58			-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			22	-	22			-
Sub-Total Based							**4,431**	**140**	**4,571**	**525**	**-**	**525**
Transient	Fighter / Attack / Trainer						228	4	232	-	-	-
	Bomber						6	-	6	-	-	-
	Large Jet						251	20	271	-	-	-
	Large Cargo Jet						83	2	85	-	-	-
	Small Jet						12	-	12	-	-	-
	Large Turboprop						81	-	81	-	-	-
	Small Prop						58	-	58	-	-	-
	Helicopter						22	-	22	-	-	-
	Sub-Total Transient						**741**	**26**	**767**	**-**	**-**	**-**
GRAND TOTAL							**5,172**	**166**	**5,338**	**525**	**-**	**525**

Notes:

1 F-16C based normal departures are split between mil (85%) and AB (15%); min risk departures are mil power only

2 Each circuit counts as two operations

3 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

6 F-15A previously modeled

Table E-12. Annual Airfield Flight Operations for Baseline (CY14) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/ Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - Vectored			Arrival - IFR [2]			Arrival - VFR Other [2]			Arrival - Pitchout		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based		n/a	0	F-35A					-			-			-			-
	18 AGRS		18	F-16C	F110-GE-100	1	66		66	523	27	550	175		175	1,839	-	1,839
	168 ARW		8	KC-135R			309	157	466	-	-	-	-	-	-	-	-	-
	CAP		5	GASEPF		3	10	-	10	-	-	-	112	-	112	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			1,008	-	1,008	-	-	-	-	-	-	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A			-	-	-	7	-	7	11	-	11	15	-	15
		AV-8		AV-8B	F402-RR-408		-	-	-	2	-	2	6	-	6	-	-	-
		F-15		F-15E	F100-PW-229	4, 6	2	-	2	7	-	7	27	-	27	-	-	-
		F-16, Typhoon		F-16C	F110-GE-100	4	2	-	2	19	5	24	73	18	91	-	-	-
		F-18		FA-18C/D		4	-	-	-	3	-	3	10	-	10	-	-	-
				FA-18E/F		4, 5	-	-	-	2	-	2	9	-	9	-	-	-
		EA-6B		EA-6B			-	-	-	1	-	1	3	-	3	-	-	-
		Tornado		TORNADO			-	-	-	1	-	1	2	-	2	1	-	1
		F-22		F-22		4, 5	-	-	-	1	-	1	5	-	5	-	-	-
	Bomber	B-52, B-2		B-52H		5	6	-	6	-	-	-	-	-	-	-	-	-
	Large Jet	737, C-40, 757, C-32, A-320		737-700		5	21	1	22	-	-	-	-	-	-	-	-	-
		747, A-340		747-400		5	12	1	13	-	-	-	-	-	-	-	-	-
		767, 777, A-330, A-310		767-CF6		5	24	1	25	-	-	-	-	-	-	-	-	-
		C-9		C-9A			1	-	1	-	-	-	-	-	-	-	-	-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			55	3	58	-	-	-	-	-	-	-	-	-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			144	8	152	-	-	-	-	-	-	-	-	-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			84	1	85	-	-	-	-	-	-	-	-	-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			12	-	12	-	-	-	-	-	-	-	-	-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H &N&P			79	2	81	-	-	-	-	-	-	-	-	-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			58	-	58	-	-	-	-	-	-	-	-	-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			22	-	22	-	-	-	-	-	-	-	-	-
Sub-Total Based							**1,393**	**157**	**1,550**	**523**	**27**	**550**	**287**	**-**	**287**	**1,839**	**-**	**1,839**
Transient	Fighter / Attack / Trainer						4	-	4	43	5	48	146	18	164	16	-	16
	Bomber						6	-	6	-	-	-	-	-	-	-	-	-
	Large Jet						257	14	271	-	-	-	-	-	-	-	-	-
	Large Cargo Jet						84	1	85	-	-	-	-	-	-	-	-	-
	Small Jet						12	-	12	-	-	-	-	-	-	-	-	-
	Large Turboprop						79	2	81	-	-	-	-	-	-	-	-	-
	Small Prop						58	-	58	-	-	-	-	-	-	-	-	-
	Helicopter						22	-	22	-	-	-	-	-	-	-	-	-
	Sub-Total Transient						**522**	**17**	**539**	**43**	**5**	**48**	**146**	**18**	**164**	**16**	**-**	**16**
GRAND TOTAL							**1,915**	**174**	**2,089**	**566**	**32**	**598**	**433**	**18**	**451**	**1,855**	**-**	**1,855**

Notes:

1 F-16C based normal departures are split between mil (85%) and AB (15%), min risk departures are mil power only

2 Each circuit counts as two operations

3 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

6 F-15A previously modeled

Table E-12. Annual Airfield Flight Operations for Baseline (CY14) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - SFO			Arrival - Min Risk			Pattern - IFR (2)		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based			0	F-35A					-			-			-
	18 AGRS		18	F-16C	F110-GE-100	1	345	-	345	525	-	525	350	-	350
	168 ARW	n/a	8	KC-135R			-	-	-	-	-	-	1,076	807	1,883
	CAP		5	GASEPF		3	-	-	-	-	-	-	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A					-			-			-
		AV-8		AV-8B	F402-RR-408				-			-			-
		F-15		F-15E	F100-PW-229	4, 6			-			-			-
		F-16, Typhoon		F-16C	F110-GE-100	4			-			-			-
		F-18		FA-18C/D		4	-	-	-	-	-	-	-	-	-
				FA-18E/F		4, 5	-	-	-	-	-	-	-	-	-
		EA-6B		EA-6B					-			-			-
		Tornado		TORNADO					-			-			-
		F-22		F-22		4, 5			-			-			-
	Bomber	B-52, B-2		B-52H		5			-			-			-
	Large Jet	737, C-40, 757, C-32, A-320		737-700		5			-			-			-
		747, A-340		747-400		5			-			-			-
		767, 777, A-330, A-310		767-CF6		5			-			-			-
		C-9		C-9A					-			-			-
		KC-10, MD-11, DC-10, KDC-11		KC-10A					-			-			-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R					-			-			-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A					-			-			-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A					-			-			-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H &N&P					-			-			-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12					-			-			-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60					-			-			-
Sub-Total Based							**345**	**-**	**345**	**525**	**-**	**525**	**1,426**	**807**	**2,233**
Transient	Fighter / Attack / Trainer						-	-	-	-	-	-	-	-	-
	Bomber						-	-	-	-	-	-	-	-	-
	Large Jet						-	-	-	-	-	-	-	-	-
	Large Cargo Jet						-	-	-	-	-	-	-	-	-
	Small Jet						-	-	-	-	-	-	-	-	-
	Large Turboprop						-	-	-	-	-	-	-	-	-
	Small Prop						-	-	-	-	-	-	-	-	-
	Helicopter						-	-	-	-	-	-	-	-	-
	Sub-Total Transient						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
GRAND TOTAL							**345**	**-**	**345**	**525**	**-**	**525**	**1,426**	**807**	**2,233**

Notes:

1 F-16C based normal departures are split between mil (85%) and AB (15%); min risk departures are mil power only

2 Each circuit counts as two operations

3 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

6 F-15A previously modeled

Table E-12. Annual Airfield Flight Operations for Baseline (CY14) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Pattern - VFR [2]			Pattern - SFO [2]			TOTAL		
							Day (0700-2200)	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*	**Day (0700-2200)**	**Night (2200-0700)**	**Total**
Based		n/a	0	F-35A					-			-	-	-	-
	18 AGRS		18	F-16C	F110-GE-100	1	2,800	-	2,800	660	-	660	10,748	62	10,810
	168 ARW		8	KC-135R			538	269	807	-	-	-	2,284	1,338	3,622
	CAP		5	GASEPF		3	549	-	549	-	-	-	793	-	793
	210 RQS HH-60		1	SK70 (UH-60A)			188	-	188	-	-	-	2,204	-	2,204
Transient	Fighter/ Attack	A-10	n/a	A-10A					-			-	66	-	66
		AV-8		AV-8B	F402-RR-408				-			-	16	-	16
		F-15		F-15E	F100-PW-229	4, 6			-			-	70	2	72
		F-16, Typhoon		F-16C	F110-GE-100	4			-			-	209	25	234
		F-18		FA-18C/D		4	-	-	-	-	-	-	25	-	25
				FA-18E/F		4, 5	-	-	-	-	-	-	23	-	23
		EA-6B		EA-6B					-			-	8	-	8
		Tornado		TORNADO					-			-	7	-	7
		F-22		F-22		4, 5			-			-	13	-	13
	Bomber	B-52, B-2		B-52H		5			-			-	12	-	12
	Large Jet	737, C-40, 757, C-32, A-320		737-700		5			-			-	41	3	44
		747, A-340		747-400		5			-			-	24	2	26
		767, 777, A-330, A-310		767-CF6		5			-			-	47	3	50
		C-9		C-9A					-			-	2	-	2
		KC-10, MD-11, DC-10, KDC-11		KC-10A					-			-	109	7	116
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R					-			-	285	19	304
	Large Cargo Jet	C-17, C-5, AN-124		C-5A					-			-	167	3	170
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A					-			-	24	-	24
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H &N&P					-			-	160	2	162
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12					-			-	116	-	116
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60					-			-	44	-	44
Sub-Total Based							**4,075**	**269**	**4,344**	**660**	**-**	**660**	**16,029**	**1,400**	**17,429**
Transient	Fighter / Attack / Trainer						-	-	-	-	-	-	437	27	464
	Bomber						-	-	-	-	-	-	12	-	12
	Large Jet						-	-	-	-	-	-	508	34	542
	Large Cargo Jet						-	-	-	-	-	-	167	3	170
	Small Jet						-	-	-	-	-	-	24	-	24
	Large Turboprop						-	-	-	-	-	-	160	2	162
	Small Prop						-	-	-	-	-	-	116	-	116
	Helicopter						-	-	-	-	-	-	44	-	44
	Sub-Total Transient						**-**	**-**	**-**	**-**	**-**	**-**	**1,468**	**66**	**1,534**
GRAND TOTAL							**4,075**	**269**	**4,344**	**660**	**-**	**660**	**17,497**	**1,466**	**18,963**

Notes:

1 F-16C based normal departures are split between mil (85%) and AB (15%); min risk departures are mil power only

2 Each circuit counts as two operations

3 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

6 F-15A previously modeled

Table E-13. Annual Airfield Flight Operations for the No-Action Alternative (CY21)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Departure			Departure - Min Risk			Arrival - Vectored		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based		n/a	0	F-35A			-		-			-			-
	18 AGRS		18	F-16C	F110-GE-100	1	2,940	35	2,975	525	-	525	66	-	66
	168 ARW		8	KC-135R			361	105	466	-	-	-	309	157	466
	CAP		5	GASEPF		2	122	-	122	-	-	-	10	-	10
	210 RQS HH-60		1	SK70 (UH-60A)			1,008	-	1,008	-	-	-	1,008	-	1,008
Transient	Fighter/ Attack	A-10	n/a	A-10A			33	-	33	-	-	-	-	-	-
		AV-8		F-35B		4, 5	8	-	8	-	-	-	-	-	-
		F-15		F-15E	F100-PW-229		34	2	36	-	-	-	2	-	2
		F-16, Typhoon		F-16C	F110-GE-100	4	115	2	117	-	-	-	2	-	2
		F-18		F-35B		4, 5	12	-	12		-	-			
				FA-18E/F		4, 5	12	-	12	-	-	-	-	-	-
		EA-6B		EA-18G (FA-18E/F)		5	4	-	4	-	-	-	-	-	-
		Tornado		TORNADO			3	-	3	-	-	-	-	-	-
		F-22		F-22			7	-	7	-	-	-		-	-
	Bomber	B-52, B-2		B-52H			6	-	6	-	-	-	6	-	6
	Large Jet	737, C-40, 757, C-32, A-320		737-700			20	2	22	-	-	-	21	1	22
		747, A-340		747-400			12	1	13			-	12	1	13
		767, 777, A-330, A-310		767-CF6			23	2	25			-	24	1	25
		C-9		C-9A			1	-	1	-	-	-	1	-	1
		KC-10, MD-11, DC-10, KDC-11		KC-10A			54	4	58	-		-	55	3	58
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			141	11	152	-	-	-	144	8	152
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			83	2	85	-	-	-	84	1	85
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			12		12				12		12
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			81	-	81	-	-	-	79	2	81
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			58		58	-		-	58		58
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			22		22	-		-	22		22
Sub-Total Based							**4,431**	**140**	**4,571**	**525**	**-**	**525**	**1,393**	**157**	**1,550**
Transient	Fighter / Attack / Trainer						228	4	232	-	-	-	4	-	4
	Bomber						6	-	6	-	-	-	6	-	6
	Large Jet						251	20	271	-	-	-	257	14	271
	Large Cargo Jet						83	2	85	-	-	-	84	1	85
	Small Jet						12	-	12	-	-	-	12	-	12
	Large Turboprop						81	-	81	-	-	-	79	2	81
	Small Prop						58	-	58	-	-	-	58	-	58
	Helicopter						22	-	22	-	-	-	22	-	22
Sub-Total Transient							**741**	**26**	**767**	**-**	**-**	**-**	**522**	**17**	**539**
GRAND TOTAL							**5,172**	**166**	**5,338**	**525**	**-**	**525**	**1,915**	**174**	**2,089**

Notes:

1 F-16C based normal departures are split between mil (20%) and AB (80%); min risk departures are 100% AB

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

Table E-13. Annual Airfield Flight Operations for the No-Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - IFR [3]			Arrival - VFR [3]			Arrival - Pitchout		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based		n/a	0	F-35A			-	-	-	-	-	-	-	-	-
	18 AGRS		18	F-16C	F110-GE-100	1	523	27	550	175	-	175	1,839	-	1,839
	168 ARW		8	KC-135R			-	-	-	-	-	-	-	-	-
	CAP		5	GASEPF		2	-	-	-	112	-	112	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A			7	-	7	11	-	11	15	-	15
		AV 8		F-35B		4, 5	2	-	2	6	-	6	-	-	-
		F-15		F-15E	F100-PW-229		7	-	7	27	-	27	-	-	-
		F 16, Typhoon		F-16C	F110-GE-100	4	19	5	24	73	18	91	-	-	-
		F-18		F-35B		4, 5	3		3	10		10	-	-	-
				FA-18E/F		4, 5	2	-	2	9	-	9	-	-	-
		EA-6B		EA-18G (FA-18E/F)		5	1	-	1	3	-	3	-	-	-
		Tornado		TORNADO			1	-	1	2	-	2	1	-	1
		F-22		F-22			1	-	1	5	-	5	-	-	-
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	-	-	-
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	-	-	-
		747, A-340		747-400			-	-	-	-	-	-	-	-	-
		767, 777, A-330, A-310		767-CF6			-	-	-	-	-	-	-	-	-
		C-9		C-9A			-	-	-	-	-	-	-	-	-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			-	-	-	-	-	-	-	-	-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	-	-	-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	-	-	-
	Small Jet	C-37, C-20, C-21, U-35, U-36, UC-35, T-1		C-21A			-	-	-	-	-	-	-	-	-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, F-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	-	-	-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	-	-	-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	-	-	-
Sub-Total Based							**523**	**27**	**550**	**287**	**-**	**287**	**1,839**	**-**	**1,839**
Transient	Fighter / Attack / Trainer						43	5	48	146	18	164	16	-	16
	Bomber						-	-	-	-	-	-	-	-	-
	Large Jet						-	-	-	-	-	-	-	-	-
	Large Cargo Jet						-	-	-	-	-	-	-	-	-
	Small Jet						-	-	-	-	-	-	-	-	-
	Large Turboprop						-	-	-	-	-	-	-	-	-
	Small Prop						-	-	-	-	-	-	-	-	-
	Helicopter						-	-	-	-	-	-	-	-	-
Sub-Total Transient							**43**	**5**	**48**	**146**	**18**	**164**	**16**	**-**	**16**
GRAND TOTAL							**566**	**32**	**598**	**433**	**18**	**451**	**1,855**	**-**	**1,855**

Notes

1 F-16C based normal departures are split between mil (20%) and AB (80%); min risk departures are 100% AB

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

Table E-13. Annual Airfield Flight Operations for the No-Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - SFO			Arrival - Min Risk			Pattern - IFR [3]		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based		n/a	0	F-35A					-			-			-
	18 AGRS		18	F-16C	F110-GE-100	1	345	-	345	525	-	525	350	-	350
	168 ARW		8	KC-135R			-	-	-	-	-	-	1,076	807	1,883
	CAP		5	GASEPF		2	-	-	-	-	-	-	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A			-	-	-	-	-	-	-	-	-
		AV-8		F-35B		4, 5	-	-	-	-	-	-	-	-	-
		F-15		F-15E	F100-PW-229		-	-	-	-	-	-	-	-	-
		F-16, Typhoon		F-16C	F110-GE-100	4	-	-	-	-	-	-	-	-	-
		F-18		F-35B		4, 5	-	-	-	-	-	-	-	-	-
				FA-18E/F		4, 5	-	-	-	-	-	-	-	-	-
		EA-6B		EA-18G (FA-18E/F)		5	-	-	-	-	-	-	-	-	-
		Tornado		TORNADO			-	-	-	-	-	-	-	-	-
		F-22		F-22			-	-	-	-	-	-	-	-	-
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	-	-	-
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	-	-	-
		747, A-340		747-400			-	-	-	-	-	-	-	-	-
		767, 777, A-330, A-310		767-CF6			-	-	-	-	-	-	-	-	-
		C-9		C-9A			-	-	-	-	-	-	-	-	-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			-	-	-	-	-	-	-	-	-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	-	-	-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	-	-	-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			-	-	-	-	-	-	-	-	-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	-	-	-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	-	-	-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	-	-	-
Sub-Total Based							**345**	**-**	**345**	**525**	**-**	**525**	**1,426**	**807**	**2,233**
Transient	Fighter / Attack / Trainer						-	-	-	-	-	-	-	-	-
	Bomber						-	-	-	-	-	-	-	-	-
	Large Jet						-	-	-	-	-	-	-	-	-
	Large Cargo Jet						-	-	-	-	-	-	-	-	-
	Small Jet						-	-	-	-	-	-	-	-	-
	Large Turboprop						-	-	-	-	-	-	-	-	-
	Small Prop						-	-	-	-	-	-	-	-	-
	Helicopter						-	-	-	-	-	-	-	-	-
	Sub-Total Transient						**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
GRAND TOTAL							**345**	**-**	**345**	**525**	**-**	**525**	**1,426**	**807**	**2,233**

Notes:

1. F-16C based normal departures are split between mil (20%) and AB (80%); min risk departures are 100% AB
2. GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller
3. Each circuit counts as two operations
4. LFE uses 100% AB departures
5. Not previously modeled at Eielson AFB

Table E-13. Annual Airfield Flight Operations for the No-Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Pattern - VFR [3]			Pattern - SFO [3]			TOTAL		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based			0	F-35A											
	18 AGRS	n/a	18	F-16C	F110-GE-100	1	2,800	-	2,800	660	-	660	10,748	62	10,810
	168 ARW		8	KC-135R			538	269	807	-	-	-	2,284	1,338	3,622
	CAP		5	GASEPF		2	549	-	549	-	-	-	793	-	793
	210 RQS HH-60		1	SK70 (UH-60A)			188	-	188	-	-	-	2,204	-	2,204
Transient	Fighter/ Attack	A-10	n/a	A-10A			-	-	-	-	-	-	66	-	66
		AV-8		F-35B		4, 5	-	-	-	-	-	-	16	-	16
		F-15		F-15E	F100-PW-229		-	-	-	-	-	-	70	2	72
		F-16, Typhoon		F-16C	F110-GE-100	4	-	-	-	-	-	-	209	25	234
		F-18		F-35B		4, 5	-	-	-	-	-	-	25	-	25
				FA-18E/F		4, 5	-	-	-	-	-	-	23	-	23
		EA-6B		EA-18G (FA-18E/F)		5	-	-	-	-	-	-	8	-	8
		Tornado		TORNADO			-	-	-	-	-	-	7	-	7
		F-22		F-22			-	-	-	-	-	-	13	-	13
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	12	-	12
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	41	3	44
		747, A-340		747-400			-	-	-	-	-	-	24	2	26
		767, 777, A-330, A-310		767-CF6									47	3	50
		C-9		C-9A									2		2
		KC-10, MD-11, DC-10, KDC-11		KC-10A									109	7	116
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	285	19	304
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	167	3	170
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			-	-	-	-	-	-	24	-	24
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	160	2	162
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	116	-	116
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	44	-	44
Sub-Total Based							4,075	269	4,344	660	-	660	16,029	1,400	17,429
Transient	Fighter / Attack / Trainer						-	-	-	-	-	-	437	27	464
	Bomber						-	-	-	-	-	-	12	-	12
	Large Jet												508	34	542
	Large Cargo Jet						-	-	-	-	-	-	167	3	170
	Small Jet						-	-	-	-	-	-	24	-	24
	Large Turboprop							-					160	2	162
	Small Prop												116		116
	Helicopter												44		44
	Sub-Total Transient						-	-	-	-	-	-	1,468	66	1,534
GRAND TOTAL							4,075	269	4,344	660	-	660	17,497	1,466	18,963

Notes:

1 F-16C based normal departures are split between mil (20%) and AB (80%); min risk departures are 100% AB

GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller;

2 GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

5 Not previously modeled at Eielson AFB

Table E-14. Annual Airfield Flight Operations for the Proposed Action Alternative (CY21)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Departure			Departure - Min Risk			Arrival - Vectored		
							Day (0700-2200)	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*
Based	tbd	n/a	48	F-35A		1	7,172	172	7,344	1,296	-	1,296	163	-	163
	18 AGRS		18	F-16C	F110-GE-100	1	2,940	35	2,975	525	-	525	66	-	66
	168 ARW		8	KC-135R			361	105	466	-	-	-	309	157	466
	CAP		5	GASEPF		3	122	-	122	-	-	-	10	-	10
	210 RQS HH-60		1	SK70 (UH-60A)			1,008	-	1,008	-	-	-	1,008	-	1,008
Transient	Fighter/ Attack	A-10	n/a	A-10A			33	-	33	-	-	-	-	-	-
		AV-8		F-35B		**5, 6**	8	-	8	-	-	-	-	-	-
		F-15		**F-15E**	**F100-PW-229**		34	2	36	-	-	-	2	-	2
		F-16, Typhoon		F-16C	F110-GE-100	5	115	2	117	-	-	-	2	-	2
		F-18		F-35B		5, 6	12	-	12	-	-	-	-	-	-
				FA-18E/F		5?, 6	12	-	12	-	-	-	-	-	-
		EA-6B		EA-18G (FA-18E/F)		6	4	-	4	-	-	-	-	-	-
		Tornado		TORNADO			3	-	3	-	-	-	-	-	-
		F-22		F-22			7	-	7	-	-	-	-	-	-
	Bomber	B-52, B-2		B-52H			6	-	6	-	-	-	6	-	6
	Large Jet	737, C-40, 757, C-32, A-320		737-700			20	2	22	-	-	-	21	1	22
		747, A-340		747-400			12	1	13	-	-	-	12	1	13
		767, 777, A-330, A-310		767-CF6			23	2	25	-	-	-	24	1	25
		C-9		C-9A			1	-	1	-	-	-	1	-	1
		KC-10, MD-11, DC-10, KDC-11		KC-10A			54	4	58	-	-	-	55	3	58
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			141	11	152	-	-	-	144	8	152
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			83	2	85	-	-	-	84	1	85
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			12	-	12	-	-	-	12	-	12
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			81	-	81	-	-	-	79	2	81
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			58	-	58	-	-	-	58	-	58
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			22	-	22	-	-	-	22	-	22
Sub-Total Based							**11,603**	**312**	**11,915**	**1,821**	**-**	**1,821**	**1,556**	**157**	**1,713**
Transient	Fighter / Attack / Trainer						228	4	232	-	-	-	4	-	4
	Bomber						6	-	6	-	-	-	6	-	6
	Large Jet						251	20	271	-	-	-	257	14	271
	Large Cargo Jet						83	2	85	-	-	-	84	1	85
	Small Jet						12	-	12	-	-	-	12	-	12
	Large Turboprop						81	-	81	-	-	-	79	2	81
	Small Prop						58	-	58	-	-	-	58	-	58
	Helicopter						22	-	22	-	-	-	22	-	22
	Sub-Total Transient						**741**	**26**	**767**	**-**	**-**	**-**	**522**	**17**	**539**
GRAND TOTAL							**12,344**	**338**	**12,682**	**1,821**	**-**	**1,821**	**2,078**	**174**	**2,252**

Notes:

1 Based F-16C normal departures would be split between mil (20%) and AB (80%) for takeoff roll; min risk departures would be 100% AB; based F-35 departures would be split between mil (90%) and AB (10%) for takeoff roll

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

Table E-14. Annual Airfield Flight Operations for the Proposed Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - IFR [2]			Arrival - VFR [2]			Arrival - Pitchout		
							Day (0700-2200)	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*	*Day (0700-2200)*	*Night (2200-0700)*	*Total*
Based	tbd	n/a	48	F-35A		1	1,186	172	1,358	610	-	610	4,713	-	4,713
	18 AGRS		18	F-16C	F110-GE-100	1	523	27	550	175	-	175	1,839	-	1,839
	168 ARW		8	KC-135R			-	-	-	-	-	-	-	-	-
	CAP		5	GASEPF		3	-	-	-	112	-	112	-	-	-
	210 RQS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-
Transient	Fighter/ Attack	A-10	n/a	A-10A			7	-	7	11	-	11	15	-	15
		AV-8		F-35B		**5, 6**	2	-	2	6	-	6	-	-	-
		F-15		**F-15E**	**F100-PW-229**		7	-	7	27	-	27	-	-	-
		F-16, Typhoon		F-16C	F110-GE-100	5	19	5	24	73	18	91	-	-	-
		F-18		F-35B		5, 6	3	-	3	10	-	10	-	-	-
				FA-18E/F		5?, 6	2	-	2	9	-	9	-	-	-
		EA-6B		EA-18G (FA-18E/F)		6	1	-	1	3	-	3	-	-	-
		Tornado		TORNADO			1	-	1	2	-	2	1	-	1
		F-22		F-22			1	-	1	5	-	5	-	-	-
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	-	-	-
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	-	-	-
		747, A-340		747-400			-	-	-	-	-	-	-	-	-
		767, 777, A-330, A-310		767-CF6			-	-	-	-	-	-	-	-	-
		C-9		C-9A			-	-	-	-	-	-	-	-	-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			-	-	-	-	-	-	-	-	-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	-	-	-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	-	-	-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			-	-	-	-	-	-	-	-	-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	-	-	-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	-	-	-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	-	-	-
Sub-Total Based							**1,709**	**199**	**1,908**	**897**	**-**	**897**	**6,552**	**-**	**6,552**
Transient	Fighter / Attack / Trainer						43	5	48	146	18	164	16	-	16
	Bomber						-	-	-	-	-	-	-	-	-
	Large Jet						-	-	-	-	-	-	-	-	-
	Large Cargo Jet						-	-	-	-	-	-	-	-	-
	Small Jet						-	-	-	-	-	-	-	-	-
	Large Turboprop						-	-	-	-	-	-	-	-	-
	Small Prop						-	-	-	-	-	-	-	-	-
	Helicopter						-	-	-	-	-	-	-	-	-
	Sub-Total Transient						**43**	**5**	**48**	**146**	**18**	**164**	**16**	**-**	**16**
GRAND TOTAL							**1,752**	**204**	**1,956**	**1,043**	**18**	**1,061**	**6,568**	**-**	**6,568**

Notes:

1 Based F-16C normal departures would be split between mil (20%) and AB (80%) for takeoff roll; min risk departures would be 100% AB; based F-35 departures would be split between mil (90%) and AB (10%) for takeoff roll

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

Table E-14. Annual Airfield Flight Operations for the Proposed Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/ Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Arrival - PFO/SFO			Arrival - Min Risk			Pattern - IFR[2]			Pattern - VFR[2]		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	tbd	n/a	48	F-35A		1	500	-	500	1,296	-	1,296	778	-	778	6,048	-	6,048
	18 AGRS		18	F-16C	F110-GE-100	1	345	-	345	525	-	525	350	-	350	2,800	-	2,800
	168 ARW		8	KC-135R			-	-	-	-	-	-	1,076	807	1,883	538	269	807
	CAP		5	GASEPF		2	-	-	-	-	-	-	-	-	-	549	-	549
	210 RGS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-	188	-	188
Transient	Fighter/ Attack	A-10	n/a	A-10A			-	-	-	-	-	-	-	-	-	-	-	-
		AV-8		F-35B		4,5	-	-	-	-	-	-	-	-	-	-	-	-
		F-15		F-15E	F100-PW-229		-	-	-	-	-	-	-	-	-	-	-	-
		F-16, Typhoon		F-16C	F110-GE-100	4	-	-	-	-	-	-	-	-	-	-	-	-
		F-18		F-35B		4, 5	-	-	-	-	-	-	-	-	-	-	-	-
				FA-18E/F		4, 5	-	-	-	-	-	-	-	-	-	-	-	-
		EA-6B		EA-18G (FA-18E/F)		5	-	-	-	-	-	-	-	-	-	-	-	-
		Tornado		TORNADO			-	-	-	-	-	-	-	-	-	-	-	-
		F-22		F-22			-	-	-	-	-	-	-	-	-	-	-	-
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	-	-	-	-	-	-
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	-	-	-	-	-	-
		747, A-340		747-400			-	-	-	-	-	-	-	-	-	-	-	-
		767, 777, A-330, A-310		767-CF6			-	-	-	-	-	-	-	-	-	-	-	-
		C-9		C-9A			-	-	-	-	-	-	-	-	-	-	-	-
		KC-10, MD-11, DC-10, KDC-11		KC-10A			-	-	-	-	-	-	-	-	-	-	-	-
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	-	-	-	-	-	-
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	-	-	-	-	-	-
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			-	-	-	-	-	-	-	-	-	-	-	-
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	-	-	-	-	-	-
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	-	-	-	-	-	-
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Based							845	-	845	1,821	-	1,821	2,204	807	3,011	10,123	269	10,392
Transient	Fighter / Attack / Trainer						-	-	-	-	-	-	-	-	-	-	-	-
	Bomber						-	-	-	-	-	-	-	-	-	-	-	-
	Large Jet						-	-	-	-	-	-	-	-	-	-	-	-
	Large Cargo Jet						-	-	-	-	-	-	-	-	-	-	-	-
	Small Jet						-	-	-	-	-	-	-	-	-	-	-	-
	Large Turboprop						-	-	-	-	-	-	-	-	-	-	-	-
	Small Prop						-	-	-	-	-	-	-	-	-	-	-	-
	Helicopter						-	-	-	-	-	-	-	-	-	-	-	-
Sub-Total Transient							-	-	-	-	-	-	-	-	-	-	-	-
GRAND TOTAL							845	-	845	1,821	-	1,821	2,204	807	3,011	10,123	269	10,392

Notes:

1 Based F-16C normal departures would be split between mil (20%) and AB (80%) for takeoff roll; min risk departures would be 100% AB; based F-35 departures would be split between mil (90%) and AB (10%) for takeoff roll

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

Table E-14. Annual Airfield Flight Operations for the Proposed Action Alternative (CY21) (continued)

Category	Representing Squadron/ Group	Aircraft in Squadron/ Group	PAA	Modeled Aircraft Type	Engine (if necessary)	Note	Pattern - VFR Reentry w/o Break [3]			Pattern - VFR Reentry w/Break [3]			Pattern - PFO/SFO [3]			TOTAL		
							Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	tbd	n/a	48	F-35A		1	-	-	-	-	-	-	2,000	-	2,000	25,762	344	26,106
	18 AGRS		18	F-16C	F110-GE-100	1	-	-	-	-	-	-	660	-	660	10,748	62	10,810
	168 ARW		8	KC-135R			-	-	-	-	-	-	-	-	-	2,284	1,338	3,622
	CAP		5	GASEPF		2	-	-	-	-	-	-	-	-	-	793	-	793
	210 RQS HH-60		1	SK70 (UH-60A)			-	-	-	-	-	-	-	-	-	2,204	-	2,204
Transient	Fighter/ Attack	A-10	n/a	A-10A			-	-	-	-	-	-	-	-	-	66	-	66
		AV-8		F-35B		4,5	-	-	-	-	-	-	-	-	-	16	-	16
		F-15		F-15E	F100-PW-229		-	-	-	-	-	-	-	-	-	70	2	72
		F-16, Typhoon		F-16C	F110-GE-100	4	-	-	-	-	-	-	-	-	-	209	25	234
		F-18		F-35B		4, 5	-	-	-	-	-	-	-	-	-	25	-	25
				FA-18E/F		4, 5	-	-	-	-	-	-	-	-	-	23	-	23
		EA-6B		EA-18G (FA-18E/F)		5	-	-	-	-	-	-	-	-	-	8	-	8
		Tornado		TORNADO			-	-	-	-	-	-	-	-	-	7	-	7
		F-22		F-22			-	-	-	-	-	-	-	-	-	13	-	13
	Bomber	B-52, B-2		B-52H			-	-	-	-	-	-	-	-	-	12	-	12
	Large Jet	737, C-40, 757, C-32, A-320		737-700			-	-	-	-	-	-	-	-	-	41	3	44
		747, A-340		747-400			-	-	-	-	-	-	-	-	-	24	2	26
		767, 777, A-330, A-310		767-CF6			-	-	-	-	-	-	-	-	-	47	3	50
		C-9		C-9A			-	-	-	-	-	-	-	-	-	2	-	2
		KC-10, MD-11, DC-10, KDC-11		KC-10A			-	-	-	-	-	-	-	-	-	109	7	116
		KC-135, RC-135, WC-135, TC-135, E-6, E-8B, E-3		KC-135R			-	-	-	-	-	-	-	-	-	285	19	304
	Large Cargo Jet	C-17, C-5, AN-124		C-5A			-	-	-	-	-	-	-	-	-	167	3	170
	Small Jet	C-37, C-20, C-21, LJ-35, LJ-36, UC-35, T-1		C-21A			-	-	-	-	-	-	-	-	-	24	-	24
	Large Turboprop	C-130, L-100, C-110, C-23, D-328, DC-6, E-2, P-3, KC-130J		C-130H&N&P			-	-	-	-	-	-	-	-	-	160	2	162
	Small Prop	C-12, C-441, C-206, PA-28, PA-46T		C-12			-	-	-	-	-	-	-	-	-	116	-	116
	Helicopter	UH-60, HH-60, AS-350, CH-47, JetRanger, OH-58		H-60			-	-	-	-	-	-	-	-	-	44	-	44
Sub-Total Based							-	-	-	-	-	-	2,660	-	2,660	41,791	1,744	43,535
Transient	Fighter/ Attack/ Trainer						-	-	-	-	-	-	-	-	-	437	77	514
	Bomber						-	-	-	-	-	-	-	-	-	12	-	12
	Large Jet						-	-	-	-	-	-	-	-	-	508	34	542
	Large Cargo Jet						-	-	-	-	-	-	-	-	-	167	3	170
	Small Jet						-	-	-	-	-	-	-	-	-	24	-	24
	Large Turboprop						-	-	-	-	-	-	-	-	-	160	2	162
	Small Prop						-	-	-	-	-	-	-	-	-	116	-	116
	Helicopter						-	-	-	-	-	-	-	-	-	44	-	44
	Sub-Total Transient						-	-	-	-	-	-	-	-	-	1,468	66	1,534
GRAND TOTAL							#REF!	#REF!	#REF!	#REF!	#REF!	#REF!	2,660	-	2,660	43,259	1,810	45,069

Notes:

1 Based F-16C normal departures would be split between mil (20%) and AB (80%) for takeoff roll; min risk departures would be 100% AB; based F-35 departures would be split between mil (90%) and AB (10%) for takeoff roll

2 GASEPF Fix Pitch = General Aviation, Single-engine, propeller-driven, fixed-pitch propeller; GASEPV Var Pitch = General Aviation, Single-engine, propeller-driven, variable-pitch propeller

3 Each circuit counts as two operations

4 LFE uses 100% AB departures

Table E-15. Eielson AFB Annual Run-Up Operations under Baseline

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-16C	F110 GE 100	F16 Engine Run ups for Leak, Fuel Transfer and Phase Ops	4BD3	199	18	75%	25%	74 % NC	5	1
			4BD1	199	18	75%	25%	74 % NC	5	1
			8BB9	199	18	75%	25%	74 % NC	5	1
			8BB1	199	18	75%	25%	74 % NC	5	1
		F16 Engine Run ups for Systems Check and Trouleshooting	CH02	19	44	80%	20%	74 % NC	20	1
			CH10	19	44	80%	20%	74 % NC	20	1
			4BD3	199	44	80%	20%	74 % NC	20	1
			4BD1	199	44	80%	20%	74 % NC	20	1
			8B11	199	44	80%	20%	74 % NC	20	1
			8BB9	199	44	80%	20%	74 % NC	20	1
			8BB3	199	44	80%	20%	74 % NC	20	1
			8BB1	199	44	80%	20%	74 % NC	20	1
		F16 Engine Run ups for Augmenter Runs at Trim Pad	KCTP	349	18	50%	50%	74 % NC	15	1
								90 % NC	8	1
								104 % NC	4	1
		F16 Engine Run ups for Phase Dock	4BD1	199	24	95%	5%	74 % NC	10	1
					0			85 % NC	10	1
			8B11	199	24	95%	5%	74 % NC	10	1
					0			85 % NC	10	1
			8BB9	199	24	95%	5%	74 % NC	10	1
					0			85 % NC	10	1
			8BB3	199	24	95%	5%	74 % NC	10	1
					0			85 % NC	10	1
			8BB1	199	24	95%	5%	74 % NC	10	1
					0			85 % NC	10	1
		F16 Pre-Flight Warmup/Post Flight Cool Down Run ups	CH02	19	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			CH10	19	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			4BD3	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			4BD1	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			8B11	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			8BB9	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			8BB3	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
			8BB1	199	438	99%	1%	74 % NC	20	1
					0			74 % NC	5	1
		F16 Arming Run Up on Runway 31	A312	182	1663	100%	0%	74 % NC	10	1
			A314	182	1663	100%	0%	74 % NC	10	1
		F16 Arming Run Up on Runway 13	A133	134	88	100%	0%	74 % NC	10	1
			A136	134	88	100%	0%	74 % NC	10	1
		F16 De-Arming Run Up on Sierra Loop	SER3	104	1750	100%	0%	74 % NC	5	1
			SER5	104	1750	100%	0%	74 % NC	5	1

Table E-15. Eielson AFB Annual Run-Up Operations under Baseline (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based KC-135R	F108-CF-100	KC-135R Fuel Transfer Operations	KC15	74	155	100%	0%	18.9 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	15	4
		KC-135R Leak and Operational Check Run ups	KC15	74	42	100%	0%	18.9 % NF	5	4
			KC17	74	42	100%	0%	18.9 % NF	5	4
			KC19	74	42	100%	0%	18.9 % NF	5	4
		KC-135R Pre-Phase Check Run ups	KC13	74	155	100%	0%	18.9 % NF	25	4
					0			75 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	25	4
					0			75 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	25	4
					0			75 % NF	15	4
		KC-135R Trim Check Run ups at Trim Pad	KCTP	349	466	100%	0%	18.9 % NF	20	2
					0			70 % NF	45	2
					0			90 % NF	30	2
		KC-135R Pre-Flight Check Run ups when below 20F	KC13	74	117	100%	0%	18.9 % NF	5	4
			KC15	74	117	100%	0%	18.9 % NF	5	4
			KC17	74	117	100%	0%	18.9 % NF	5	4
			KC19	74	117	100%	0%	18.9 % NF	5	4
Based Aero Club & CAP (OV-10A)	T76-G-416/417	AEROCLUB & CAP AIRCRAFT ROUTINE MAINTENANCE	1121	314	122	100%	0%	70 % RPM	5	1

Table E-15. Eielson AFB Annual Run-Up Operations under Baseline (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-16 (F110-GE-100 in a hush house) (out-of-frame, unless otherwise indicated)	F100-PW-100	F16 Engine Leak Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	12	1
					0			80 % RPM	10	1
					0			92 % RPM	5 sec	1
		F16 Engine VIB Survey Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
					0			72 % RPM	15 sec	1
					0			76 % RPM	15 sec	1
					0			80 % RPM	15 sec	1
					0			83 % RPM	15 sec	1
					0			86 % RPM	15 sec	1
					0			89 % RPM	15 sec	1
					0			92 % RPM	15 sec	1
					0			AB	15 sec	1
		F16 uninstalled Engine Functional Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
					0			80 % RPM	60 sec	1
					0			90 % RPM	6	1
		F16 Engine Augmentor Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
					0			85 % RPM	5	1
					0			AB	2	1
		F16 Break in Check Run up at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	10	1
								76 % RPM	5	1
								78 % RPM	5	1
								80 % RPM	5	1
								84 % RPM	6	1
								86 % RPM	10	1
								92 % RPM	10	1
								AB	4	1
		F16 Operational Checks at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	15	1
								92 % RPM	10	1
								AB	5	1
Transient A-10A	TF34-GE-100	EXERCISE A10 AND SIMILAR AIRCRAFT PREFLIGHT WARMUP/SYSCHECKS	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT ARMING BEFORE SORTIES	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT DEARMING AFTER	A103	314	17	100%	0%	64 % NC	5	1
			A105	314	17	100%	0%	64 % NC	5	1

Table E-15. Eielson AFB Annual Run-Up Operations under Baseline (concluded)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Transient EA-6B	J52 P 408	EXERCISE EA-6B AND SIMILAR	RR12	204	2	100%	0%	60 % RPM	5	2
		AIRCRAFT PREFLIGHT ARMING	RR16	204	2	100%	0%	60 % RPM	5	2
		EXERCISE EA-6B AND SIMILAR	A103	314	2	100%	0%	60 % RPM	10	2
		AIRCRAFT PREFLIGHT De-ARMING	A105	314	2	100%	0%	60 % RPM	10	2
Transient F-16C	F110-GE-100	EXERCISE F 16 AND OTHER	PR15	204	39	98%	2%	74 % NC	10	1
		SIMILAR EXERCISE AIRCRAFT -	SR02	64	39	98%	2%	74 % NC	10	1
		Arming	QR13	64	39	98%	2%	74 % NC	10	1
		EXERCISE F 16 AND OTHER	A103	314	59	98%	2%	74 % NC	5	1
		SIMILAR EXERCISE AIRCRAFT -	A105	314	59	98%	2%	74 % NC	5	1
Transient F-18A/C	F404 GE 400&402	EXERCISE F-18 AND OTHER	PR15	204	4	100%	0%	63 % NC	10	2
		SIMILAR EXERCISE AIRCRAFT -	QR13	64	4	100%	0%	63 % NC	10	2
		Arming	SR02	64	4	100%	0%	63 % NC	10	2
		EXERCISE F-18 AND OTHER	A103	314	4	100%	0%	63 % NC	5	2
		SIMILAR EXERCISE AIRCRAFT -	A105	314	4	100%	0%	63 % NC	5	2
Transient F-18E/F	F414-GE-400	EXERCISE F-18 AND OTHER	PR15	204	4	100%	0%	63 % NC	10	2
		SIMILAR EXERCISE AIRCRAFT -	QR13	64	4	100%	0%	63 % NC	10	2
		Arming	SR02	64	4	100%	0%	63 % NC	10	2
		EXERCISE F-18 AND OTHER	A103	314	1	100%	0%	63 % NC	5	2
		SIMILAR EXERCISE AIRCRAFT -	A105	314	1	100%	0%	63 % NC	5	2
Transient TORNADO	RB.199-34R-04	EXERCISE TORNADO, JAGUAR OR	PR01	204	1	100%	0%	65 % RPM	10	2
		SIMILAR EXERCISE AIRCRAFT -	QR03	64	1	100%	0%	65 % RPM	10	2
		Arming	PR05	204	1	100%	0%	65 % RPM	10	2
			QR08	64	1	100%	0%	65 % RPM	10	2
			PR10	204	1	100%	0%	65 % RPM	10	2
			QR13	64	1	100%	0%	65 % RPM	10	2
		EXERCISE TORNADO, JAGUAR OR	A103	314	2	100%	0%	65 % RPM	5	2
		SIMILAR EXERCISE AIRCRAFT -	A105	314	2	100%	0%	65 % RPM	5	2

Table E-16. Eielson AFB Run-Up Operations under the No-Action Alternative

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-16C	F110-GE-100	F16 Engine Run ups for Leak, Fuel Transfer and Phase Ops	4BD3	199	18	75%	25%	74 % NC	5	1
			4BD1	199	18	75%	25%	74 % NC	5	1
			8BB9	199	18	75%	25%	74 % NC	5	1
			8BB1	199	18	75%	25%	74 % NC	5	1
		F16 Engine Run ups for Systems Check and Trouleshooting	CH02	19	44	80%	20%	74 % NC	20	1
			CH10	19	44	80%	20%	74 % NC	20	1
			4BD3	199	44	80%	20%	74 % NC	20	1
			4BD1	199	44	80%	20%	74 % NC	20	1
			8B11	199	44	80%	20%	74 % NC	20	1
			8BB9	199	44	80%	20%	74 % NC	20	1
			8BB3	199	44	80%	20%	74 % NC	20	1
			8BB1	199	44	80%	20%	74 % NC	20	1
		F16 Engine Run ups for Augmenter Runs at Trim Pad	KCTP	349	18	50%	50%	74 % NC	15	1
								90 % NC	8	1
								104 % NC	4	1
		F16 Engine Run ups for Phase Dock	4BD1	199	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			8B11	199	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			8BB9	199	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			8BB3	199	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			8BB1	199	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
		F16 Pre-Flight Warmup/Post Flight Cool Down Run ups	CH02	19	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			CH10	19	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			4BD3	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			4BD1	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			8B11	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			8BB9	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			8BB3	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
			8BB1	199	438	99%	1%	74 % NC	20	1
								74 % NC	5	1
		F16 Arming Run Up on Runway 31	A312	182	1663	100%	0%	74 % NC	10	1
			A314	182	1663	100%	0%	74 % NC	10	1
		F16 Arming Run Up on Runway 13	A133	134	88	100%	0%	74 % NC	10	1
			A136	134	88	100%	0%	74 % NC	10	1
		F16 De-Arming Run Up on Sierra Loop	SER3	104	1750	100%	0%	74 % NC	5	1
			SER5	104	1750	100%	0%	74 % NC	5	1

Table E-16. Eielson AFB Run-Up Operations under the No-Action Alternative (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based KC-135R	F108-CF-100	KC-135R Fuel Transfer Operations	KC15	74	155	100%	0%	18.9 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	15	4
		KC-135R Leak and Operational Check Run ups	KC15	74	42	100%	0%	18.9 % NF	5	4
			KC17	74	42	100%	0%	18.9 % NF	5	4
			KC19	74	42	100%	0%	18.9 % NF	5	4
		KC-135R Pre-Phase Check Run ups	KC13	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
		KC-135R Trim Check Run ups at Trim Pad	KCTP	349	466	100%	0%	18.9 % NF	20	2
								70 % NF	45	2
								90 % NF	30	2
		KC-135R Pre-Flight Check Run ups when below 20F	KC13	74	117	100%	0%	18.9 % NF	5	4
			KC15	74	117	100%	0%	18.9 % NF	5	4
			KC17	74	117	100%	0%	18.9 % NF	5	4
			KC19	74	117	100%	0%	18.9 % NF	5	4
Based Aero Club & CAP (OV-10A)	T76-G-416/417	AEROCLUB & CAP AIRCRAFT ROUTINE MAINTENANCE	1121	314	122	100%	0%	70 % RPM	5	1

Table E-16. Eielson AFB Run-Up Operations under the No-Action Alternative (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-16 (F110-GE-100 in a hush house) (out-of-frame, unless otherwise indicated)	F100-PW-100	F16 Engine Leak Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	12	1
								80 % RPM	10	1
								92 % RPM	5 sec	1
		F16 Engine VIB Survey Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								72 % RPM	15 sec	1
								76 % RPM	15 sec	1
								80 % RPM	15 sec	1
								83 % RPM	15 sec	1
								86 % RPM	15 sec	1
								89 % RPM	15 sec	1
								92 % RPM	15 sec	1
								AB	15 sec	1
		F16 uninstalled Engine Functional Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								80 % RPM	60 sec	1
								90 % RPM	6	1
		F16 Engine Augmentor Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								85 % RPM	5	1
								AB	2	1
		F16 Break in Check Run up at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	10	1
								76 % RPM	5	1
								78 % RPM	5	1
								80 % RPM	5	1
								84 % RPM	6	1
								86 % RPM	10	1
								92 % RPM	10	1
								AB	4	1
		F16 Operational Checks at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	15	1
								92 % RPM	10	1
								AB	5	1
Transient A-10A	TF34-GE-100	EXERCISE A10 AND SIMILAR AIRCRAFT PREFLIGHT WARMUP/SYSCHECKS	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT ARMING BEFORE SORTIES	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT DEARMING AFTER	A103	314	17	100%	0%	64 % NC	5	1
			A105	314	17	100%	0%	64 % NC	5	1

Table E-16. Eielson AFB Run-Up Operations under the No-Action Alternative (concluded)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Transient EA-18G	F414-GE-400	EXERCISE EA-6B AND SIMILAR AIRCRAFT PREFLIGHT ARMING	RR12	204	2	100%	0%	65 % RPM	10	2
			RR16	204	2	100%	0%	65 % RPM	10	2
		EXERCISE EA-6B AND SIMILAR AIRCRAFT PREFLIGHT De-ARMING	A103	314	2	100%	0%	65 % RPM	5	2
			A105	314	2	100%	0%	65 % RPM	5	2
Transient F-16C	F110-GE-100	EXERCISE F-16 AND OTHER SIMILAR EXERCISE AIRCRAFT - Arming	PR15	204	39	98%	2%	74 % NC	10	1
			SR02	64	39	98%	2%	74 % NC	10	1
			QR13	64	39	98%	2%	74 % NC	10	1
		EXERCISE F-16 AND OTHER SIMILAR EXERCISE AIRCRAFT -	A103	314	59	98%	2%	74 % NC	5	1
			A105	314	59	98%	2%	74 % NC	5	1
Transient F-18E/F and F-15	F414-GE-400	EXERCISE F-18 AND OTHER SIMILAR EXERCISE AIRCRAFT - Arming	PR15	204	16	96%	4%	63 % NC	10	2
			QR13	64	16	96%	4%	63 % NC	10	2
			SR02	64	16	96%	4%	63 % NC	10	2
		EXERCISE F-18 AND OTHER SIMILAR EXERCISE AIRCRAFT -	A103	314	2	96%	4%	63 % NC	5	2
			A105	314	2	96%	4%	63 % NC	5	2
Transient TORNADO	RB.199-34R-04	EXERCISE TORNADO, JAGUAR OR SIMILAR EXERCISE AIRCRAFT - Arming	PR01	204	1	100%	0%	65 % RPM	10	2
			QR03	64	1	100%	0%	65 % RPM	10	2
			PR05	204	1	100%	0%	65 % RPM	10	2
			QR08	64	1	100%	0%	65 % RPM	10	2
			PR10	204	1	100%	0%	65 % RPM	10	2
			QR13	64	1	100%	0%	65 % RPM	10	2
		EXERCISE TORNADO, JAGUAR OR SIMILAR EXERCISE AIRCRAFT -	A103	314	2	100%	0%	65 % RPM	5	2
			A105	314	2	100%	0%	65 % RPM	5	2

Table E-17. Eielson AFB Run-Up Operations under the Proposed Action Alternative

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-16C	F110-GE-100	F16 Engine Run ups for Leak, Fuel Transfer and Phase Ops	LMA7	224	18	75%	25%	74 % NC	5	1
			227A	44	18	75%	25%	74 % NC	5	1
			228C	224	18	75%	25%	74 % NC	5	1
			227B	44	18	75%	25%	74 % NC	5	1
		F16 Engine Run ups for Systems Check and Trouleshooting	LMA7	224	73	80%	20%	74 % NC	20	1
			227A	44	73	80%	20%	74 % NC	20	1
			228C	224	73	80%	20%	74 % NC	20	1
			228D	224	73	80%	20%	74 % NC	20	1
			227B	44	73	80%	20%	74 % NC	20	1
		F16 Engine Run ups for Augmenter Runs at Trim Pad	KCTP	349	18	50%	50%	74 % NC	15	1
								90 % NC	8	1
								104 % NC	4	1
		F16 Engine Run ups for Phase Dock	LMA7	224	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			227A	44	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			228C	224	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			228D	224	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
			227B	44	24	95%	5%	74 % NC	10	1
								85 % NC	10	1
		F16 Pre-Flight Warmup/Post Flight Cool Down Run ups	LMA7	224	700	99%	1%	74 % NC	20	1
								74 % NC	5	1
			227A	44	700	99%	1%	74 % NC	20	1
								74 % NC	5	1
			228C	224	700	99%	1%	74 % NC	20	1
								74 % NC	5	1
			228D	224	700	99%	1%	74 % NC	20	1
								74 % NC	5	1
			227B	44	700	99%	1%	74 % NC	20	1
								74 % NC	5	1
		F16 Arming Run Up on Runway 31	A312	182	1663	100%	0%	74 % NC	10	1
			A314	182	1663	100%	0%	74 % NC	10	1
		F16 Arming Run Up on Runway 13	A133	134	88	100%	0%	74 % NC	10	1
			A136	134	88	100%	0%	74 % NC	10	1
		F16 De-Arming Run Up on Sierra Loop	SER3	104	1750	100%	0%	74 % NC	5	1
			SER5	104	1750	100%	0%	74 % NC	5	1

Table E-17. Eielson AFB Run-Up Operations under the Proposed Action Alternative (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based F-35A	F-135-PW-100	High RPM/Low Thrust MBIT	8BB3	199	9	100%	0%	10 %ETR	5	1
					9	100%	0%	31 %ETR	3	1
					9	100%	0%	10 %ETR	5	1
			8B11	199	9	100%	0%	10 %ETR	5	1
					9	100%	0%	31 %ETR	3	1
					9	100%	0%	10 %ETR	5	1
			CH02	19	9	100%	0%	10 %ETR	5	1
					9	100%	0%	31 %ETR	3	1
					9	100%	0%	10 %ETR	5	1
			CH10	19	9	100%	0%	10 %ETR	5	1
					9	100%	0%	31 %ETR	3	1
					9	100%	0%	10 %ETR	5	1
		Post Maintenance MBIT	8BB3	199	49	100%	0%	10 %ETR	5	1
					49	100%	0%	10 %ETR	3	1
					49	100%	0%	10 %ETR	5	1
			8B11	199	49	100%	0%	10 %ETR	5	1
					49	100%	0%	10 %ETR	3	1
					49	100%	0%	10 %ETR	5	1
			CH02	19	49	100%	0%	10 %ETR	5	1
					49	100%	0%	10 %ETR	3	1
					49	100%	0%	10 %ETR	5	1
			CH10	19	49	100%	0%	10 %ETR	5	1
					49	100%	0%	10 %ETR	3	1
					49	100%	0%	10 %ETR	5	1
Based KC-135R	F108-CF-100	KC-135R Fuel Transfer Operations	KC15	74	155	100%	0%	18.9 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	15	4
		KC-135R Leak and Operational Check Run ups	KC15	74	42	100%	0%	18.9 % NF	5	4
			KC17	74	42	100%	0%	18.9 % NF	5	4
			KC19	74	42	100%	0%	18.9 % NF	5	4
		KC-135R Pre-Phase Check Run ups	KC13	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
			KC17	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
			KC19	74	155	100%	0%	18.9 % NF	25	4
								75 % NF	15	4
		KC-135R Trim Check Run ups at Trim Pad	KCTP	349	466	100%	0%	18.9 % NF	20	2
								70 % NF	45	2
								90 % NF	30	2
		KC-135R Pre-Flight Check Run ups when below 20F	KC13	74	117	100%	0%	18.9 % NF	5	4
			KC15	74	117	100%	0%	18.9 % NF	5	4
			KC17	74	117	100%	0%	18.9 % NF	5	4
			KC19	74	117	100%	0%	18.9 % NF	5	4

Table E-17. Eielson AFB Run-Up Operations under the Proposed Action Alternative (continued)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Based Aero Club & CAP (OV-10A)	T76-G 416/417	AEROCLUB & CAP AIRCRAFT ROUTINE MAINTENANCE	1121	314	122	100%	0%	70 % RPM	5	1
Based F-16 (F110-GE-100 in a hush house) (out-of-frame, unless otherwise indicated)	F100-PW-100	F16 Engine Leak Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	12	1
								80 % RPM	10	1
								92 % RPM	5 sec	1
		F16 Engine VIB Survey Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								72 % RPM	15 sec	1
								76 % RPM	15 sec	1
								80 % RPM	15 sec	1
								83 % RPM	15 sec	1
								86 % RPM	15 sec	1
								89 % RPM	15 sec	1
								92 % RPM	15 sec	1
								AB	15 sec	1
		F16 uninstalled Engine Functional Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								80 % RPM	60 sec	1
								90 % RPM	6	1
		F16 Engine Augmentor Check Run up at Hush House	HH	144	60	54%	46%	68 % RPM	10	1
								85 % RPM	5	1
								AB	2	1
		F16 Break in Check Run up at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	10	1
								76 % RPM	5	1
								78 % RPM	5	1
								80 % RPM	5	1
								84 % RPM	6	1
								86 % RPM	10	1
								92 % RPM	10	1
								AB	4	1
		F16 Operational Checks at Hush House **(in frame)**	HH	144	36	50%	50%	68 % RPM	15	1
								92 % RPM	10	1
								AB	5	1

Table E-17. Eielson AFB Run-Up Operations under the Proposed Action Alternative (concluded)

Aircraft	Modeled Engine ID	Test Name	Location ID	Magnetic Headin (deg)	Annual Events	% Day (0700-2200)	% Night (2200-0700)	Reported Power Setting	Duration at Power Setting (in minutes) per event	Number of Engines Running Per Event
Transient A-10A	TF34-GE-100	EXERCISE A10 AND SIMILAR AIRCRAFT PREFLIGHT WARMUP/SYSCHECKS	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT ARMING BEFORE SORTIES	RR06	204	8	100%	0%	64 % NC	10	1
			RR10	204	8	100%	0%	64 % NC	10	1
			SR04	64	8	100%	0%	64 % NC	10	1
			SR08	64	8	100%	0%	64 % NC	10	1
		EXERCISE A10 AND SIMILAR AIRCRAFT DEARMING AFTER	A103	314	17	100%	0%	64 % NC	5	1
			A105	314	17	100%	0%	64 % NC	5	1
Transient EA-18G	F414-GE-400	EXERCISE EA-6B AND SIMILAR AIRCRAFT PREFLIGHT ARMING	RR12	204	2	100%	0%	65 % RPM	10	2
			RR16	204	2	100%	0%	65 % RPM	10	2
		EXERCISE EA-6B AND SIMILAR AIRCRAFT PREFLIGHT De-ARMING	A103	314	2	100%	0%	65 % RPM	5	2
			A105	314	2	100%	0%	65 % RPM	5	2
Transient F-16C	F110-GE-100	EXERCISE F-16 AND OTHER SIMILAR EXERCISE AIRCRAFT - Arming	PR15	204	39	98%	2%	74 % NC	10	1
			SR02	64	39	98%	2%	74 % NC	10	1
			QR13	64	39	98%	2%	74 % NC	10	1
		EXERCISE F-16 AND OTHER SIMILAR EXERCISE AIRCRAFT -	A103	314	59	98%	2%	74 % NC	5	1
			A105	314	59	98%	2%	74 % NC	5	1
Transient F-18E/F and F-15	F414-GE-400	EXERCISE F-18 AND OTHER SIMILAR EXERCISE AIRCRAFT Arming	PR15	204	16	96%	4%	63 % NC	10	2
			QR13	64	16	96%	4%	63 % NC	10	2
			SR02	64	16	96%	4%	63 % NC	10	2
		EXERCISE F-18 AND OTHER SIMILAR EXERCISE AIRCRAFT	A103	314	2	96%	4%	63 % NC	5	2
			A105	314	2	96%	4%	63 % NC	5	2
Transient TORNADO	RB.199-34R-04	EXERCISE TORNADO, JAGUAR OR SIMILAR EXERCISE AIRCRAFT Arming	PR01	204	1	100%	0%	65 % RPM	10	2
			QR03	64	1	100%	0%	65 % RPM	10	2
			PR05	204	1	100%	0%	65 % RPM	10	2
			QR08	64	1	100%	0%	65 % RPM	10	2
			PR10	204	1	100%	0%	65 % RPM	10	2
			QR13	64	1	100%	0%	65 % RPM	10	2
		EXERCISE TORNADO, JAGUAR OR SIMILAR EXERCISE AIRCRAFT -	A103	314	2	100%	0%	65 % RPM	5	2
			A105	314	2	100%	0%	65 % RPM	5	2

Figure E-16. Eielson AFB Run Up Locations

The airfield noise analysis was conducted according to established U.S. DoD guidelines and best practices and employed the U.S. DoD NOISEMAP suite of computer-based modeling tools (Czech 2014; Wasmer and Maunsell 2006a; Wasmer and Maunsell 2006b). Table E-18 lists the modeling parameters relevant to this study. The Rotorcraft Noise Model (RNM) component of the NOISEMAP suite was not used for this study.

Table E-18. Airfield Noise Modeling Parameters

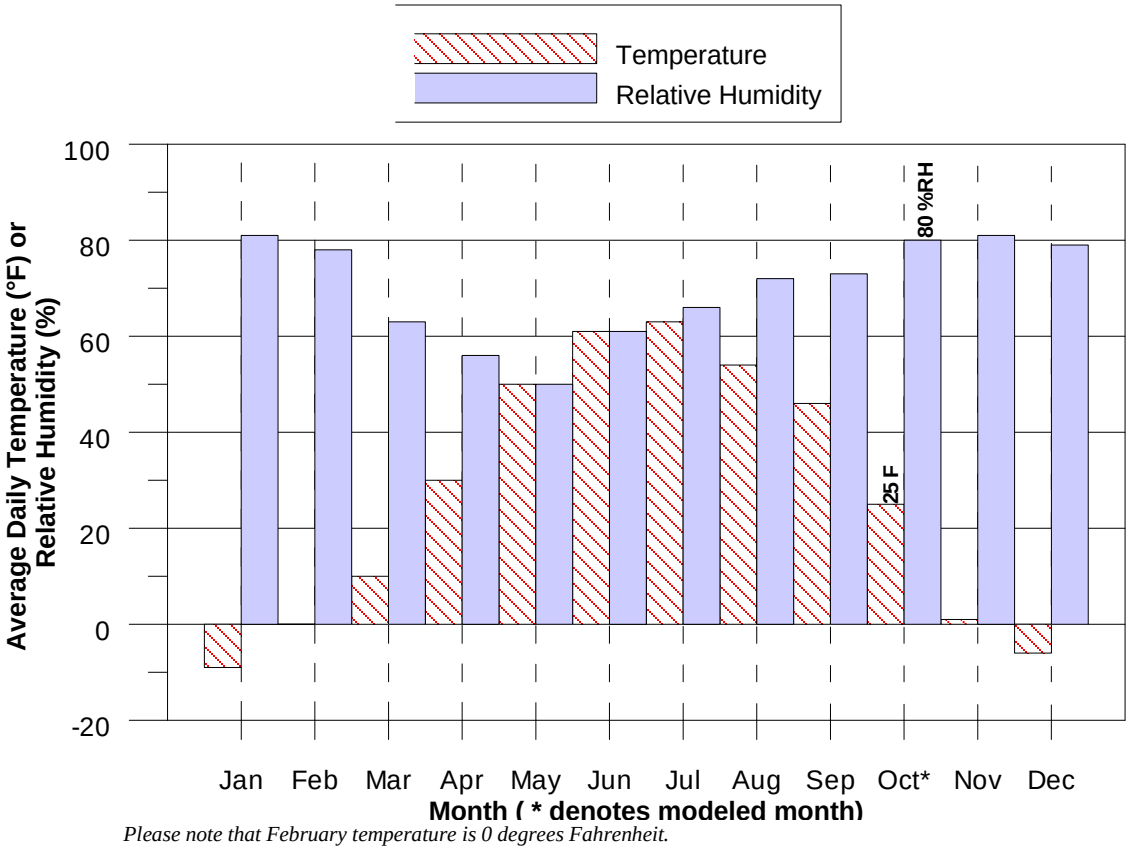
Airfield Noise Model	
Software	*Analysis*
NMAP (NOISEMAP)	Fixed- and rotary-wing Aircraft
Parameter	*Description*
Receiver Grid Spacing	500 ft in x and y
Operating Days Metric	AAD; 365 days per year
Topography	
Elevation Data Source	1/3 arc-second NED
Elevation and Impedance Grid spacing	500 ft in x and y
Flow Resistivity of Land Areas (soft)	200 kPa-s/m^2
Flow Resistivity of Water Areas	1,000,000 kPa-s/m^2
Weather	
Temperature	25 °F
Relative Humidity	80%
Barometric Pressure	29.17 in HG

The airfield modeling uses a local coordinate system with the origin at the beginning of Runway 13 at Eielson AFB which is at geographical coordinates 64.684167° North , 147.11778° West and an elevation of 547 feet above Mean Sea Level (FAA 2015). The current magnetic declination is 19.6º West (FAA 2015). As indicated by Table E-15, elevation and impedance grid files were created to model the immediate Eielson AFB area (a square 75,000 ft on each side, centered on the aforementioned reference point) based on data obtained from the US Geological Survey (USGS, 2014) and a grid spacing of 250 feet. Regarding impedance, areas of land are modeled as an acoustically "soft" surface (with a flow resistivity of 200 kPa-s/m^2) and bodies of water, are modeled as "hard" (1,000,000 kPa-s/m^2). Water bodies in the vicinity of Eielson AFB were modeled as soft ground due to the water bodies' negligible contribution to the effect of sound propagation from the AFB.

The DNL analysis utilized annual average daily flight and run-up operations, i.e., annual operations divided by 365 days. For the proposed F-35A aircraft, the most up-to-date flight profiles (using the Karnes 3.2 profiles) and airfield course rules were used in the noise modeling.

Weather

This report utilized detailed daily average weather conditions for each month for Eielson AFB between 2005 and 2014. Average daily temperature and relative humidity values are plotted in Figure E-17. NOISEMAP's BaseOps program computes sound absorption coefficients for each month and selects the month with the median coefficient to use in the noise exposure modeling (U.S. Air Force 1992). The modeled conditions selected by the BaseOps program correspond to the month of October with a temperature of 25°F and a relative humidity of 80 percent. These conditions were also used for MR_NMAP modeling. The average daily barometric pressure was also obtained but not plotted; the modeled value from October was 29.17 inHg.



Please note that February temperature is 0 degrees Fahrenheit.

Figure E-17. Average Daily Weather Conditions

Population, Household, and Acreage Counts

For the areas affected by DNL greater than or equal to 65 dB, acreage, population and households[1] were determined in 5-dB bands of DNL from 65 dB to 85 dB. Generally, to determine the population affected within a band of DNL, e.g., 65 to 70 dB DNL, this analysis used U.S. Census block groups (from the American Community Survey, 5-year estimates) and assumes an even distribution of population within each block group under the respective DNL contour bands. In most cases, this methodology provides a reasonable estimate of the number of people who may be exposed. However, for the locations in the vicinity of the bases characterized by low or inconsistent population densities, actual houses were also counted using aerial imagery and using the U.S. Census population multiplier (people per household) for the specific affected county. Otherwise, the U.S. Census block method would yield substantially overestimated populations. Acreage reported herein excludes the base property since it is directly associated with aircraft operations.

[1] According to the U.S. Census Bureau, households are defined as a house, an apartment, a mobile home, a group of rooms, or a single room occupied (or if vacant, intended for occupancy) as separate living quarters. Separate living quarters are those in which the occupants live separately from any other people in the building and that have direct access from the outside of the building or through a common hall. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated people sharing living quarters (U.S. Census Bureau 2010a).

Points of Interest

Representative POIs include on- and off-base schools, day care locations, places of worship, and residential areas derived from Google Earth satellite imagery and verified by base personnel. Residential areas were defined, where feasible, by the centroid of the intersection of the 65 dB DNL or greater contours and U.S. Census block groups.

Speech Interference

Speech interference for normal conversation comprises an indicator of noise effects. Such interference is measured by the number of average daily indoor daytime (7:00 a.m. to 10:00 p.m.) events per hour subject to indoor L_{max} of at least 50 dB at representative locations. This measure also accounts for 17 dB or 27 dB of noise attenuation provided by buildings such as houses and schools with windows open or closed, respectively, in cold climates (FICON 1992). Since modeling accounts for outdoor noise levels only, the associated outdoor L_{max} would be 67 dB and 77 dB for windows open and closed, respectively. Per the DNWG guidelines, speech interference analysis determines the number of times with which speech would be interfered. Thus, NMAP is used to compute the Number of Events at or above a Specified Threshold (NA) with the thresholds being 67 dB and 77 dB L_{max} for the DNL daytime hours only.

Classroom Learning Interference

Because of the nature of activities in schools, different speech interference criteria are used. For schools, two additional classroom criteria have to be applied to evaluate if speech interference would inhibit classroom learning. When considering intermittent noise caused by aircraft overflights, guidelines for classroom interference indicate that an appropriate criterion is a limit on indoor background equivalent noise levels of 35 to 40 dB (equivalent sound level [L_{eq}]) and a limit on single events of 50 dB L_{max}. The 50 dB L_{max} for single events equates to outdoor L_{max} of 67 dB and 77 dB for windows open and closed, respectively, using cold climate Noise Level Reductions of 17 and 27 dB (FICON 1992). Thus the number of annual average daily events whose L_{max} would be greater than or equal to 65 dB and 75 dB serve as the measure of potential classroom learning effects and are presented as NA65 L_{max} and NA75L_{max} for windows open and closed, respectively, on a per-hour basis. Because classrooms are in use during the day predominantly, these criteria are applied for aircraft operations occurring between 8:00 a.m. and 4:00 p.m. rather than between 7:00 a.m. and 10:00 p.m. for standard speech interference.

Sleep Disturbance

Sleep disturbance is a concern for communities exposed to nighttime noise. Sleep, or the lack of quality sleep, has the potential to affect health and concentration, although the relationship between noise levels and sleep disturbance is complex and not fully understood. To assess the potential for sleep disturbance, the analysis uses SEL as the metric and calculates the probability of being awakened at least once from overflights occurring between 10:00 p.m. and 7:00 a.m. when most people sleep. The SEL from each overflight is based on the particular type of aircraft, flight track, power setting, speed, and altitude relative to the residential receptor. The analysis also accounts for standard building attenuation of 17 dB and 27 dB with windows open and closed, respectively. When summed, the probability of being awakened for a given location is determined.

Potential for Hearing Loss

Potential for Hearing Loss (PHL) applies to people living long-term (40 or more years) in high noise environments. The threshold for screening PHL is exposure to DNL greater than or equal to 80 dB (OSD 2009).

E.3.2 Airspace

Subsonic

When aircraft flight tracks are not well defined, but are distributed over a wide area, such as in a MOA, Range/Restricted Areas, or MTR with wide corridors, cumulative noise exposure is assessed using the Military Operating Area and Range Noise Model (MR_NMAP; Lucas & Calamia 1994), Version 2.2. Table E-19 lists the modeling parameters relevant to this study.

Table E-19. Airspace (subsonic) Noise Modeling Parameters

Airspace (Subsonic) Noise Model	
Software	**Version**
MR_NMAP	2.2
Parameter	**Description**
Receiver Grid Spacing	3,394 feet in x and y
Operating Days Metric	Average Daily Operations during Busiest Month
Topography (n/a - Ldnmr is nap of the earth)	
Modeled Weather (Same as Airfield)	

MR_NMAP allows for entry of airspace information, the horizontal distribution of operations, flight profiles (average power settings, altitude distributions, and speeds), and numbers of sorties. "Horizontal distribution of operations" refers to the modeling of lateral airspace utilization via three general representations:

1) broadly distributed operations throughout three-dimensional volumes of airspace for modeling of MOA and Range events,
2) operations distributed among parallel tracks for modeling of MTR events, and
3) operations on specific tracks for modeling of unique MOA, Range, MTR, or target area activity.

The core program, MR_NMAP, incorporates the number of average daily flight operations during the busiest month by time period, specified horizontal distributions, volume of the airspaces, and profiles of the aircraft to primarily calculate: (a) average L_{dnmr} for entire airspaces, or (c) maximum L_{dnmr} under MTRs or specific tracks. Grouping of airspace units used and scheduled together consistently were assessed as one area. This EIS presents tabulated levels for both baseline and proposed operations.

MR_NMAP does not have the capability to model varying terrain or ground impedance. It assumes all flight profiles' altitudes are relative to the elevation of the ground. The weather conditions for the airfield modeling were assumed to apply to the modeled flight areas.

The L_{dnmr} metric requires the modeling of the busiest month. The busiest month in the northern JPARC airspace is during major flying exercises such as Red Flag-Alaska and Northern Edge. For calendar year

2014, the busiest month was June, during a Red Flag-Alaska exercise. It was estimated that 100 percent of the operations would occur during $L_{dnmr's}$ daytime period (7:00 a.m. to 10:00 p.m.).

If busiest month operations are distributed horizontally and vertically throughout an area, the MR_NMAP program requires flight areas be defined which best capture those operations. The Air Force identified three areas where operations predominantly occur during these busiest months: the Fight Zone, and two aerial refueling areas—Tanker 1 and 2. Airspace operations not associated with the four areas were modeled in separate MOA and ATCAA airspace units. The airspace units modeled are depicted in Figure E-17 and listed in Table E-20. Please note that airspace unit floors and ceilings have been converted to AGL.

Table E-20. Modeled Northern JPARC Airspace

Flight Area	*Floor (ft) AGL*	*Ceiling (ft) AGL*
Fight Zone	18,000	37,000
Tanker 1	19,000	26,000
Tanker 2	16,000	23,000
Fox 3	5,000	14,000
Blair ATCAA	38,000	58,000
Paxon ATCAA	1,000	14,000
Delta Large	1,000	4,500
Yukon Large	100	14,000
Yukon 2	100	16,000
Yukon 3B	2,000	16,000
Yukon 4	100	16,000
Yukon 5	5,000	17,500
Viper B	9,500	17,500
R2202	0	18,500
R2205	0	18,000
R2211	0	30,000

The boundaries of the MOAs, Restricted Areas, and the Fight Zone were derived from the In Flight Guide[2]. The Tanker Areas are based on pilot interviews. Because the busiest month is the month in which the Red Flag Exercise occurs, operations from the areas that overlap the Fight Zone and Tanker Areas are moved to those areas. For the areas that are entirely (or very close to entirely) within the Fight Zone, all the operations in that area were moved to the Fight Zone. All aerial refueling tanker operations that overlap the Tanker Areas (such as Fox 3) are assigned to the Tanker 1 and 2 areas. For airspace that is partly in the Fight Zone or Tanker areas (such as Yukon 2), a portion of their operations are considered in their own areas, and a portion in the Fight Zone or Tanker areas. For airspace completely outside of the Fight Zone and Tanker areas (such as Yukon 5), all operations remain in that area. From the operational data provided by Eielson Range personal, 29.4 percent of the annual operations occur in June, so 29.4 percent of the proposed F-35 operations were identified to occur during the busiest month for the Proposed Action Alternative. Tables E-21 and E-22 detail busiest month operations for baseline and the Proposed Action Alternative.

[2] Red Flag-Alaska In-Flight Guide Supplement, 353rd Combat Training Squadron, 4 July 2013.

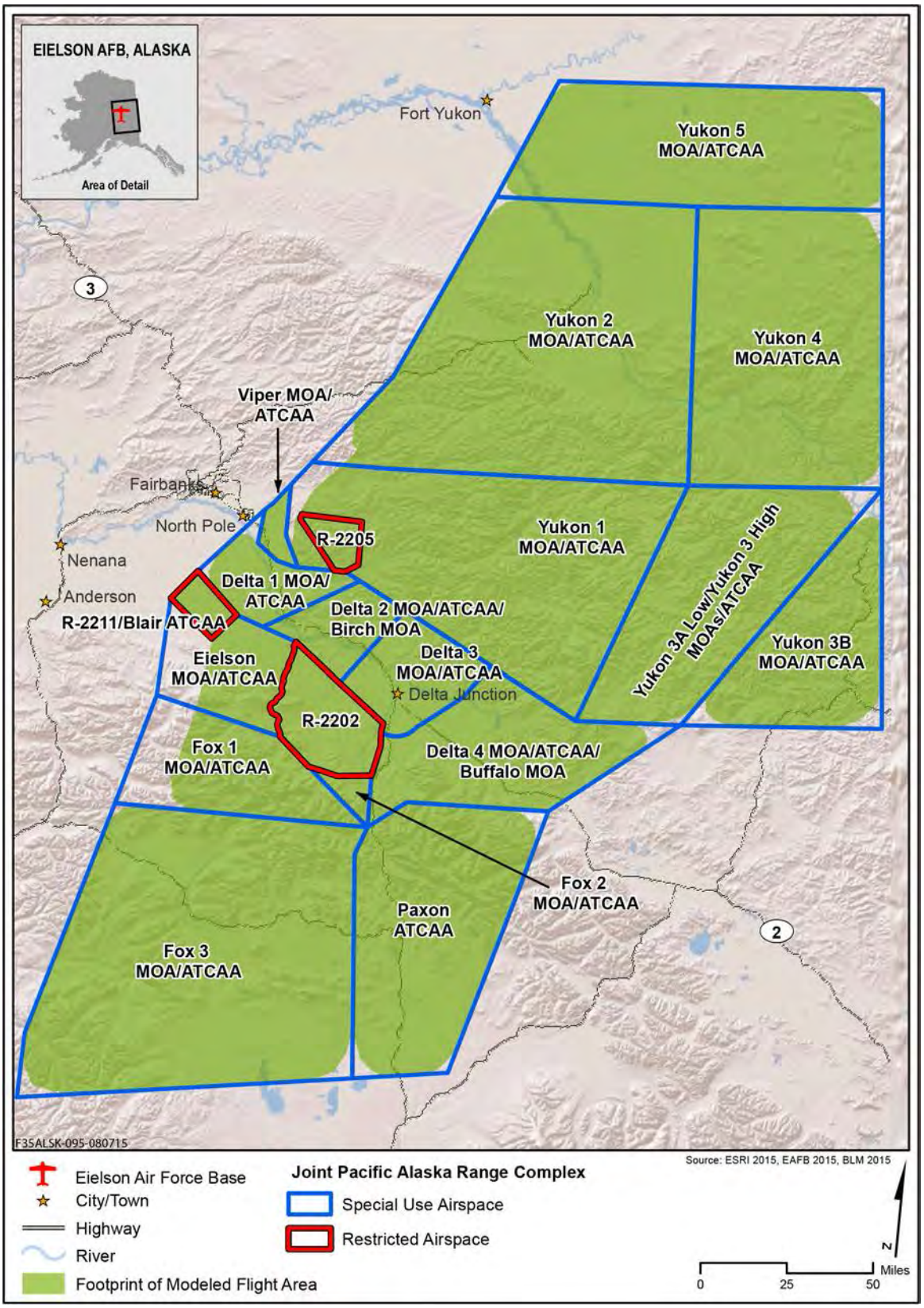


Figure E-18. Modeled Northern Joint Pacific Alaska Range Complex Airspace and Points of Interest

For MR_NMAP modeling, operations are entered as Annual Operations. Because the L_{dnmr} metric models a busiest month, the operations were multiplied by 12 to create "Effective Annual Operations."

The specific flight profiles applied to the modeling are listed in Tables E-23 and E-24 for modeled baseline aircraft and the F-35A, respectively.

Supersonic

Modeling of supersonic flight activity considers the following factors: airspace geometry, flight operations, flight durations, flight areas, flight profiles (altitude distribution, maneuver characteristics) and atmospheric effects. The DoD's PCBoom4 computer program (Plotkin and Grandi 2002) can be used to compute the complete sonic boom footprint for a given single event, accounting for details of a particular maneuver.

Supersonic operations for the proposed action and alternatives are, however, associated with air combat training, which cannot be described in the deterministic manner that PCBoom4 requires. Supersonic events occur as aircraft approach an engagement, break at the end, and maneuver for advantage during the engagement. Long time cumulative sonic boom exposure in terms of CDNL is more meaningful for this kind of environment.

BooMap96 is a program that computes CDNL contours in military Air Combat Maneuver (ACM) training airspaces based on published methodology (Frampton et al, 1993). CDNL contours in ACM arenas follow an elliptical pattern which depends on the size of the airspace and the sortie rate. Long-term sonic boom measurement projects have been conducted in four supersonic air combat training airspaces: White Sands, New Mexico (Plotkin *et al.* 1989); the eastern portion of the Goldwater Range, Arizona (Plotkin *et al.* 1992); the Elgin MOA at Nellis AFB, Nevada (Frampton *et al.* 1993); and the western portion of the Goldwater Range (Page *et al.* 1994). These studies included analysis of schedule and air combat maneuvering instrumentation data and supported development of the 1992 BooMap model (Plotkin *et al.* 1992). The current version of BooMap (Frampton *et al.* 1993) incorporates results from all four studies.

Table E-21. Baseline and No-Action Alternative Airspace Operations During the Busiest Month in Northern JPARC Airspace

Flight Area	*A-10*	*F-15C*	*F-15J*	*F-16*	*F-22*	*EA-18G*	*E-3*	*E-767*	*KC-135R, KC-767, E-3*	*C-130*	*HC-130*	*HH-60*	*Total*
Fight Zone	1,385	923	346	2,189	967	244	88	40	300	383	3	3	6,871
Tanker 1	-	-	-	-	-	-	-	-	106	-	-	-	106
Tanker 2	-	-	-	-	-	-	-	-	41	-	-	-	41
Fox 3	174	114	42	315	124	31	11	5		49	-	1	866
Blair ATCAA	190	158	76	338	140	61	18	11	81	150	-	-	1,223
Paxon ATCAA	292	228	84	582	238	61	26	10	93	95	-	-	1,709
Delta Large	439	347	142	840	345	107	39	10	140	223	-	1	2,633
Yukon Large	76	63	29	135	56	24	7	4	32	38	-	-	464
Yukon 2	149	117	48	299	119	31	11	5		48	-	-	827
Yukon 3B	38	32	14	68	28	12	4	2	16	18	-	-	232
Yukon 4	38	32	14	68	28	12	4	2		19	-	-	217
Yukon 5	38	32	14	68	28	12	4	2	16	18	-	-	232
Viper B	371	236	88	648	238	61	22	10	89	95	-	-	1,858
R2202	214	226	68	542	240	61	1	-	-	78	1	-	1,431
R2205	-	159	68	522	140	61	1	-	-	78	-	1	1,030
R2211	140	-	-	470	-	-	-	-	-	-	1	7	618

Table E-22. Proposed Action Alternative Airspace Operations During the Busiest Month in Northern JPARC Airspace

Flight Area	*A-10*	*F-15C*	*F-15J*	*F-16*	*F-35A*	*F-22*	*EA-18G*	*E-3*	*E-767*	*KC-135R, KC-767, E-3*	*C-130*	*HC-130*	*HH-60*	*Total*
Fight Zone	1,385	923	346	2,189	768	967	244	88	40	300	383	3	3	7,639
Tanker 1	-	-	-	-	-	-	-	-	-	106	-	-	-	106
Tanker 2	-	-	-	-	-	-	-	-	-	41	-	-	-	41
Fox 3	174	114	42	315	111	124	31	11	5	-	49	-	1	977
Blair ATCAA	190	158	76	338	119	140	61	18	11	81	150	-	-	1,342
Paxon ATCAA	292	228	84	582	204	238	61	26	10	93	95	-	-	1,913
Delta Large	439	347	142	840	295	345	107	39	10	140	223	-	1	2,928
Yukon Large	76	63	29	135	47	56	24	7	4	32	38	-	-	511
Yukon 2	149	117	48	299	105	119	31	11	5	-	48	-	-	932
Yukon 3B	38	32	14	68	24	28	12	4	2	16	18	-	-	256
Yukon 4	38	32	14	68	24	28	12	4	2	-	19	-	-	241
Yukon 5	38	32	14	68	24	28	12	4	2	16	18	-	-	256
Viper B	371	236	88	648	227	238	61	22	10	89	95	-	-	2,085
R2202	214	226	68	542	190	240	61	1	-	-	78	1	-	1,621
R2205	-	159	68	522	183	140	61	1	-	-	78	-	1	1,213
R2211	140	-	-	470	165	-	-	-	-	-		1	7	783

Table E-23. Modeled JPARC Airspace Flight Profiles under Baseline (CY14) and No-Action Alternative (CY21)

Aircraft Type	***Modeled Aircraft Type (if different)***	***Flight Profile***				***Altitude Distribution - Fight Zone***	***Altitude Distribution - Tanker 1 and 2***	***Altitude Distribution - All other Areas (Typical Percentage of In-area Sortie Duration Time)***						
		Average Power Setting	*Power Setting Description*	*Average Airspeed (KIAS)*	*Average Sortie Duration in airspace (minutes)*	*20,000 - 39,000 ft MSL*	*20,000 - 27,000 ft MSL*	*500 - 1,000 ft AGL*	*1,000 - 3,000 ft AGL*	*3,000 - 5,000 ft AGL*	*5,000 - 10,000 ft AGL*	*10,000 ft AGL - FL180*	*FL180 and above*	*Total*
A-10	A-10A	5333 NF	Training Route	325	90	100		33	17	16	24	10		100
F-15C	F-15A	81% NC	MID SPD Training RT	520	90	100			2	3	10	25	60	100
F-15J	F-15A	81% NC	MID SPD Training RT	520	90	100		5	1	9	10	25	50	100
F-16	F-16A	87% NC	MID SPD Training RT	450	90	100		4	2	3	5	26	60	100
F-22	F-22	70% ETR	Cruise Power	350	90	100		5	2	3	5	10	75	100
EA-18G	FA-18E/F	90% NC	MID SPD Training RT	400	90	100			2	3	10	25	60	100
E-3	KC-135R	89.6% NF	Max Rated Thrust	300	120	100							100	100
E-767	KC-135R	89.6% NF	Max Rated Thrust	300	120	100							100	100
KC-135R / KC-767	KC-135R	89.6% NF	Max Rated Thrust	300	120	100	100					20	80	100
C-130	C-130H&N&P	970 C TIT	Take Off Power	170	90	100		28	15	15	22	20		100
HC-130	C-130H&N&P	2000 IN-LBS	Take Off Power	170	120	100		23	12	11	25	19	10	100
HH-60	UH60A	N/A	LFO Lite 140 KTS	140	120	100		20	27	28	25			100

Table E-24. F-35A Aircraft Flight Profiles Modeled in Northern JPARC Airspace

Flight Profiles (All Areas)			***Altitude Distribution - Fight Zone***	***Altitude Distribution - All Other Areas (Typical Percentage of Sortie Duration Time - Total 100%)***						
Average Power Setting	*Average Airspeed (KIAS)*	*Average Sortie Duration in airspace (minutes)*	*20,000 - 39,000 ft MSL*	*500 - 1,000 ft AGL*	*1,000 - 3,000 ft AGL*	*3,000 - 5,000 ft AGL*	*5,000 - 10,000 ft AGL*	*10,000 ft AGL - FL180*	*FL180 and above*	*Total*
75% ETR	400	90	100	4	2	3	5	26	60	100

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Because BooMap is directly based on long-term measurements, it implicitly accounts for such variables as maneuvers, statistical variations in operations, atmosphere effects, and other factors. Based upon that data, CDNL was determined as a function of the number of sorties per month and the dimensions of the elliptical flight area. The elliptical pattern is aligned with the "Available Airspace", or "Maneuver Ellipse" which is an elliptical maneuver region within the airspace. It is common for ACM arenas to have a single maneuver ellipse, with that region being the largest ellipse that can be inscribed within the airspace boundaries. Many supersonic areas have several maneuver ellipses, with operations divided among them.

BooMap96 allows the user to define up to 10 maneuver ellipses in an airspace, and assign monthly operations to each. The program draws upon published definitions of existing MOAs and Restricted areas or user-defined airspace boundaries. BooMap96 quantifies the size and shape of CDNL contours, and also numbers of booms per day, in air combat training airspaces. BooMap was used for prediction of cumulative sonic boom exposure in this analysis. The next section details the modeling parameters relevant to this study.

Sonic booms from air combat training activity typically have an elliptical pattern. Aircraft usually set-up at positions up to 100 nm apart, then proceed toward each other for an engagement. Aircraft can become supersonic at various times during an engagement exercise. Supersonic events can occur as the aircraft accelerate toward each other, during dives in the engagement itself, and during disengagement. Maneuvers take place within a generally elliptical region aligned with the setup points. The long-term average noise exposure (CDNL) and where the booms occur also tend to be in elliptical shape.

Figure E-19 shows a sample of supersonic flight tracks measured in the air combat training airspace at White Sands (Plotkin *et al.* 1989). The tracks fall into an elliptical shape aligned with preferred engagement directions in the airspace. Figure E-20 shows the CDNL contours that were fit to six months of measured booms in the White Sands airspace. The subsequent measurement programs refined the fit, and demonstrated that the elliptical maneuver area is related to the size and shape of the airspace (Frampton *et al*. 1993).

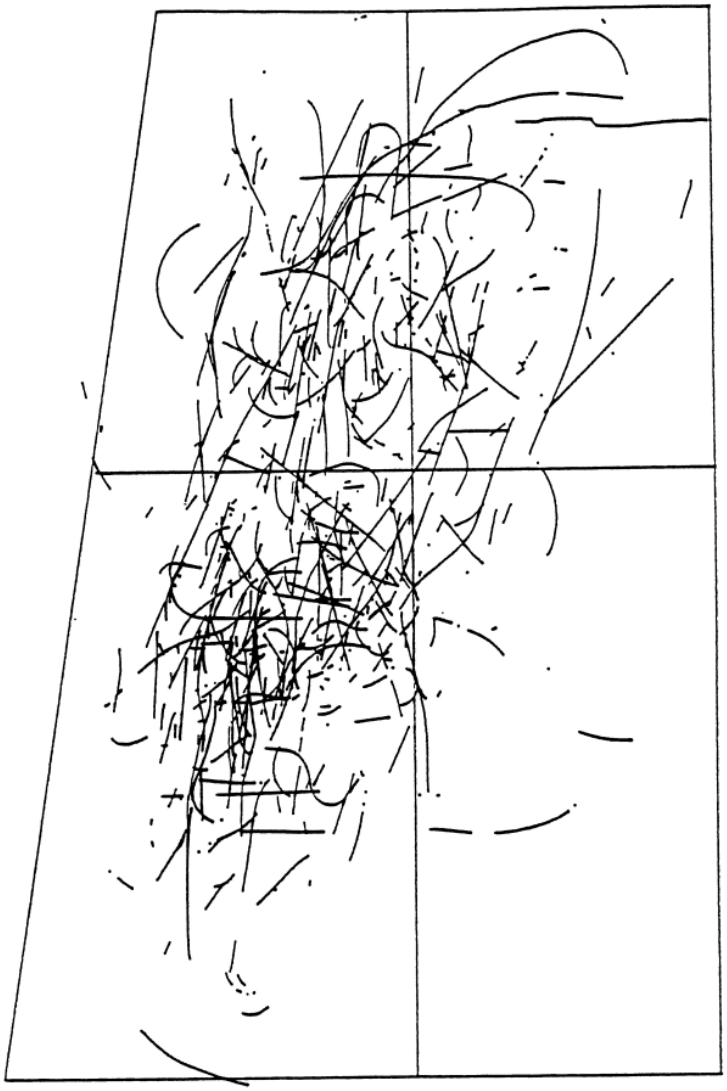

Figure E-19. Supersonic Flight Tracks in Supersonic Air Combat Training Airspace

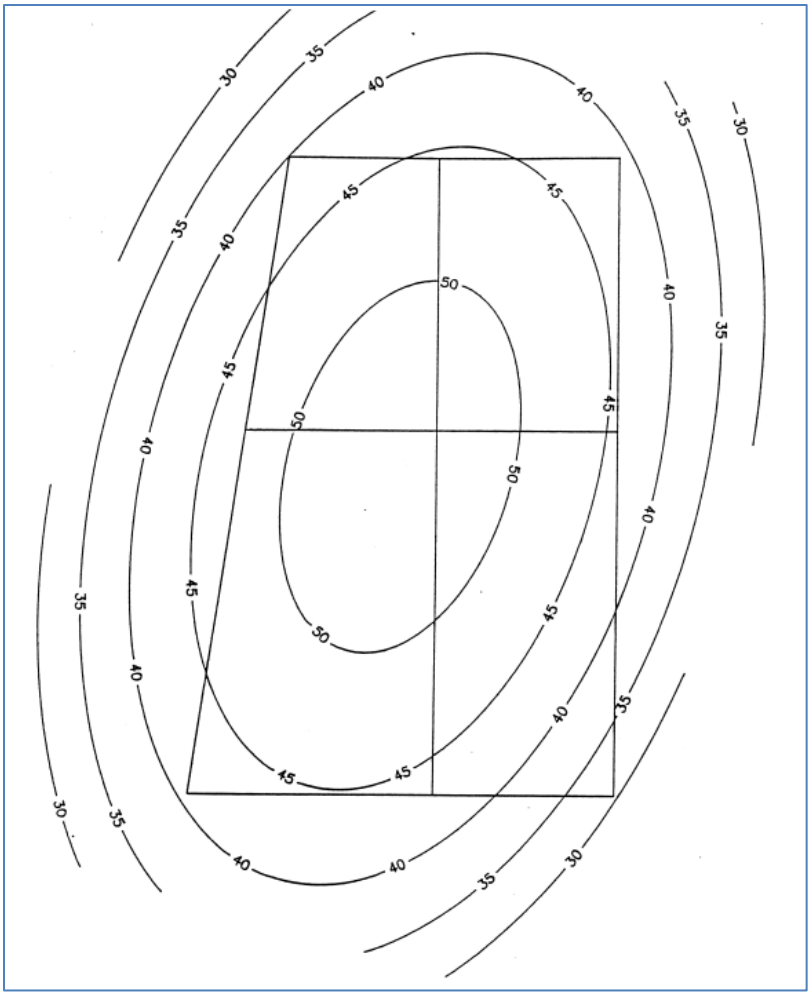

Figure E-20. Elliptical CDNL Contours in Supersonic Air Combat Training Airspace

Analysis of supersonic aircraft flight comprises the activity occurring during the busiest month, which coincides with the major flying exercises that occurred in June 2014. This methodology is consistent with the subsonic modeling. Of the fight-type aircraft operating in the JPARC SUA only the F-15C/J, F-16, and F-22 use supersonic flight on a regular basis. Table E-25 details the supersonic sorties generated by these aircraft in the northern JPARC airspace. Ten percent of the total sorties are estimated to reach supersonic speeds as detailed in the F-35A Operational Beddown EIS.

Supersonic flight typically occurs within larger areas and may extend across several MOAs. This necessitates modeling larger combined areas to represent the current activity. Figure E-21 depicts the three maneuver ellipses. The Fight Zone ellipse approximates the subsonic Fight Zone area with 686 supersonic sorties during the busiest month. The “Yukons” ellipse represents the remaining area of the Yukon MOAs used for the supersonic activity with 129 sorties while the “Fox_Paxon” ellipse accounts for activity within the Fox and Paxon MOAs with 232 sorties. The F-16 generates the largest share of supersonic activity at approximately half of the total 1,047 supersonic busiest month sorties in the northern JPARC airspace. It was estimated that 100 percent of the operations occur during CDNL's nighttime period (7:00 a.m. to 10:00 p.m.).

Table E-25. Supersonic Airspace Operations under Baseline/No Action and Proposed Action Alternative

Subsonic Flight Areas[3]	*Supersonic Modeled Area*	*Baseline/No Action*				*Proposed*	*Total Subsonic Operations*	*Total Supersonic Operations*[1,2]
		F-15C	*F-15J*	*F-16*	*F-22*	*F-35A*		
Fight Zone	-	1,379	520	3,544	1,412	774	*7,629*	-
	Fight Zone	**138**	**52**	**354**	**141**	**77**	-	**763**
Yukon 2 MOA	-	117	48	299	119	65	*648*	-
Yukon Large	-	95	43	203	84	44	*469*	
Yukon 3 B	-	24	11	51	21	11	*118*	
Yukon 5	-	40	18	85	35	18	*196*	
	Yukon	**28**	**12**	**64**	**26**	**14**	-	**143**
Fox 3 MOA	-	228	84	630	248	138	*1,328*	-
Paxon MOA	-	228	84	582	238	127	*1,259*	
	Fox/Paxon	**46**	**17**	**121**	**49**	**27**	-	**259**
Tanker 1	-	-	-	-	-	-	-	-
Tanker 2	-	-	-	-	-	-	-	
Delta 1 MOA	-	126	58	270	112	59	*625*	
R-2205	-	80	34	198	70	43	*425*	
Viper B MOA	-	236	88	648	238	142	*1,352*	
Blair ATCAA	-	158	76	338	140	74	*786*	
R-2211	-	-	-	306	-	67	*373*	
	Total	**211**	**81**	**539**	**216**	**118**	*15,208*	**1,165**

Notes:

[1]Of the sorties occurring within areas allowing supersonic flight, 10 percent modeled as supersonic per the F-35A Operational Beddown EIS; supersonic numbers bolded.

[2]Only fighter-type aircraft operating at supersonic speeds included in analysis.

[3]Supersonic operations were not modeled in the following subsonic airspace: Tanker 1, Tanker 2, Delta 1 MOA, R-2205, Viper B MOA, Blair ATCAA, and R-2211.

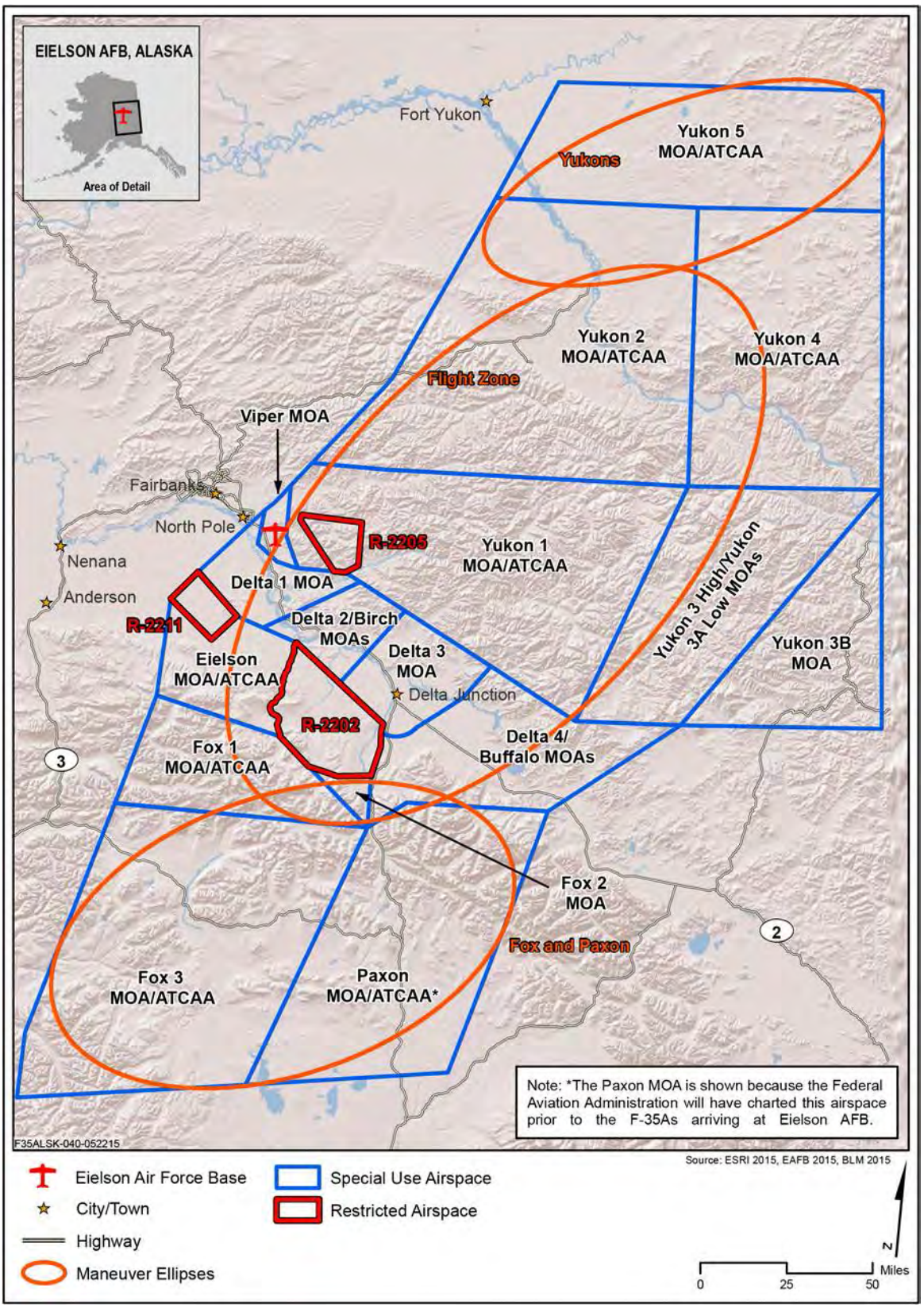

Figure E-21. Maneuver Ellipses for High-Altitude Supersonic Operations in Authorized JPARC Airspace

The supersonic operations listed in Table E-22 and ellipses from Figure E-19 were entered into the BooMap96 program to compute the CDNL and Booms per Month grid files. The elliptical areas are defined by their major and minor axis lengths, angle of rotation of the major axis from north, and the location of the center point using the Universal Transverse Mercator (UTM) projection. Table E-26 lists these parameters for each ellipsis modeled with BooMap96.

Table E-26. BooMap96 Elliptical Modeled Area Input

		Fight Zone	***Yukons***	***Fox / Paxon***
Center point horizontal	x0	601,799	672,823	520,253
Center point vertical	y0	7,178,714	7,355,180	6,988,002
1st Axis Length (nm)	A	44.6	20.19	35.08
2nd Axis Length (nm)	B	86.77	52.98	60.58
Rotation (degrees)	rot	39.64	68.62	65.79

Modeling for the Proposed Action Alternative is similar to baseline, using the same, modeled airspace units and the same approximation that 10 percent of the F-35A operations would exceed the speed of sound. Table E-25 presented the F-35A supersonic operations that total 77, 14, and 27 for the Fight Zone, Yukons, and Fox/Paxon areas, respectively. For the Proposed Action Alternative F-35A supersonic operations would account for approximately 10 percent of all supersonic operations in northern JPARC airspace.

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Appendix F:
Air Emissions Calculations

APPENDIX F: AIR EMISSIONS CALCULATIONS

1. General Information

This report includes the details of equations, inputs, and outputs from the air quality analysis. It is based on the use of the ACAM model and much is a direct output of that model.

Action Location

Base: EIELSON AFB
County(s): Fairbanks North Star Borough
Regulatory Area(s): NOT IN A REGULATORY AREA

Action Title: Add F-35As to Existing Missions at Eielson AFB

Project Number/s (if applicable): None

Projected Action Start Date: 1 / 2016

Action Purpose and Need:

To maintain capable ready forces required for national defense, the Air Force must integrate the F-35A mission while transitioning from legacy fighter aircraft programs. The purpose of the Proposed Action is to maintain efficient and effective combat capability and mission readiness in the PACAF AOR as the Air Force faces deployments across a spectrum of conflicts while also providing for homeland defense. Beddown and operation of the F-35A at a PACAF AOR base would represent a major step toward this goal. This beddown action assures availability of combat-ready pilots in the PACAF AOR flying the most advanced fighter aircraft in the world. The Secretary of the Air Force determined that there was a need to locate F-35A aircraft in the PACAF AOR.

Action Description:

Add two squadrons of F-35As, consisting of 48 Primary Assigned Aircraft (PAA), and 6 Backup Aircraft Inventory (i.e., replacement aircraft when a PAA is not in operation) to the existing missions of the 354th Fighter Wing at Eielson AFB. Proposed Action includes additional military and civilian personnel; increases in airfield and airspace operations; modifications and additions to existing facilities and infrastructure; and construction of new facilities to operate and maintain two F-35 squadrons.

Eielson AFB, Alaska is located in the Fairbanks-Northstar Borough. The Borough is designated partially maintenance for Carbon Monoxide and partially nonattainment for PM2.5-2006 (Fairbanks Regulatory Area). Eielson AFB is not within the boundaries of the Fairbanks Regulatory area; therefore, the base is in attainment for all criteria pollutants.

Note that all building alterations are assumed to be interior construction; therefore, no assessment was performed on these activities.

Point of Contact for Initial Model Runs

Name: James McClain
Title: Contractor for HQ AFCEC/CZTQ
Organization: Solutio Environmental, Inc.
Email: jmcclain@SolutioEnv.com
Phone Number: (210) 740-7000

Activity Location

County Fairbanks North Star Borough
Regulatory Area(s) NOT IN A REGULATORY AREA

Activity List

Number	*Activity Type*	*Activity Title*	*Activity Description:*
2	Personnel	Personnel Increase for FY18	Personnel increases would be incremental, happening over 2 to 3 years, typically preceding (starting in FY19) the scheduled delivery of the aircraft by several months. Aircraft are anticipated to arrive in two phases, with the first squadron starting to arrive in FY19, and the second squadron arriving in 2020. Current projections call for about a third of the F-35 personnel arriving early in FY19 (359 military/yr and 216 civilians/yr), with the remaining arriving in FY20 (717 military/yr and 434 civilians/yr).
3	Personnel	Personnel Increase for FY20	Personnel increases would be incremental, happening over 2 to 3 years, typically preceding (starting in FY19) the scheduled delivery of the aircraft by several months. Aircraft are anticipated to arrive in two phases, with the first squadron starting to arrive in FY19, and the second squadron arriving in 2020. Current projections call for about a third of the F-35 personnel arriving early in FY19 (359 military/yr and 216 civilians/yr), with the remaining arriving in FY20 (717 military/yr and 434 civilians/yr).
4	Aircraft	F-35A Aircraft Operations for 1st Squadron (FY19)	1st squadrons of F-35As, consisting of 24 Primary Assigned Aircraft (PAA), and 3 Backup Aircraft Inventory (i.e., replacement aircraft when a PAA is not in operation) to the existing missions of the 354th Fighter Wing at Eielson AFB. Based on previous analyses of F-35A operations (Air Force 2014), the Proposed Action would result in the addition of approximately 4,320 sorties per year per squadron to existing base flight activities. Aircraft are anticipated to arrive in two phases, with the first squadron starting to arrive in FY19, and the second squadron arriving in 2020.
5	Aircraft	F-35A Aircraft Operations for 2nd Squadron (FY20)	2nd squadrons of F-35As, consisting of 24 Primary Assigned Aircraft (PAA), and 3 Backup Aircraft Inventory (i.e., replacement aircraft when a PAA is not in operation) to the existing missions of the 354th Fighter Wing at Eielson AFB. Based on previous analyses of F-35A operations (Air Force 2014), the Proposed Action would result in the addition of approximately 4,320 sorties per year per squadron to existing base flight activities. Aircraft are anticipated to arrive in two phases, with the first squadron starting to arrive in FY19, and the second squadron arriving in 2020.

Activity List (continued)

Number	*Activity Type*	*Activity Title*	*Activity Description:*
6	Construction / Demolition	Construct 6-Bay Flight Simulator Facility	New construction of a 6-Bay Flight Simulator Facility. Assumed: 1 yr construction period
7	Construction / Demolition	Construct 4-Bay Hangar/Propulsion Maintenance/ Corrosion Control Personnel Dispatch	New construction for 4-Bay Hangar/Propulsion Maintenance/Corrosion Control Personnel Dispatch
8	Construction / Demolition	Construct 4-Bay Hangar/Squadron Operations/AMU	New construction of 4-Bay Hangar/Squadron Operations/AMU (Squadron 2).
9	Construction / Demolition	Construct 8-Bay, 16-Aircraft Weather Shelters (1 of 2)	New construct of 8-Bay 16-Aircraft Weather Shelters.
10	Construction / Demolition	Construct 8-Bay, 16-Aircraft Weather Shelters (2 of 2)	New construction of a 8-Bay 16-Aircraft Weather Shelters
11	Construction / Demolition	Missile Maintenance Facility	Demolish old and Construct new Missile Maintenance Facility
12	Construction / Demolition	Munitions Storage Igloos (Quarry Hill)	Demolish/Construct 6 Munitions Storage Igloos (Quarry Hill)
13	Construction / Demolition	Construct South Heat Plant	New construct of South Heat Plant
14	Construction / Demolition	Construct 200-Person Dormitory	New construction of a 200-person dormitory
15	Construction / Demolition	Construct Covered Parking for R-11 Aircraft Refueling Vehicles	New construction of covered parking for R-11 Aircraft Refueling Vehicles
16	Aircraft	Touch & Go (FY19 - indef)	---
17	Aircraft	Touch & Go (FY20 - indef)	---

General Information and Timeline Assumptions

		Activity															
		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
	Activity Type	Personnel	Personnel	Aircraft	Aircraft	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Construction / Demolition	Aircraft	Aircraft
	Add or Remove Activity from Baseline?	Add	Add	Add	Add	---	---	---	---	---	---	---	---	---	---	Add	Add
	Start Date:																
	Month	10	10	1	1	1	10	9	3	3	2	1	3	3	6	1	1
	Year	2018	2019	2019	20	2016	2016	2016	2017	2017	2017	2017	2017	2017	2017	2019	2020
	End Date:				20												
	Month	(Indefinite)	(Indefinite)	(Indefinite)	(Indefinite)	12	3	3	12	12	12	12	12	12	7	(Indefinite)	(Indefinite)
	Year					2016	2018	2018	2017	2017	2017	2017	2017	2017	2017		
Emissions (Tons/Year)	VOC	1.94637	3.89612	8.77530	8.77530	0.81403	0.80932	1.07233	1.19853	1.14231	0.34422	0.36972	0.32873	0.42074	0.03977	0.00225	0.00225
	SOx	0.02934	0.05874	5.58961	5.58961	0.00449	0.00447	0.00465	0.00489	0.00436	0.00303	0.00279	0.00282	0.00314	0.00045	0.56807	0.56833
	NOx	1.72793	3.45887	51.00005	51.00005	2.61127	2.59655	2.44641	2.65013	2.29342	1.50368	1.37279	1.40337	1.57690	0.23457	8.05657	8.06022
	CO	31.03432	62.12261	117.63059	117.63059	2.39658	2.37205	2.48452	2.55019	2.30051	1.43065	1.33304	1.35560	1.48399	0.24752	0.44058	0.44078
	PM 10	0.09129	0.18273	9.64247	9.64247	0.53441	1.12380	0.88038	0.98631	0.96856	0.95433	0.29567	0.24830	0.41696	0.01328	0.71630	0.71662
	PM 2.5	0.04564	0.09137	8.15926	8.15926	0.14677	0.14472	0.13166	0.14016	0.12248	0.07414	0.06787	0.07025	0.07826	0.01318	0.60159	0.60187
	Pb	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
	NH3	0.30972	0.61999	0.00000	0.00000	0.00550	0.00542	0.00671	0.00644	0.00605	0.00305	0.00302	0.00309	0.00318	0.00063	0.00000	0.00000

Personnel Assumptions

	Activity	
	2	*3*
Activity Type	Personnel	Personnel
Number of Personnel:		
Active Duty Personnel	359	717
Civilian Personnel	216	434
Support Contractor Personnel	0	0
Air National Guard (ANG) Personnel	0	0
Reserve Personnel	0	0
Default Setting Used?	Yes	Yes
Average Personnel Round Trip Commute (mile)	20	20
Personnel Work Schedule:		
Active Duty Personnel	5 Days Per Week	5 Days Per Week
Civilian Personnel	5 Days Per Week	5 Days Per Week
Support Contractor Personnel	5 Days Per Week	5 Days Per Week
Air National Guard (ANG) Personnel	4 Days Per Month	4 Days Per Month
Reserve Personnel	4 Days Per Month	4 Days Per Month

Notes: Defaults are used for Average Personnel Round Trip Commute & Personnel Work Schedule.

Personnel On-Road Vehicle Mixture

	Activity			
	2		*3*	
On Road Vehicle Mixture:	POVs	GOVs	POVs	GOVs
LDGV (%)	37.55	54.49	37.55	54.49
LDGT (%)	60.32	37.73	60.32	37.73
HDGV (%)	0	4.67	0	4.67
LDDV (%)	0.03	0	0.03	0
LDDT (%)	0.2		0.2	0
HDDV (%)	0	3.11	0	3.11
MC (%)	1.9	0	1.9	0

Aircraft Assumptions

	Activity			
	4	***5***	***16***	***17***
Flight Engine Assumptions:				
Aircraft& Engine:				
Aircraft Designation	F-35A	F-35A	F-35A	F-35A
Engine Model	F135-PW-100	F135-PW-100	F135-PW-100	F135-PW-100
Primary Function	Combat	Combat	Combat	Combat
Number of Engines	1	1	1	1
Aircraft & Engine Surrogate				
Is Aircraft & Engine a Surrogate?	No	No	No	No
Original Aircraft Name	---	---	---	---
Original Engine Name	---	---	---	---
Flight Operations Assumptions				
Flight Operations:				
Number of Aircraft	24	24	24	24
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft	4320	4320	0	0
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft	0	0	2206	2207
Number of Annual Trim Test(s) per Aircraft	0	0	0	0
Default Settings Used:	No	No	No	No
Flight Operations TIMs (Time In Mode):				
Taxi/Idle Out (mins)	18.5	18.5	0	0
Takeoff (mins)	1.15	1.15	0.23	0.23
Climb Out (mins)	0	0	0.78	0.78
Approach (mins)	3.05	3.05	1.82	1.82
Taxi/Idle In (mins)	11.3	11.3	0	0
Trim Test:				
Idle (mins):	12	12	12	12
Approach (mins)	27	27	27	27
Intermediate (mins)	9	9	9	9
Military (mins)	9	0	9	9
AfterBurn (mins)	3	3	3	3
Auxiliary Power Unit (APU) Assumptions:				
Default Settings Used?	Yes	Yes	No	No
Number of APU per Aircraft	---	---	---	---
Operation Hours for Each LTO	---	---	---	---
Exempt Source?	---	---	---	---
Designation	---	---	---	---
Manufacturer	---	---	---	---
Aerospace Ground Equipment (AGE) Assumptions:				
Default Settings Used?	Yes	Yes	---	---
AGE Usage:				
Number of Annual LTO (Landing and Take-off) cycles for AGE	4320	4320	---	---

Aerospace Ground Equipment (default) - Activity 4 and 5

	Activity			
	4	***5***	***16***	***17***
Total Number of	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	2	No	Air Compressor	MC-11
1	1	No	Bomb Lift	MJ-1B
1	0.33	No	Generator Set	A/M32A-86D
1	0.5	No	Heater	H1
1	0.5	No	Hydraulic Test Stand	MJ-2/TTU-228 - 130hp
1	8	No	Light Cart	NF-2
1	0.33	No	Start Cart	A/M32A-60A

Construction Assumptions

			Activity									
			6	7	8	9	10	11	12	13	14	15
Construction Activity	Demolition	Start Month	---	---	---	---	---	2	1	---	---	---
		Quarter of the month [1]	---	---	---	---	---	1	1	---	---	---
		Year	---	---	---	---	---	2017	2017	---	---	---
		Number of Month	---	---	---	---	---	0	0	---	---	---
		Number of Days	---	---	---	---	---	19	20	---	---	---
		Area of Building to be	---	---	---	---	---	9500	13314	---	---	---
		Height of Building to be demolished (Ft)	---	---	---	---	---	10	10	---	---	---
	Site Grading	Start Month	1	10	10	3	3	3	3	3	3	---
		Quarter of the month [1]	1	1	1	1	1	3	3	1	1	---
		Year	2016	2016	2016	2017	2017	2017	2017	2017	2017	---
		Number of Month	0	0	0	0	0	0	0	0	1	---
		Number of Days	18	19	19	19	19	19	19	19	0	---
		Area of Site to be Graded	65000	152000	115000	130640	130640	130000	27000	18500	29000	---
		Amount of Material to be Hauled On-Site	10	20	20	20	10	20	10	20	20	---
		Amount of Material to be Hauled Off-Site	10	20	20	20	10	20	10	20	20	---
	Excavating/ Trenching	Start Month	2	10	9	3	3	3	3	3	3	---
		Quarter of the month [1]	4	4	3	4	4	1	1	3	2	---
		Year	2016	2016	2016	2017	2017	2017	2017	2017	2017	---
		Number of Month	0	0	0	0	0	1	0	0	1	---
		Number of Days	19	19	19	19	19	0	19	19	0	---
		Area of Site to be Trenched	500	5000	5000	5000	5000	5000	5000	10000	5000	---
		Amount of Material to be Hauled On-Site	0	0	10	10	5	10	10	10	10	---
		Amount of Material to be Hauled Off-Site	0	0	0	10	5	10	10	10	10	---
	Building Construction	Start Month	3	6	6	3	3	3	3	4	4	7
		Quarter of the month [1]	3	3	3	3	3	3	3	1	1	1
		Year	2016	2017	2017	2017	2017	2017	2017	2017	2017	2017
		Number of Month	9	9	9	9	9	9	9	9	9	1
		Number of Days	0	0	0	0	0	0	0	0	0	0
		Building Category [3]	Office or Industrial	Office or Industrial	Office or Industrial	Office or Industrial	Office or Industrial	Office or Industrial	Office or Industrial	Office or Industrial	Commercial or Retail	Commercial or Retail
		Area of Building (sf)	32,399	30,315	56836	65320	65320	9500	13314	9235	14683	1566
		Height of Building (ft)	10	12	20	15	15	10	10	15	20	1
		Number of Units	---	---	---	---	---	---	---	---	---	---
	Architectural Coatings	Start Month	8	9	8	8	7	8	8	8	8	---
		Quarter of the month [1]	1	1	3	3	3	1	1	1	2	---
		Year	2016	2017	2017	2017	2017	2017	2017	2017	2017	---
		Number of Month	0	0	0	0	0	0	1	0	0	---
		Number of Days	19	19	19	19	19	19	0	15	15	---
		Building Category [3]	---	---	---	---	---	---	---	---	Non-	---
		Total Square Footage	32399	32399	56836	65320	65320	9500	13314	9235	15000	---
		Number of Units	---	---	---	---	---	---	---	---	---	---
	Paving	Start Month	9	9	9	8	---	8	8	8	8	6
		Quarter of the month [1]	1	2	2	2	---	2	1	1	1	1
		Year	2016	2017	2017	2017	---	2017	2017	2017	2017	2017
		Number of Month	1	0	0	0	---	0	0	1	1	1
		Number of Days	0	19	19	19	---	19	19	0	0	0
		Paving Area	100000	90000	25000	150000	---	10000	9000	27000	44000	1566

Construction Assumptions (continued)

			Activity	
			6	7
Construction Activity	Demolition	Default Settings Used?	---	---
		Average Day(s) worked per week	---	---
		Construction Exhaust -Equipment:		
		Concrete/Industrial Saws	---	---
		Rubber Tired Dozers Composite	---	---
		Tractors/Loaders/Backhoes	---	---
	Site Grading	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	---	---
		Graders Composite	1 equipment per 6 hrs/day	1 equipment per 8 hrs/day
		Other Construction Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Rubber Tired Dozers Composite	1 equipment per 6 hrs/day	1 equipment per 8 hrs/day
		Scrapers Composite	---	---
		Tractors/Loaders/Backhoes	1 equipment per 7 hrs/day	2 equipment per 7 hrs/day
	Excavating/ Trenching	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	2 equipment per 8 hrs/day	2 equipment per 8 hrs/day
		Other General Industrial Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
	Building Construction	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cranes Composite	1 equipment per 6 hrs/day	1 equipment per 6 hrs/day
		Forklifts Composite	2 equipment per 6 hrs/day	2 equipment per 6 hrs/day
		Generator Sets Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Welders Composite	3 equipment per 8 hrs/day	3 equipment per 8 hrs/day
	Architectural Coatings	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
	Paving	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cement and Mortar Mixers	4 equipment per 6 hrs/day	4 equipment per 6 hrs/day
		Pavers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Paving Equipment Composite	2 equipment per 6 hrs/day	2 equipment per 6 hrs/day
		Rollers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day

Construction Assumptions (continued)

			Activity	
			8	9
Construction Activity	Demolition	Default Settings Used?	---	---
		Average Day(s) worked per week	---	---
		Construction Exhaust -Equipment:		
		Concrete/Industrial Saws	---	---
		Rubber Tired Dozers Composite	---	---
		Tractors/Loaders/Backhoes	---	---
	Site Grading	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Graders Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Other Construction Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Rubber Tired Dozers Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Scrapers Composite	---	2 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	2 equipment per 7 hrs/day	2 equipment per 7 hrs/day
	Excavating/ Trenching	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	2 equipment per 8 hrs/day	2 equipment per 8 hrs/day
		Other General Industrial Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
	Building Construction	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cranes Composite	1 equipment per 6 hrs/day	1 equipment per 6 hrs/day
		Forklifts Composite	2 equipment per 6 hrs/day	2 equipment per 6 hrs/day
		Generator Sets Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Welders Composite	3 equipment per 8 hrs/day	3 equipment per 8 hrs/day
	Architectural Coatings	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
	Paving	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cement and Mortar Mixers	4 equipment per 6 hrs/day	4 equipment per 6 hrs/day
		Pavers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Paving Equipment Composite	1 equipment per 8 hrs/day	2 equipment per 6 hrs/day
		Rollers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 7 hrs/day	---

Construction Assumptions (continued)

			Activity	
			10	11
Construction Activity	Demolition	Default Settings Used?	---	Yes
		Average Day(s) worked per week	---	5 (default)
		Construction Exhaust -Equipment:		
		Concrete/Industrial Saws	---	1 equipment per 8 hrs/day
		Rubber Tired Dozers Composite	---	1 equipment per 1 hrs/day
		Tractors/Loaders/Backhoes	---	2 equipment per 6 hrs/day
	Site Grading	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	---	---
		Graders Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Other Construction Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Rubber Tired Dozers Composite	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Scrapers Composite	---	---
		Tractors/Loaders/Backhoes	2 equipment per 7 hrs/day	2 equipment per 7 hrs/day
	Excavating/ Trenching	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	2 equipment per 8 hrs/day	2 equipment per 8 hrs/day
		Other General Industrial Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
	Building Construction	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cranes Composite	1 equipment per 6 hrs/day	1 equipment per 4 hrs/day
		Forklifts Composite	2 equipment per 6 hrs/day	2 equipment per 6 hrs/day
		Generator Sets Composite	1 equipment per 8 hrs/day	---
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Welders Composite	3 equipment per 8 hrs/day	---
	Architectural Coatings	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
	Paving	**Default Settings Used?**	---	Yes
		Average Day(s) worked per week	---	5 (default)
		Construction Exhaust -Equipment:	---	
		Cement and Mortar Mixers	---	4 equipment per 6 hrs/day
		Pavers Composite	---	1 equipment per 7 hrs/day
		Paving Equipment Composite	---	---
		Rollers Composite	---	1 equipment per 7 hrs/day
		Tractors/Loaders/Backhoes	---	1 equipment per 7 hrs/day

Construction Assumptions (continued)

			Activity	
			12	13
Construction Activity	Demolition	Default Settings Used?	Yes	---
		Average Day(s) worked per week	5 (default)	---
		Construction Exhaust -Equipment:		
		Concrete/Industrial Saws	1 equipment per 8 hrs/day	---
		Rubber Tired Dozers Composite	1 equipment per 1 hrs/day	---
		Tractors/Loaders/Backhoes	2 equipment per 6 hrs/day	---
	Site Grading	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	---	---
		Graders Composite	1 equipment per 6 hrs/day	1 equipment per 6 hrs/day
		Other Construction Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Rubber Tired Dozers Composite	1 equipment per 6 hrs/day	1 equipment per 6 hrs/day
		Scrapers Composite	---	---
		Tractors/Loaders/Backhoes	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
	Excavating/ Trenching	Default Settings Used?	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Excavators Composite	2 equipment per 8 hrs/day	2 equipment per 8 hrs/day
		Other General Industrial Equipment	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
	Building Construction	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cranes Composite	1 equipment per 4 hrs/day	1 equipment per 4 hrs/day
		Forklifts Composite	2 equipment per 6 hrs/day	2 equipment per 6 hrs/day
		Generator Sets Composite	---	---
		Tractors/Loaders/Backhoes	1 equipment per 8 hrs/day	1 equipment per 8 hrs/day
		Welders Composite	---	---
	Architectural Coatings	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
	Paving	**Default Settings Used?**	Yes	Yes
		Average Day(s) worked per week	5 (default)	5 (default)
		Construction Exhaust -Equipment:		
		Cement and Mortar Mixers	4 equipment per 6 hrs/day	4 equipment per 6 hrs/day
		Pavers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Paving Equipment Composite	---	1 equipment per 8 hrs/day
		Rollers Composite	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day
		Tractors/Loaders/Backhoes	1 equipment per 7 hrs/day	1 equipment per 7 hrs/day

Construction Assumptions (continued)

			Activity									
			6	7	8	9	10	11	12	13	14	15
Construction Activity	Demolition	**Vehicle Exhaust:**										
		Average Hauling Truck Capacity (yd3):	---	---	---	---	---	20	20	---	---	---
		Average Hauling Truck Round Trip Commute (mile)	---	---	---	---	---	20 (default)	20 (default)	---	---	---
		Vehicle Exhaust Vehicle Mixture-POVs:										
		LDGV (%)	---	---	---	---	---	0	0	---	---	---
		LDGT (%)	---	---	---	---	---	0	0	---	---	---
		HDGV (%)	---	---	---	---	---	0	0	---	---	---
		LDDV (%)	---	---	---	---	---	0	0	---	---	---
		LDDT (%)	---	---	---	---	---	0	0	---	---	---
		HDDV (%)	---	---	---	---	---	100	100	---	---	---
		MC (%)	---	---	---	---	---	0	0	---	---	---
		Worker Trips:										
		Average Worker Round Trip	---	---	---	---	---	20	20	---	---	---
		Worker Trips Vehicle Mixture- POVs	---	---	---	---	---			---	---	---
		LDGV (%)	---	---	---	---	---	50	50	---	---	---
		LDGT (%)	---	---	---	---	---	50	50	---	---	---
		HDGV (%)	---	---	---	---	---	0	0	---	---	---
		LDDV (%)	---	---	---	---	---	0	0	---	---	---
		LDDT (%)	---	---	---	---	---	0	0	---	---	---
		HDDV (%)	---	---	---	---	---	0	0	---	---	---
		MC (%)	---	---	---	---	---	0	0	---	---	---

Construction Assumptions (continued)

			Activity									
			6	7	8	9	10	11	12	13	14	15
Construction Activity	Site Grading	**Vehicle Exhaust:**										
		Average Hauling Truck Capacity (yd3)	20	20	20	20	20	20	20	20	20	---
		Average Hauling Truck Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	---
		Vehicle Exhaust Vehicle Mixture-POVs:										
		LDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDGT (%)	0	0	0	0	0	0	0	0	0	---
		HDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDDV (%)	0	0	0	0	0	0	0	0	0	---
		LDDT (%)	0	0	0	0	0	0	0	0	0	---
		HDDV (%)	100	100	100	100	100	100	100	100	100	---
		MC (%)	0	0	0	0	0	0	0	0	0	---
		Worker Trips:										
		Average Worker Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	---
		Worker Trips Vehicle Mixture- POVs:										
		LDGV (%)	50	50	50	50	50	50	50	50	50	---
		LDGT (%)	50	50	50	50	50	50	50	50	50	---
		HDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDDV (%)	0	0	0	0	0	0	0	0	0	---
		LDDT (%)	0	0	0	0	0	0	0	0	0	---
		HDDV (%)	0	0	0	0	0	0	0	0	0	---
		MC (%)	0	0	0	0	0	0	0	0	0	---

Construction Assumptions (continued)

			Activity									
			6	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*
Construction Activity	*Excavating/ Trenching*	**Vehicle Exhaust:**										
		Average Hauling Truck Capacity (yd3):	20	20	20	20	20	20	20	20	20	---
		Average Hauling Truck Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	---
		Vehicle Exhaust Vehicle Mixture-POVs:										
		LDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDGT (%)	0	0	0	0	0	0	0	0	0	---
		HDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDDV (%)	0	0	0	0	0	0	0	0	0	---
		LDDT (%)	0	0	0	0	0	0	0	0	0	---
		HDDV (%)	100	100	100	100	100	100	100	100	100	---
		MC (%)	0	0	0	0	0	0	0	0	0	---
		Worker Trips:										
		Average Worker Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	---
		Worker Trips Vehicle Mixture- POVs										
		LDGV (%)	50	50	50	50	50	50	50	50	50	---
		LDGT (%)	50	50	50	50	50	50	50	50	50	---
		HDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDDV (%)	0	0	0	0	0	0	0	0	0	---
		LDDT (%)	0	0	0	0	0	0	0	0	0	---
		HDDV (%)	0	0	0	0	0	0	0	0	0	---
		MC (%)	0	0	0	0	0	0	0	0	0	---

Construction Assumptions (continued)

			Activity									
			6	7	8	9	10	11	12	13	14	15
Construction Activity	Building Construction	**Vehicle Exhaust:**										
		Average Hauling Truck Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)
		Vehicle Exhaust Vehicle Mixture-POVs:										
		LDGV (%)	0	0	0	0	0	0	0	0	0	0
		LDGT (%)	0	0	0	0	0	0	0	0	0	0
		HDGV (%)	0	0	0	0	0	0	0	0	0	0
		LDDV (%)	0	0	0	0	0	0	0	0	0	0
		LDDT (%)	0	0	0	0	0	0	0	0	0	0
		HDDV (%)	100	100	100	100	100	100	100	100	100	100
		MC (%)	0	0	0	0	0	0	0	0	0	0
		Worker Trips:										
		Average Worker Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)
		Worker Trips Vehicle Mixture- POVs										
		LDGV (%)	50	50	50	50	50	50	50	50	50	50
		LDGT (%)	50	50	50	50	50	50	50	50	50	50
		HDGV (%)	0	0	0	0	0	0	0	0	0	0
		LDDV (%)	0	0	0	0	0	0	0	0	0	0
		LDDT (%)	0	0	0	0	0	0	0	0	0	0
		HDDV (%)	0	0	0	0	0	0	0	0	0	0
		MC (%)	0	0	0	0	0	0	0	0	0	0
		Vendor Trips:										
		Average Vendor Round Trip Commute (mile)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)	40 (default)
		Vendor Trips Vehicle Mixture- POVs										
		LDGV (%)	0	0	0	0	0	0	0	0	0	0
		LDGT (%)	0	0	0	0	0	0	0	0	0	0
		HDGV (%)	0	0	0	0	0	0	0	0	0	0
		LDDV (%)	0	0	0	0	0	0	0	0	0	0
		LDDT (%)	0	0	0	0	0	0	0	0	0	0
		HDDV (%)	100	100	100	100	100	100	100	100	100	100
		MC (%)	0	0	0	0	0	0	0	0	0	0

Construction Assumptions (concluded)

			Activity									
			6	7	8	9	10	11	12	13	14	15
Construction Activity	Architectural Coatings	**Worker Trips:**										
		Average Worker Round Trip Commute	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)	---
		Worker Trips Vehicle Mixture- POVs:										
		LDGV (%)	50	50	50	50	50	50	50	50	50	---
		LDGT (%)	50	50	50	50	50	50	50	50	50	---
		HDGV (%)	0	0	0	0	0	0	0	0	0	---
		LDDV (%)	0	0	0	0	0	0	0	0	0	---
		LDDT (%)	0	0	0	0	0	0	0	0	0	---
		HDDV (%)	0	0	0	0	0	0	0	0	0	---
		MC (%)	0	0	0	0	0	0	0	0	0	---
	Paving	**Vehicle Exhaust:**										
		Average Hauling Truck Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	---	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)
		Vehicle Exhaust Vehicle Mixture-POVs:	0	0	0	0	---	0	0	0	0	0
		LDGV (%)	0	0	0	0	---	0	0	0	0	0
		LDGT (%)	0	0	0	0	---	0	0	0	0	0
		HDGV (%)	0	0	0	0	---	0	0	0	0	0
		LDDV (%)	0	0	0	0	---	0	0	0	0	0
		LDDT (%)	0	0	0	0	---	0	0	0	0	0
		HDDV (%)	100	100	100	100	---	100	100	100	100	100
		MC (%)	0	0	0	0	---	0	0	0	0	0
		Worker Trips:										
		Average Worker Round Trip Commute (mile)	20 (default)	20 (default)	20 (default)	20 (default)	---	20 (default)	20 (default)	20 (default)	20 (default)	20 (default)
		Worker Trips Vehicle Mixture- POVs:					---					
		LDGV (%)	50	50	50	50	---	50	50	50	50	50
		LDGT (%)	50	50	50	50	---	50	50	50	50	50
		HDGV (%)	0	0	0	0	---	0	0	0	0	0
		LDDV (%)	0	0	0	0	---	0	0	0	0	0
		LDDT (%)	0	0	0	0	---	0	0	0	0	0
		HDDV (%)	0	0	0	0	---	0	0	0	0	0
		MC (%)	0	0	0	0	---	0	0	0	0	0

Personnel Emission Factor(s)

On Road Vehicle Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2018	LDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	Activity 2
2018	LDGT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2018	HDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2018	LDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2018	LDDT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2018	HDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2018	MC	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	LDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	Activity 3
2019	LDGT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	HDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	LDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	LDDT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	HDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2019	MC	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	

Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

Proprietary Information. Contact Air Quality Subject Matter Expert for More Information regarding this engine's Emission Factors.

Aerospace Ground Equipment Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flo	wVOC	SOx	NOx	CO	PM 10	PM 2.5	CO2e
MC-11	1.8	0.276	0.004	0.177	12.262	0.109	0.1	34.8
MJ-1B	0	3.04	0.219	4.78	3.04	0.8	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147
H1	0.4	0.1	0.011	0.16	0.18	0.006	0.006	8.9
MJ-2/TTU-22	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0	0.01	0.043	0.11	0.08	0.01	0.01	22.1
A/M32A-60A	0	0.27	0.306	1.82	5.48	0.211	0.205	221.1

Construction/Demolition Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Year	*Equipment*	*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*CH4*	*CO2*	*Emission Factors are Used for These Construction Activity*
2017	Concrete/ Industrial Saws Composite	0.0678	0.0006	0.4267	0.3892	0.0297	0.0297	0.0061	58.463	Activity 11 & 12
2017	Rubber Tired Dozers Composite	0.2464	0.0024	1.9508	0.93	0.0796	0.0796	0.0222	239.08	
2017	Tractors/ Loaders/ Backhoes Composite	0.0558	0.0007	0.368	0.3666	0.0221	0.0221	0.005	66.797	

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-Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2017	LDGV	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	Activity 11 & 12
2017	LDGT	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	
2017	HDGV	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	
2017	LDDV	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	
2017	LDDT	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	
2017	HDDV	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	
2017	MC	0.6	0.01	0.5	9.52	0.028	0.014		0.1	501	

Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Year	*Equipment*	*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*CH4*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	Graders	0.12	0.001	0.887	0.588	0.044	0.0441	0.011	132.7	Activity 6,7& 8
2016	Other Construction Equipment Composite	0.072	0.001	0.568	0.36	0.023	0.0233	0.006	122.6	
2016	Rubber Tired Dozers	0.259	0.002	2.089	0.983	0.086	0.0858	0.023	239.1	
2016	Tractors/ Loaders/ Backhoes	0.061	7.00E-04	0.407	0.369	0.026	0.0258	0.006	66.8	
2016	Excavators Composite	0.099	0.001	0.66	0.521	0.033	0.0332	0.009	119.6	
2017	Excavators Composite	0.092	0.001	0.586	0.518	0.029	0.0288	0.008	119.6	Activity 9, 10, 11, 12, 13 & 14
2017	Graders	0.112	0.001	0.801	0.584	0.04	0.0396	0.01	132.7	
2017	Other Construction Equipment Composite	0.067	0.001	0.504	0.357	0.021	0.0206	0.006	122.5	
2017	Rubber Tired Dozers	0.246	0.002	1.951	0.93	0.08	0.0796	0.022	239.1	
2017	Scrapers Composite	0.226	0.003	1.748	0.871	0.072	0.0716	0.02	262.5	
2017	Tractors/Loaders/ Backhoes	0.056	7.00E-04	0.368	0.367	0.022	0.0221	0.005	66.8	

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	LDGV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	Activity 6,7 & 8
2016	LDGT	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	HDGV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	LDDV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	LDDT	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	HDDV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	MC	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2017	LDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	Activity 9,10,11,12,13 & 14
2017	LDGT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	HDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	LDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	LDDT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	HDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	MC	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	

Trenching/Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Year	*Equipment*	*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*CH4*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	Graders Composite	0.1196	0.0014	0.8866	0.5883	0.0441	0.0441	0.0107	132.74	Activity 6,7 & 8
2016	Other Construction Equipment Composite	0.0719	0.0012	0.5679	0.3602	0.0233	0.0233	0.0064	122.56	
2016	Rubber Tired Dozers	0.2591	0.0024	2.0891	0.9833	0.0858	0.0858	0.0233	239.09	
2016	Tractors/ Loaders/ Backhoes	0.061	0.0007	0.4069	0.3689	0.0258	0.0258	0.0055	66.797	
2016	Excavators Composite	0.0987	0.0013	0.6602	0.5212	0.0332	0.0332	0.0089	119.58	
2017	Excavators Composite	0.0915	0.0013	0.5857	0.5183	0.0288	0.0288	0.0082	119.57	Activity 9, 10,11,12,13 &14
2017	Graders	0.112	0.0014	0.8007	0.5843	0.0396	0.0396	0.0101	132.74	
2017	Other Construction Equipment Composite	0.0674	0.0012	0.5044	0.3568	0.0206	0.0206	0.006	122.54	
2017	Rubber Tired Dozers	0.2464	0.0024	1.9508	0.93	0.0796	0.0796	0.0222	239.08	
2017	Scrapers Composite	0.2256	0.0026	1.7483	0.8713	0.0716	0.0716	0.0203	262.48	
2017	Tractors/Loaders/Backhoes Composite	0.0558	0.0007	0.368	0.3666	0.0221	0.0221	0.005	66.797	

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*EmissionFactors are Used for These Construction Activity*
2016	LDGV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	Activity 6,7 & 8
2016	LDGT	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	HDGV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	LDDV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	LDDT	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	HDDV	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2016	MC	0.625	0.009	0.571	9.736	0.028	0.014		0.095	500	
2017	LDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	Activity 9,10,11,12,13 & 14
2017	LDGT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	HDGV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	LDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	LDDT	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	HDDV	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	
2017	MC	0.597	0.009	0.53	9.519	0.028	0.014		0.095	500.8	

Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Year	*Equipment*	*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*CH4*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	Cranes	0.1136	0.0013	0.9387	0.4263	0.0387	0.0387	0.0102	128.62	Activity 6
2016	Forklifts Composite	0.0427	0.0006	0.2815	0.2189	0.0136	0.0136	0.0038	54.395	
2016	Generator Sets Composite	0.058	0.0006	0.4369	0.2862	0.024	0.024	0.0052	60.992	
2016	Tractors/ Loaders/ Backhoes Composite	0.061	0.0007	0.4069	0.3689	0.0258	0.0258	0.0055	66.797	
2016	Welders Composite	0.0482	0.0003	0.2173	0.195	0.0168	0.0168	0.0043	25.602	
2017	Cranes	0.1073	0.0013	0.8624	0.4152	0.0352	0.0352	0.0096	128.62	Activity 7, 8, 9, 10, 11, 12,13,14 & 15
2017	Forklifts Composite	0.0399	0.0006	0.2492	0.2181	0.0118	0.0118	0.0036	54.395	
2017	Generator Sets Composite	0.0526	0.0006	0.4052	0.282	0.0215	0.0215	0.0047	60.992	
2017	Tractors/ Loaders/ Backhoes Composite	0.0558	0.0007	0.368	0.3666	0.0221	0.0221	0.005	66.797	
2017	Welders Composite	0.0433	0.0003	0.2054	0.1912	0.015	0.015	0.0039	25.602	

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	LDGV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	Activity 6
2016	LDGT	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	HDGV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	LDDV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	LDDT	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	HDDV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	MC	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2017	LDGV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	Activity 7, 8, 9, 10, 11, 12, 13, 14 & 15
2017	LDGT	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	HDGV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	LDDV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	LDDT	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	HDDV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	MC	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	

Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

Year		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	LDGV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	Activity 6
2016	LDGT	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	HDGV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	LDDV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	LDDT	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	HDDV	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2016	MC	0.63	0.01	0.57	9.74	0.028	0.014		0.1	500	
2017	LDGV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	Activity 7,8,9,10,11,12 ,13 & 14
2017	LDGT	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	HDGV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	LDDV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	LDDT	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	HDDV	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	
2017	MC	0.6	0.01	0.53	9.52	0.028	0.014		0.1	501	

Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Year	Start Month	Equipment	VOC	SOx	NOx	CO	PM 10	PM 2.5	CH4	CO2	Emission Factors are Used for These Construction Activity
2016	9	Graders Composite	0.1196	0.0014	0.8866	0.5883	0.0441	0.0441	0.0107	132.74	Activity 6
2016	9	Other Construction Equipment	0.0719	0.0012	0.5679	0.3602	0.0233	0.0233	0.0064	122.56	
2016	9	Rubber Tired Dozers	0.2591	0.0024	2.0891	0.9833	0.0858	0.0858	0.0233	239.09	
2016	9	Tractors/ Loaders/ Backhoes	0.061	0.0007	0.4069	0.3689	0.0258	0.0258	0.0055	66.797	
2017	8	Excavators	0.0915	0.0013	0.5857	0.5183	0.0288	0.0288	0.0082	119.57	Activity 9,11,12,13, & 14
2017	8	Graders Composite	0.112	0.0014	0.8007	0.5843	0.0396	0.0396	0.0101	132.74	
2017	8	Other Construction Equipment	0.0674	0.0012	0.5044	0.3568	0.0206	0.0206	0.006	122.54	
2017	8	Rubber Tired Dozers	0.2464	0.0024	1.9508	0.93	0.0796	0.0796	0.0222	239.08	
2017	8	Scrapers Composite	0.2256	0.0026	1.7483	0.8713	0.0716	0.0716	0.0203	262.48	
2017	8	Tractors/ Loaders/ Backhoes	0.0558	0.0007	0.368	0.3666	0.0221	0.0221	0.005	66.797	
2017	9	Excavators	0.0987	0.0013	0.6602	0.5212	0.0332	0.0332	0.0089	119.58	Activity 7 & 8
2017	9	Graders Composite	0.1196	0.0014	0.8866	0.5883	0.0441	0.0441	0.0107	132.74	
2017	9	Other Construction Equipment	0.0719	0.0012	0.5679	0.3602	0.0233	0.0233	0.0064	122.56	
2017	9	Rubber Tired Dozers	0.2591	0.0024	2.0891	0.9833	0.0858	0.0858	0.0233	239.09	
2017	9	Tractors/ Loaders/ Backhoes	0.061	0.0007	0.4069	0.3689	0.0258	0.0258	0.0055	66.797	

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

Year	*Start Month*		*VOC*	*SOx*	*NOx*	*CO*	*PM 10*	*PM 2.5*	*Pb*	*NH3*	*CO2*	*Emission Factors are Used for These Construction Activity*
2016	9	HDDV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	Activity 6
2016	9	HDGV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2016	9	LDDT	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2016	9	LDDV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2016	9	LDGT	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2016	9	LDGV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2016	9	MC	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	6	HDDV	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	Activity 15
2017	6	HDGV	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	6	LDDT	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	6	LDDV	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	6	LDGT	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	6	LDGV	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	6	MC	0.74	0.01	0.74	10.67	0.03	0.016		0.1	496	
2017	8	HDDV	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	Activity 9,11,12,13, & 14
2017	8	HDGV	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	8	LDDT	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	8	LDDV	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	8	LDGT	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	8	LDGV	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	8	MC	0.6	0.01	0.53	9.519	0.028	0.014		0.1	501	
2017	9	HDDV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	9	HDGV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	Activity 7 & 8
2017	9	LDDT	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	9	LDDV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	9	LDGT	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	9	LDGV	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	
2017	9	MC	0.63	0.01	0.57	9.736	0.028	0.014		0.1	500	

2. Air Quality Model Report Detail

FORMULAS

Personnel Formula(s)

Personnel Vehicle Miles Travel for Work Days per Year

$VMT_P = NP * WD * AC$

VMT_P: Personnel Vehicle Miles Travel (miles/year) NP: Number of Personnel
WD: Work Days per Year
AC: Average Commute (miles)

Total Vehicle Miles Travel per Year

$VMT_{Total} = VMT_{AD} + VMT_C + VMT_{SC} + VMT_{ANG} + VMT_{AFRC}$

VMT_{Total}: Total Vehicle Miles Travel (miles)
VMT_{AD}: Active Duty Personnel Vehicle Miles Travel (miles)
VMT_C: Civilian Personnel Vehicle Miles Travel (miles)
VMT_{SC}: Support Contractor Personnel Vehicle Miles Travel (miles)
VMT_{ANG}: Air National Guard Personnel Vehicle Miles Travel (miles)
VMT_{AFRC}: Reserve Personnel Vehicle Miles Travel (miles)

Vehicle Emissions per Year

$V_{POL} = (VMT_{Total} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{Total}: Total Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Personnel On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Aircraft

Flight Operations Formula(s)

Aircraft Emissions per Mode for LTOs per Year

$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs) TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel) NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

Aircraft Emissions for LTOs per Year

AELTO = AEMIDLE_IN + AEMIDLE_OUT + AEMAPPROACH + AEMCLIMBOUT + AEMTAKEOFF

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)
AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs) TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel) NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

Aircraft Emissions for TGOs per Year
AETGO = AEMAPPROACH + AEMCLIMBOUT + AEMTAKEOFF

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs) TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel) NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

Aircraft Emissions for Trim per Year
AETRIM = AEPSIDLE + AEPSAPPROACH + AEPSINTERMEDIATE + AEPSMILITARY + AEPSAFTERBURN

AE_{TRIM}: Aircraft Emissions (TONs)
$AEPS_{IDLE}$: Aircraft Emissions for Idle Power Setting (TONs)
$AEPS_{APPROACH}$: Aircraft Emissions for Approach Power Setting (TONs)
$AEPS_{INTERMEDIATE}$: Aircraft Emissions for Intermediate Power Setting (TONs)
$AEPS_{MILITARY}$: Aircraft Emissions for Military Power Setting (TONs)
$AEPS_{AFTERBURN}$: Aircraft Emissions for After Burner Power Setting (TONs)

Auxiliary Power Unit (APU) Formula(s)

Auxiliary Power Unit (APU) Emissions per Year
APU_{POL} = APU * OH * LTO * NA * EF_{POL} / 2000

APU_{POL}: Auxiliary Power Unit (APU) Emissions per Pollutant (TONs) APU: Number of Auxiliary Power Units
OH: Operation Hours for Each LTO (hour) LTO: Number of LTOs
NA: Number of Aircraft
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Aerospace Ground Equipment (AGE) Formula(s)

Aerospace Ground Equipment (AGE) Emissions per Year
AGE_{POL} = AGE * OH * LTO * EF_{POL} / 2000

AGE_{POL}: Aerospace Ground Equipment (AGE) Emissions per Pollutant (TONs) AGE: Total Number of Aerospace Ground Equipment
OH: Operation Hours for Each LTO (hour)
LTO: Number of LTOs
EF_{POL}: Emission Factor for Pollutant (lb/hr)
2000: Conversion Factor pounds to tons

Construction/Demolition
Demolition Phase Formula(s)

Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2) BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

Vehicle Exhaust Emissions per Phase
VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space) HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip) V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000
V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles) WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Site Grading Phase Formula(s)

Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3) $HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3) HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles) WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Trenching / Excavating Phase Formula(s)

Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day) ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days) H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3) $HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3) HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles) WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Architectural Coatings Phase Formula(s)

Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile) PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs) BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

Paving Phase Formula(s)

Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days) H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3) HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Off-Gassing Emissions per Phase

$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre) PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

Building Construction Phase Formula(s) – Construction 6 to 13

Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (0.42 / 1000) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles) WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Vender Trips Emissions per Phase

VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles) BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Building Construction Phase Formula(s) – Construction 14 & 15

Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs) NE: Number of Equipment
WD: Number of Total Work Days (days) H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (0.32 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles) BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.32 / 1000): Conversion Factor ft^3 to trips (0.32 trip / 1000 ft^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (milesp) WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.05 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles) BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.05 / 1000): Conversion Factor ft^3 to trips (0.05 trip / 1000 ft^3) HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile) VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

3. General Conclusions

Short term construction emissions will occur over a 2 to 3 year period but since operation increases will be in a staged fashion, overall emissions per year will be smaller than the peak expected. Emissions from the increased operations will peak and be at a steady-state in 2021. Total emission increases for the region will be small.

Appendix G: Draft EIS Comments and Responses

G DRAFT EIS PUBLIC COMMENTS AND RESPONSES

This appendix contains comments received from federal, state, and local agencies, as well as the general public during the public comment period for the Draft F-35A Pacific Operational Beddown Environmental Impact Statement (EIS). The public comment period began on September 4, 2015 with the Draft EIS Notice of Availability published in the *Federal Register*. In accordance with the National Environmental Policy Act (NEPA), all comments were reviewed and taken into consideration by the Air Force in its decision-making process. Responses were provided for all substantive comments and incorporated into the Final EIS. Substantive comments are those that identify issues and concerns related to the Proposed Action and Alternatives and/or directly relate to the analyses and findings presented in the EIS. Non-substantive comments are those that express a conclusion, an opinion, or a vote for or against the proposal itself; or that otherwise state a personal preference or opinion.

The following presents the United States (U.S.) Air Force's (Air Force's) Comment and Response Process. Please note that providing your name in the EIS process meant that you understood that your name and comment would be made part of the public record for this EIS. All comments, whether presented orally or in writing at the hearings, received via U.S. Postal Service, or submitted via the internet, were considered equally.

G.1 Comment Receipt and Review

G.1.1 Receipt

Comments on the Draft EIS included letters, emails, handwritten notes, and oral testimony received during the 45-day public comment period. Please note that everyone who sent a comment is listed and recognized as commenting. To minimize the appendix size only the oral testimony, unique letters, emails, and handwritten notes were scanned and substantive comments bracketed, categorized, and specifically received responses. According to Council of Environmental Quality, if a number of comments are identical or very similar, agencies may group the comments and prepare a single answer for each group.

G.1.2 Review

In accordance with 40 Code of Federal Regulations 1503.4, comments were assessed and considered as follows:

- Each letter, email, handwritten note, and oral testimony was assigned an identification number, then were read and reviewed carefully.
- Within each letter, email, handwritten note, and oral testimony, those issues that were substantive were identified and bracketed. Three guidelines were used to determine substantive comments:
  1. The comment questioned the Proposed Action, alternatives, or other components of the F-35A Pacific Operational Beddown action.
  2. The methodology of the analysis or results was questioned.
  3. The use, adequacy, and/or accuracy of the data presented in the EIS were questioned.
- The bracketed comments were reviewed by environmental resource specialists who drafted the responses.
- In many cases, similar comments were assigned the same response. If the same comment was repeated within the same letter or testimony, it was bracketed the first time it appeared.

- Individual bracketed comments were assigned a number and a response. These responses are organized consecutively by number and appear in the Responses section of this Appendix.
- The EIS was modified to make corrections and improve or clarify the analysis.

G.2 Locating Your Comment

A directory begins on page G-3 and is arranged alphabetically by last name in the form we received the comments:

- Oral Testimony at the hearings, designated OT and found in Table G-1;
- Written Comments received at the hearings, designated WC and listed in Table G-2; and
- Mailed Comments submitted via U.S. Postal Service and via email, designated as MC, are listed in Table G-3.

After locating your name, note the comment number in the third column. This identification number was assigned to your oral and/or written comments and labeled in the top right corner (space permitting). In some instances, individuals asked their names to be withheld from the publication. For these individuals, their name is listed as "anonymous." If the signature/commenter was illegible, that too was noted.

As was mentioned above, the comments are arranged in three categories: (1) oral testimony given at the hearing meetings, (2) written comments presented at the hearing meetings, and (3) mailed comments received during the 45-day public review and comment period.

G.3 Comment Key

The following were used to identify the comment by resource category; the number following the abbreviation designates the particular comment in the specific resource category.

AA	Airfields and Airspace
AE	Acoustic Environment
AQ	Air Quality (including Climate Change)
CR	Cultural Resources
CU	Cumulative Effects
EA	Earth Resources
EJ	Environmental Justice and Protection of Children
HZ	Hazardous/Toxic Materials and Waste; Contaminated Sites
LM	Land Management
NR	Natural Resources
NI	NEPA Process/Public Involvement
PA	Proposed Action and Alternatives
PN	Purpose and Need
RV	Recreational and Visual Resources
SA	Safety and Environmental Health (including Air Safety)
SO	Socioeconomics (including Public Services, Transportation, and Utilities)
WR	Water Resources

G.4 Locating Responses to Comment

Air Force responses to comments are located in the Response section of this appendix and are noted in the last column of Tables G-1 to G-3. All substantive comments within each comment letter, email, or handwritten note were given a response number, if there were no substantive comments then no responses were noted. Response numbers are printed next to the brackets in the right margin of the comments. Every bracketed comment has a corresponding response. Each response is designed to be read along with the comment it addresses. Air Force responses to comments are organized alphabetically by response code. The first page of the responses provides a key to the response codes.

The responses refer to the Draft EIS. For example, if the commenter suggests a deficiency in the Draft document, the response may refer to the location in the document where information for clarification can be found. Where amended information is included, the reader is directed to that section of the Final EIS where the change was made.

Public involvement is an important part of the NEPA process, and all comments regardless of format (i.e., oral testimony, letters, emails, or handwritten notes) are equally considered by the Air Force in its decision-making process.

Table G-1. Oral Testimony Presented at the Hearing Meetings

Last Name	*First Name*	*Comment ID*	*Affiliation*	*Response Number(s)*
Atwood	Gary	OT-027	--	--
Brophy	Bill	OT-026	--	--
Cleworth	Jerry	OT-023	--	--
Coghill	John	OT-001	Senator	AE-1, PA-1
Dearborn	Ron	OT-046	--	AA-5
Dodge	Kathryn	OT-025	FNSB Assembly	--
Dodson	Jim	OT-030	Fairbanks Economic Development Corporation	--
Fate	Hugh	OT-028	--	--
Gohlke	Karl	OT-045	--	--
Hajdukovich	Leslie	OT-018	Behalf of Senator Sullivan	--
Herbert	Lisa	OT-034	Chamber of Commerce	--
Hicks	Witt	OT-014	--	AA-3
Hill	Jim	OT-011	--	AE-2, AQ-1, AQ-2, PA-2, SA-1, SA-2, SO-1,
Hopkins	Luke	OT-020	Mayor	AA-5, SO-2
Imus	Jennifer	OT-036	--	--
Isaacson	Doug	OT-006	--	--
Jones	Tim	OT-039	--	--
Kassel	Karl	OT-005	--	--
Koponen	Heather	OT-041/OT-049	--	AE-5, AQ-4, NI-2, PA-1, PA-3, PA-4, RV-1, SA-4, SA-5, SA-6, SO-4
McIntosh	Sydney	OT-016	Behalf of Governor Walker	--
Miller	Chris	OT-035	--	--
Mulford	Robert	OT-043	--	--
Muth	Sterling	OT-010	--	--
Osborn	Phil	OT-042	--	--
Otis	Buzz	OT-008	--	--
Parrish	Jimmy	OT-017	Behalf of Senator Murkowski	--
Perry	Kyle	OT-037	--	--

Table G-1. Oral Testimony Presented at the Hearing Meetings

Last Name	*First Name*	*Comment ID*	*Affiliation*	*Response Number(s)*
Pollen	Michael	OT-032	--	--
Prusak	David	OT-004	--	--
Quarberg	Don	OT-015	--	AA-4, AA-5, SA-3
Rich	Suzanne	OT-040	--	SA-4
Ripple	Chris	OT-009	--	--
Roberts	Lance	OT-029	--	--
Schmidt	Dan	OT-024	--	--
Shields	Robert	OT-033	--	--
Sibitzky	Stuart	OT-007	--	--
Sloan	John	OT-013	--	AE-3, AE-4, AQ-3
Stickler	Kim	OT-019	Behalf of Representative Young	--
Talerico	David	OT-003	Representative	--
Versandi	Tony	OT-031	--	--
White	Adam	OT-038	Alaska Airman's Association	AA-5, AA-6, AA-7
White	Chris	OT-047	--	--
Wilbur	Jack	OT-044	--	--
Williams	Jim	OT-012	Behalf of Mayor Eberhart	--
Williams	Jim	OT-021	Behalf of Mayor Eberhart	--
Wilson	Tammie	OT-002	Representative	NI-1
Wilson	Tammie	OT-022	Representative	--
Winters	Nadine	OT-048	--	--

Table G-2. Written Comments Submitted at the Hearing Meetings

Last Name	*First Name*	*Comment ID*	*Affiliation*	*Response Number(s)*
Brophy	Bill	WC-012/MC-015	--	--
Dougherty	Dennis	WC-008	--	--
Dunckler	Frank	WC-002	--	--
Eberhart	John	WC-005/WC-018	Mayor	--
Fath	Robert D.	WC-015	--	--
Greer	Mark & Debra	WC-006	--	--
Grossmann	Bruce	WC-004	--	SA-7
Haas	Heidi	WC-007	FNSB Board of Education	--
Hickok	Deb	WC-013	--	--
Hutchison	Chad	WC-001	--	--
Hutchison	Diane	WC-014	--	--
Madden	Wesley	WC-009	--	--
Perry	Kyle	WC-011	--	--
Unsigned		WC-016	--	--
Walker	Bill	WC-017/MC-016	Governor	--
Ward	Bryce	WC-003	Mayor	SO-2, SO-5
Woody	Gary	WC-010	--	--

Table G-3. Mailed Comments Received during Public Comment and Review Period

Last Name	*First Name*	*Comment ID*	*Affiliation*	*Response Number(s)*
Bennett	Shane	MC-003	--	AA-8
Brophy	William	MC-015	--	--
Chumbley	Jim	MC-004	--	--
Dodson	Jim	MC-007	Fairbanks Economic Development Corporation	SO-1
Frankevich	Joan	MC-019	National Parks Conservation Association	AA-1, AA-10, AA-11, AA-12, AE-9
Hallgren	Peter	MC-010	Mayor, Delta Junction	AA-9, AE-6
Hallgren	Peter	MC-020	Mayor, Delta Junction	AA-9, AE-6, SA-8, SA-9
Herbert	Lisa	MC-011	Greater Fairbanks Chamber of Commerce	--
Hopkins	Luke	MC-014	Mayor, Fairbanks North Star Borough	CU-1, CU-2, SO-2, SO-5, SO-6
Hutchison	Garry	MC-017	--	AE-8
Koester	Kim	MC-005/006	--	--
Morris	Julie	MC-001	--	--
Osborn	Philip	MC-009	--	--
Raymond	Matthew	MC-002	--	--
Reichgott	Christine B.	MC-013	USEPA	AE-7, EJ-1, HZ-1, HZ-2, NR-1, PA-5, WR-1
Stewart	Nicole	MC-008	--	--
Walker	Bill	MC-012	Governor, State of Alaska	--
Walker	Bill	MC-016	Governor, State of Alaska	--
Winters	Nadine	MC-018	--	SO-2

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COMMENTS

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Oral Testimony

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UNITED STATES AIR FORCE F-35A

OPERATIONAL BEDDOWN - PACIFIC

DRAFT ENVIRONMENTAL IMPACT STATEMENT

EXCERPT OF PROCEEDINGS

TRANSCRIPT OF PUBLIC COMMENTS

September 21, 2015

North Pole Middle School

North Pole, Alaska

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P R O C E E D I N G S

COL. MITCHELL: With that, let's call up our first speaker, who will Senator John Coghill. **OT-001**

SEN. COGHILL: Thank you. Ms. Ristau, right? Ristau and gentlemen and colonels. Appreciate you taking the time for this comment. I'm going to speak in favor of your action alternative. There are two, maybe three things, that I would like for you to consider including in some of your studies. One of them would be, is there something that the led -- that the state or the municipality can do to help maybe some of the noise reduction in the school building? That's one of the responsibilities we'll have. **EJ-1**

But to get a context to that, we'd like to know -- in the Anchorage area, you have the -- the JPARC -- I mean, the JBER that has the F-22s that fly out of that municipality, or by the municipality. And just for context, if I could -- if we could understand what their decibel level is, say, downtown, maybe in some of the schools closest to the base, that will help us as a -- as a municipality in an area understand what those decibels really mean to us. **AE-1**

The other thing is on the Richardson Highway going by the base, there's probably going to be a -- a ramped up security. If not, we'd like to know. If there is, we also want to know. There's a -- quite an open space right along the flight line that is public right-of-way, and we'd -- I'd

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just like to know what the -- if there's any impacts on that at all.

There is also -- that we -- we have a -- a road that could be used as an egress area, if you need to close down that part of the Richardson Highway. It's been a constant conversation. But maybe with this new ramped up aircraft facility, maybe that needs to be something that gets back into that conversation. PA-1

But without -- without reservation, we appreciate these F-35s coming to our area, and we want to work with you on some of those areas. Thank you very much.

COL. MITCHELL: Thank you, Senator Coghill. The next speaker will be Representative Tammie Wilson.

OT-002

REP. WILSON: I'll just leave it there. Thank you. For the record, my name is Representative Tammie Wilson, W-i-l-s-o-n. Thank you so much for this opportunity. First of all, I guess I really only have one question. I know you said there was a number of people who would be in this area that isn't currently in it, and I would just like to know whether they were actually personally notified that they were, through a postcard or some type of form versus just the e-mail or hearing it from a different source. NI-1

We're really excited. You can see by the turnout. When we don't turn out in North Pole, it means we're excited and we stay home. When we're upset, we show up. So I just

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want to make sure that you realize that depends upon what community you come to, but the community really is. I represent right between Eielson and Fort Wainwright. So I just want to let you know we have plenty of housing, and we are happy to have you in. Thank you, again, for the opportunity.

COL. MITCHELL: Thank you, Representative Wilson. Our next speaker will be Representative David Talerico. **OT-003**

REP. TALERICO: Thank you for the opportunity. I'm Representative Dave Talerico. My last name is T-a-l-e-r-i-c-o. And please don't be -- don't apologize for getting it wrong. When I was sworn in to office, it was mispronounced four times in the same day.

I -- I do appreciate the opportunity, and I do want to compliment you on the information that you've put out for us. And your previous presentation, I think, was -- was very clear and easy to understand. I think we're all looking forward to this. The comments I've had from my constituents, of course, are we're very big on recreation in Alaska. And especially folks, the farther out you get from -- from the actual air base, the more they're concerned of how that may impact their recreation. I think that was -- certainly was explained.

So I do want to say that I am in favor of -- of bringing the F-35s here. I -- I think it will work well.

And once again, I'll surrender my time. But thank you very much for the presentation. I think it's very well done.

COL. MITCHELL: Thank you, Representative Talerico. Our next speaker will be David Prusak. **OT-004**

MR. PRUSAK: Thank you. For the record, my name is David Prusak, P-r-u-s-a-k. I'm the project manager for the Interior Gas Utility, or IGU, which is a wholly-owned entity of the Fairbanks North Star Borough. We just completed a project in the North Pole area, extending about 80 miles of -- of natural gas lines throughout the community, in anticipation for creating a natural gas utility.

As you address the issues within the NEPA process for air quality, just I would like you to -- to have the -- the documents, take into consideration what we're doing to be able to address those issues related to the increase in population, to be able to provide a clean-burning source of fuel. So as you look at those impacts -- the human impacts within the increase within the base, some of the proactive things that the Fairbanks North Star Borough is taking through -- through the IGU to be able to provide that in the community.

So I do speak in support of -- of a proposed action that you have. I'd like to see that to be able to work into the considerations as you look at the air quality components of humans and aircraft. Thank you.

COL. MITCHELL: Thank you, Mr. Prusak. Our next speaker will be Karl Kassel. **OT-005**

MR. KASSEL: Thank you. I'm Karl Kassel. It's K-a-s-s-e-l. And I'm the presiding officer of our local borough assembly. And I want to thank you for the opportunity for this program this evening and getting the information out. I've been attending all of the previous programs as this has developed and evolved, and I want to compliment you on a very open and transparent process, that, after reviewing the draft EIS, I think you've been very responsive to concerns from our community, and I thank you for that.

I think it's quite obvious, in looking through the document, you've addressed a lot of the issues that we have -- have raised. You've been endeavoring to be a good neighbor, as our community does. We really support our men and women in uniform, I think, better than probably any other community in North America, actually. We recognize the value in having the folks here; the strategic value, the value to our community, and the value to our country, and we support all of that.

So we endeavor to be good neighbors. I think you have also. The draft EIS shows an interest to our community in appropriate flight avoidance areas, both in physical location and in timing, to respect our community and do what we can --

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or what you can to minimize the impacts of the additional noise.

And I think as the process goes forward, you will feel the cooperation that comes from our community will help resolve any of the unintended qua -- consequences that tend to roll along with a project of this magnitude. I'm sure things will come up, but I'm equally confident that working together, we can get those resolved without any major conflicts. So thank you for this process and for doing a good job of the public process and keeping everyone informed. Thank you.

COL. MITCHELL: Thank you, Mr. Kassel. Our next -- next speaker will be Doug Isaacson. **OT-006**

MR. ISAACSON: Thank you. For the record, I'm -- I'm dizzy. I'm Doug Isaacson, I-s-a-a-c-s-o-n, a former mayor, former legislator. And I'd like to talk a bit about the acoustic environment and try to keep it substantive and not anecdotal. But during my tenure as mayor, which was 2006 to 2012, the leadership of Eielson Air Force Base demonstrated sensitivity to the community by conducting several community sessions dealing with noise abatement and took actions that greatly restricted sonic booms, and you dealt with that again, and most of those effects would be outside of our area.

But I would hope that that process would continue and

would be open. I know that some of the neighbors in Moose Creek have talked about Red Flag activities and sometimes international aircraft don't necessarily honor the same code that the local aircraft do. So that would be something that you'd want to make sure of with the F-35s, that that noise abatement continues. AA-1

Airspace: I'm glad to see that that was a major concern that is addressed. It's my understanding that increased traffic at Eielson Air Force Base will continue to adhere to all FAA VFR military flight limitations and communication procedures that would introduce less than significant impacts to local aviation activity.

But it's also, again, very much more important to us locally that the commitment by the Eleventh Air Force and the local base leadership continues to regularly meet with the appropriate parties to beneficially resolve any impacts to civil or commercial aviation activities, routes, and restrictions. AA-2

Also, the ability of our community to absorb a population increase to Eielson Air Force Base, because of all the environmental factors that come with the population, I just want to point that census data shows from 2004 -- '10 to 2014, the Fairbanks North Star Borough experienced a decline in population roughly equivalent to the proposed increase. Therefore, the increase will help us economically to

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stabilize, and we'd be back, basically, to a baseline that we're used to.

One of the features of PM2.5 that Dave had just mentioned was the -- the study did address the de minimus impact made by 54 additional aircraft outside of the mixing zone. And so that's a major concern, while we take care of the -- the ground PM2.5, that you're not adding to it in the air. We appreciate that.

Land use compatibility: The Fairbanks North Star Borough has worked with civilian, state, and federal, and military leadership for the past decade to pursue or ensure joint land use compatibility measures have been identified and put into place. That would continue with this process, I'm sure. The state legislature has also approved the creation of mitil -- military facility zones, which would incentivize enterprises that support the mission of our local bases, all involved. The current industrial impacts, I don't think would be affected, or the -- the proposed or potential impacts would have any more or greater impact on NEPA issues than what is currently felt on the base. So thank you for this opportunity to support the proposed actions.

COL. MITCHELL: Thank you, Mr. Isaacson. Our next speaker will be Stuart Sibitzky.

OT-007

MR. SIBITZKY: Good evening, Colonel, ma'am. I don't know if this -- if this is really appropriate, but what the

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heck. The F-35 is air superiority. One year before the Wright brothers flew, H.G. Wells, War of the Worlds guy, said, once the command of the air is obtained by one the armies, the war is a conflict between a seeing one and a blind one.

The F-35 is an air superiority aircraft. It's going to be with us for many years to come. But it's a huge investment, and as such, it demands that the pilots receive the best training for the least cost. Air superiority has been the U.S. tool ever since -- ever since before World War II. In Korea, the enemy was designed access to the soldiers on the ground by the F-86s in the air. They kept the MIGs well north.

The F-15s and F-16s that we're so used to seeing here, they're aging. The F-16 was brought out in 1976. Next year, it's going to be 40 years old. The original air frames have been retired, current aircraft modernized, but the fact remains, the type is dated for performance, as well as systems capabilities. The F-35 is a costly piece of equipment, but a marvelous piece, and is something that we need to stay ahead of the -- of the potential enemies, because what we're flying now is 35 to 40 years old.

Staying ahead: It's known that the Russians have fighters that have sophisticated equipment, and now the Hong Kong newspaper reports that the people in China have finished

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testing on a hypersonic aircraft, Mach 5. What are they going to do with this thing? Don't know, but I bet they're not going to crop dust with it.

Putting the airplanes here at Eielson puts them in the middle of the greatest training area in the world, 68,000 square miles, the size of Oklahoma. Basing the aircraft here means they don't have to fly somewhere to train. They don't have to use fuel and aircraft hours until they're needed. And then four times a year, forces come here to -- to play Red -- Red Flag.

Airplanes here directly to the Far East, Southwest Asia, and Europe across the pole, with KC-10 and KC-135, the airplanes can be worldwide in a moment's notice. Fairbanks International has the longest civilian runway in the state, a great alternative airport in case there's a problem. Putting the airplanes here puts in the -- at Elmendorf puts them in a pattern with other aircraft at Anchorage International, maritime influencing the weather, close proximity to the mountains.

Putting the airplanes here makes sense. Training airspace close at hand, rapid deployment anywhere in the world, increased flight safety, lower training costs with the airspace that's here. Facilities are already in place; ATC, medical, housing, schools, everything you need.

Billy Mitchell said, in the development of air power,

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one has to look ahead and not backward to figure out what's going to happen and not what has happened. And off we go to the darkening sky. Be world big. Now we fly.

COL. MITCHELL: Thank you, Mr. Sibitzky. Our next speaker will be Buzz Otis.

OT-008

MR. OTIS: Good evening. Thank you for being here this evening. We welcome you to our community. And I'm here to let you know our community is ready for the F-35s. We are -- there's many in this room that have worked hard to help get funding for the bridge across the Tanana River so that the Army and Air Force have better access to JPARC. We're looking forward to increased air-to-ground training missions here.

I came to Fairbanks from the Midwest in 1975 for a couple months, and it quickly became home. And I can tell you that it's a great place and Eielson are great neighbors. I'm involved -- I've been in business here since '76, had a lot of opportunity to work on base, and what I find is committed people, committed airmen and airwomen.

I've had the opportunity to put together the North Pole Championships the last six or seven years, one of the elite dog mushing events in the community. And let me tell you, we could -- without the support of the airmen and airwomen, we wouldn't be able to -- to put that together as well as it is. We always need volunteers, and regardless of the weather,

they're -- they're -- they are there to help.

And this community can handle big projects. As Doug Isaacson pointed out, we have -- we -- our population has been shrinking, and we -- from an economic standpoint, this will be huge. Our families are a family of entrepreneurs, and we've invested here. And, quite frankly, invested more recently with the (indiscernible) that the F-35s would actually be here in the North Pole-Eielson-Fairbanks community.

We thank you for your service. Again, thank you for being here. And I wholeheartedly, and my family and employees, support the F-35s coming to the Interior of Alaska. Thank you very much.

Now that we took it out, need a technician. Where was that clip? Right there? Yeah. I could break it.

UNIDENTIFIED SPEAKER: I probably will as well.

COL. MITCHELL: Thank you, Mr. Otis. The next speaker will be Mr. Ripple. Mr. Ripple, before you begin, I just need to let you know that we don't allow audio-visual aids or signs during the presentation, and that is because they are not recorded for the session. Although, there's some photographers here, I believe from outside news organizations, we do -- any photographs of -- I see that you're holding a sign. This sign would not be included in your presentation.

MR. RIPPLE: That's fine. Name is Chris Ripple. I'm here representing myself, my family, my elders, and the voiceless around here.

UNIDENTIFIED SPEAKER: Just a brief -- there you go. If you could just speak into that, that would be great.

MR. RIPPLE: First off, peace only comes through peace. And if we're waiting on this to be an economic driver by utilizing tax money at an unheard of rate -- even the Pentagon says this is a ridiculous waste of money -- what are we doing? Are we not ingenious enough in this town to come up with better ways to create jobs for each other? I mean, I see many leaders here that aren't really leading.

And to even consider this -- for some perspective, India, last year, launched a mission to Mars, a mission to Mars, a whole other planet, for $88 million. And we're going to spend over $150 million just on the planes, not to mention the infrastructure, not to mention the extra waste. That's what I want to bring to the table here. Thank you.

COL. MITCHELL: Thank you, Mr. Ripple. Our next speaker will be Sterling Muth.

OT-010

MR. MUTH: Colonels, ma'am. Sterling Muth. Well, there's just a couple of things, I guess, I'd like to say. I -- one is I -- I support totally bringing the planes in here. I love to listen to them. I love to see them. I -- you know, the other thing that comes to mind is when

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something breaks out, here we have the -- as it's been mentioned, the ability to -- to deploy worldwide quickly and take care of problems. If we're somewhere else and they don't, then everybody is going to be asking, well, why weren't they. So I think it's a wise decision to station them here.

And as I said, I like the sound. I like to see the planes. I don't really hear what people comment about noise. I tend to think of it as the sound of freedom. Thank you.

COL. MITCHELL: Thank you, Mr. Muth. At this time, we've now heard from everyone who has previously signed up to speak, and we still have some time left. So I'm going to ask if there is anyone else who did not earlier sign up. Sir, I apologize. I see one hand that you signed up to speak and I -- I was not --

MS. RISTAU: Jim Hill.

COL. MITCHELL: Jim Hill?

MR. HILL: Yeah.

OT-011

COL. MITCHELL: Mr. Hill.

MR. HILL: Thank you. Jim -- my name is Jim Hill, H-i-l-l. I have -- I support the planes coming here, but I have some concerns. Of the 2,800 people that's supposed to come here, I have some concerns about more wood-burning devices, more garbage on and off base, more ice fog from the vehicles and the power plant on base, fuel spills from

AQ-1
AQ-2

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refueling, and wrecked airplanes. SA-1

Where are you going to get all your fuel for the planes, the vehicles? And the -- and you're either going to have to truck if from Valdez or train it up from Nikiski. PA-2

Your school situation, they're short on teachers, short on bus drivers. And the animals that it kills from the ordnance that explodes and don't explode until something steps on it. SO-1 SA-2

But my main concern, people, is the sonic booms. My family and I moved up here from Utah back in the early -- early '80s. We had the same problem from Hill Air Force Base. We had sonic booms out there. I guess they were from maybe F-14s or whatever they was, okay. They were so strong, that our bishop's house, made out of concrete blocks, it split it right up the side. AE-2

And it wasn't from settling, because he took his backhoe and dug down, and the footings were still perfect. It was from the sonic booms. They broke windows out of barns, chicken houses. It killed chickens. The mustangs -- out on the Nevada range there were they flew, the mustangs would all go over to one side of the mountains and stay there. The antelope were the same way.

Now, I know Alaska is a big playground, and we -- as its stewards, we need to make sure that the people that live here all the time, not just here for two or three years, live -- you know, you can live in compliance with some of the

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rules that we have. And that's my greatest concern, is the sonic booms, okay.

And I -- and in your presentation, the little words "not expected," them come up, and they say, well, we didn't expect that to happen. And I'm not picking on you. I'm just saying that's what happens, because we didn't get much results from Hill Air Force Base. Okay. Thank you.

COL. MITCHELL: Thank you, Mr. Hill. And, Mr. Hill, I apologize. I'm going to make sure --

MR. HILL: That's okay. I'm used to being left out.

COL. MITCHELL: Mr. Hill, I'm going to make sure that I -- if you want to have a card filled out, if we don't already have one. Let me ask at this time, if you previously signed up to speak and I haven't called your name, could you please raise your hand. That's a negative response from the audience.

At this time, I am going to say that we have now called everyone who signed up to speak and still have some time left. So if you had not previously signed up and would like to speak, please raise your hand and I will -- we'll get you a card to fill out and call you to the microphone. Is there anyone who has no previously spoke, but would like to do so now? Again, a negative response from the audience.

(END OF REQUESTED PORTION)

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TRANSCRIBER'S CERTIFICATE

I, Marci L. Lynch, hereby certify that the foregoing pages numbered 3 through 18 are a true, accurate, and complete transcript of the public comments excerpt of the USAF DEIS meeting held at North Pole, Alaska, on September 21, 2015, recorded by Teresa A. Larabee and transcribed by Linda Chastain from a copy of the electronic sound recording, to the best of my knowledge and ability.

_____ _____

(***Date) Marci L. Lynch, Court Reporter
Notary Public in and for the
State of Alaska
Commission Expires: 11/11/2015

S E A L

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UNITED STATES AIR FORCE F-35A

OPERATIONAL BEDDOWN - PACIFIC

DRAFT ENVIRONMENTAL IMPACT STATEMENT

EXCERPT OF PROCEEDINGS

TRANSCRIPT OF PUBLIC COMMENTS

September 22, 2015

Delta High School

Delta Junction, Alaska

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P R O C E E D I N G S

COL. MITCHELL: With that, let's call our first speaker, who will be Mr. Jim Williams, the chief of staff with the City of Fairbanks.

MR. WILLIAMS: Could you please repeat the instructions to register? Last name?

UNIDENTIFIED SPEAKER: (Indiscernible).

MR. WILLIAMS: Oh, Williams, W-i-l-l-i-a-m-s. Can you hear?

COL. MITCHELL: Mister -- Mr. Williams, I'm going to ask you to hold for a second.

MR. WILLIAMS: Absolutely.

COL. MITCHELL: We're -- I'm not going to count this time against you. We want to make sure the microphone is on so everyone can hear your comments.

UNIDENTIFIED SPEAKER: Yes, sir. Try that. Okay. Try that, sir. **OT-012**

MR. WILLIAMS: My name is Jim Williams, W-i-l-l-i-a-m-s. I'm the chief of staff for the City of Fairbanks, and I will be presenting a prepared comments on behalf of Mayor Eberhart. He's out ill. He can't attend tonight.

As mayor of the city of Fairbanks, I'm excited about Eielson Air Force Base becoming home to PACAF's joint strike fighter -- fighters, and strongly support the proposed action

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alternative to bed down two squadrons of F-35A aircraft at Eielson Air Force Base as an addition to all existing mission activities.

I wish to add my thanks to you and the F-35 beddown team for your time and attention to the comments submitted on the DEIS and proposed action alternative by our residents. I was pleased when I learned -- learned the Air Force's environmental analysis would consider only the proposed action and the no-alternative. There is no reasonable alternative.

Reading the DEIS, I was even more pleased to know there are only four areas where your team identified the need for mitigations, slight noise impacts in some base residential areas in classrooms, and construction impacts in small wetland and flood plain areas. I am confident that collaboration with the Air Force will develop and implement any necessary mitigation steps.

In addition to confirming that Eielson Air Force Base satify -- satisfies the strategic, geographic, and training requirements of the Air Force, your team has concluded that personnel assigned to Eielson Air Force Base will enjoy the educational, health care, transportation, recreational, and other community attributes that contribute to a superior quality of life in Interior of Alaska.

As the primary host to Fort Wainwright, the assignment

of F-35As at Eielson Air Force Base will add to the quality of training for the Army-Air Force team. Fort Wainwright units already train with Eielson Air Force Base's F-16s during Red Flag Alaska and multinational exercises. The Gray Eagle unmanned aerial vehicles and AH-64 Apache attack helicopters will also benefit from the more robust and transformational Air Force presence and focus.

On September 17th, one day short of the Air Force's 68th birthday, Secretary James released a document that presents the future vision of the service, the Air Force future operating concept, a view of the Air Force in 2035, which outlines the future of Air Force operations. It notes that successes will depend on close relationships with members of the joint team and assumes the outline will be fleshed out through examination, experimentation, and capability development.

The needs of the Air Force, the United States, and nations around the world have led the evaluation team to correctly conclude that Eielson Air Force Base is the only place PACAF's F-35As will best support the global vigilance, global reach, global power that defines the core missions of the Air Force.

On behalf of the City of Fairbanks, its residents, and our neighbors throughout the region, I pledge my commitment to ensure that personnel and families assigned to Fort

Wainwright and Eielson Air Force Base will enjoy the superior support for which Alaska's Golden Heart has been known for over seven decades. Thank you for considering our comments.

COL. MITCHELL: Thank you, Mr. Williams. And, sir, I'm sorry. I met you earlier, but I forget your name. **OT-013**

MR. SLOAN: Yeah. That's okay. I'll speak. My name is John Sloan, S-l-o-a-n. I really wasn't planning on speaking tonight, but after looking at the slides, I'm curious -- excuse me -- about the -- the EIS or the DEIS and the amount of greenhouse gases in -- emitted in the Fairbanks North Star Borough. As you may know, they have a horrible inversion problem in the wintertime, and the air quality gets really poor.

And I noticed that you said that 31,000 extra tons of -- metric tons of greenhouse gases will be emitted. I was just curious if you took into consideration, all the extra personal vehicles, all the extra space heating, and all the extra electricity usage and -- and anything else that produces greenhouse gases, or was that just the F-35 emission. And so -- because there will be a lot more activity in the North Star Borough because of the increased population. **AQ-3**

Also, I -- I spoke to a couple of gentlemen tonight about the sonic booms, and -- and you mentioned the averages of -- of the numbers throughout the day-night. I didn't

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catch the -- the acronym, but averages sometimes are like when you put your -- you know, you put your head in the oven, your feet in the freezer, and average, you're doing pretty good. But averages can be mis -- misconstrued and -- and given out as kind of funny information.

But anyway, I'm concerned about the sonic booms and the booms here in the Delta area. We have a -- a -- a space with -- that the kids play in, and we've had some booms here that the -- that actually makes the kids scream and makes our dog shake and -- and run for cover. And any increase in the number of sonic booms, I think, is a -- is an issue that all Delta people are concerned with. And I would like you to just really take that into consideration. AE-3

I know these planes probably fly much faster than the F-16s, and -- and there's going to be a lot of testing and fly-throughs over Delta Junction. And I know that if those were limited to two, I think that wouldn't be too bad. But if it were more than two, I think it's getting to be too many. AE-4

But anyway, I do appreciate you guys coming down and giving us all a chance to speak. And I think that the placement of these F-35s in the Interior of Alaska is a good thing for -- for our national security and for everything else that they bring to us, and so thank you.

COL. MITCHELL: Thank you, sir. We've now heard from

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everyone who's signed up to speak, and we still have some time left. Please raise your hand if you haven't spoken yet, but would like to do so, and we will get you a card and then have you proceed to the microphone. Sir, actually, we'll just have you proceed to the microphone, and then we'll get you a card afterwards. **OT-014**

MR. HICKS: My name is Witt Hicks, H-i-c-k-s. I live eight miles from here. My comments are related to the sonic booms. I've been keeping track of them pretty well and beginning to rate them. And they're at somewhat -- sometimes they're -- they're moderate, sometimes even acceptable. But probably the majority of the time, it's unacceptable level of noise here.

What I would request be considered before you bring more aircraft into the area at high speeds, that we -- that we establish a -- at least a 30-mile radius sonic bubble and unlimited altitude for that bubble. I think that might solve our problem. Otherwise, the economic benefits can be fantastic for the North Star Borough, and the noise impact for Delta is not so good. Don't know if there's going to be economic spillover to help us any or not, but the noise is here. And that's with or without the F-35s, so.....

AA-3

COL. MITCHELL: Sir, thank you. Is there anyone else who would like to speak? If so, please raise your hand. Sir?

MR. QUARBERG: My name is Don Quarberg, Q-u-a-r-b-e-r-g. I'm representing myself. And, Colonel, when you said we couldn't ask questions, you pretty well eviscerated my comments, because that's what I had, was questions. I'm a rag and tube pilot, fly Super Cub, you know, and we're not -- we're hard to see, and we're essentially stationary as far as you folks are concerned. And I looked at the --

COL. MITCHELL: Sir, I'm going to pause you here for a second and I'm going to pause your time, because I wanted to clarify. You can ask questions. Questions can be part of your comments. We will not be providing -- although I'm answering that question about questions, we otherwise will not be providing answers tonight. We will provide answers to any questions you have, questions that are raised about this process and about the briefing that is here, as well as what is in the draft EIS. Those answers will be provided as part of the final EIS.

So I just wanted to -- when you said I eviscerated your comments, I did not mean to do that, and I want to clarify, you're free to ask questions. Just, we may need time to look at the data, depending on what your question is, and make sure that we give you an accurate answer. So with that, sir, I will cede the floor back to you and have you start your time again.

MR. QUARBERG: All right. Thank you. Well, the only question I would have had is the definition of conflicts with civilian aircraft, because I'm one of them. And let me preface all that with, you know, I think we got the greatest Air Force in the world. I don't think there's a doubt about it. And you didn't get that way by accident. So I like to fly out here, but my main concern is to stay out of the way. I don't want to get run over, you know, and it -- there's not much of a target on a radar by a Super Cub. SA-3

And as far as special use airspace, with Terry up there in range control, I mean, you -- we couldn't ask for better neighbors than what you have been to us in the flying community. I wish we could somehow bestow some of that on the Army, but that hasn't come to -- to be yet.

We have some issues with sonic booms. I figure it saves me about $300 a month, because every time it goes off it saves me three-and-a-half bucks for a shot of espresso, because I got -- got get charged up about that. I don't have a problem with low flights. I mean, I one -- I don't have kids and dogs, so that makes a difference. But I support you coming down here.

I just want to know how I can interact with you and still be able to go out in 20A -- game management 20A, which is out here across the river, where you folks have your Red Flag exercises like that. I wish they'd -- I wish you could AA-4

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AA-5

find a time to conduct these other than September, because that's the highest -- that's the peak use for civilians. You know, we hunt out there and that sort of thing.

And so other than that, I understand we'll be able to interact with some of these gentlemen over here later. So thank you. Bring them on.

COL. MITCHELL: Ladies and gentlemen, is there anyone else who would like to speak or would like an additional three minutes before we recess this hearing? That's a negative response from the audience.

(END OF REQUESTED PORTION)

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TRANSCRIBER'S CERTIFICATE

I, Marci L. Lynch, hereby certify that the foregoing pages numbered 3 through 11 are a true, accurate, and complete transcript of the public comments excerpt of the USAF DEIS meeting held at Delta Junction, Alaska, on September 22, 2015, recorded by Teresa A. Larabee and transcribed by Linda Chastain from a copy of the electronic sound recording, to the best of my knowledge and ability.

_____ _____

(***Date) Marci L. Lynch, Court Reporter
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UNITED STATES AIR FORCE F-35A

OPERATIONAL BEDDOWN - PACIFIC

DRAFT ENVIRONMENTAL IMPACT STATEMENT

EXCERPT OF PROCEEDINGS

TRANSCRIPT OF PUBLIC COMMENTS

September 23, 2015

West Valley High School

Fairbanks, Alaska

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P R O C E E D I N G S

COL. MITCHELL: With that, let's call our first speaker, who will be Sydney McIntosh on behalf of Governor Walker.

OT-016

MS. McINTOSH: Good evening. My name is Sydney McIntosh, M-c-I-n-t-o-s-h. And I'm pleased to be here on behalf of Governor Walker to read these remarks.

It is with great pleasure that I submit these comments regarding the draft environmental impact statement concerning the basing of PACAF's F-35s at Eielson Air Force Base. Alaska, the Interior of Alaska particularly, has a long history of welcoming the military to our communities. It is within that historical context, combined with a keen look to the future, that I strongly endorse this basing of the aircraft at Eielson Air Force Base.

I am confident in that no surmountable [sic] change -- challenges stand in the way of completing this spacing task. That said, it is important to complete a comprehensive review of environmental impacts. While it is understood that trade and other Interior region workforce requirements will be strained, given Alaska's ability to draw from a larger statewide workforce pool, combined with the ability to train and educate Alaskans to meet workforce needs, I am again confident that an efficient and eager workforce will be available.

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Alaska looks forward to working with the Air Force to ensure that all workforce needs are met. Communities throughout the Interior will plan and implement changes needed to deal with impacts associated with the F-35 basing. The state looks forward to working with the Air Force and local communities to ensure that community needs are met.

The state and Fairbanks North Star Borough have long supported the JPARC training area and -- and required facilities. These facilities will be instrumental to ensuring the readiness of the F-35s as a state-of-the-art weapons platform. The state will continue its efforts to ensure the JPARC is viewed as the premier training ground for land and air training in the United States.

I'm gratified that Alaska is being recognized for the strategic value, given the military's Asia-Pacific shift. It must also be said that the security of Alaska and the nation must be recognized, given a -- given a resurgent alas -- of Russia. Alaska's geographic value cannot be overstated nor can the value of Alaska's re -- natural resources be understated. For these reasons, and the inherent association -- associated security (indiscernible), I am pleased to stridently support the basing of F-35s at Eielson Air Force Base. Signed, Bill Walker, Governor of Alaska.

MS. RISTAU: Thank you.

COL. MITCHELL: Thank you, Ms. McIntosh. Our next

speaker will be Mr. Jimmy Parrish, special assistant to United States Senator Lisa Murkowski. **OT-017**

MR. PARRISH: Thank you. Jimmy Parrish, special assistant to Senator Lisa Murkowski, P-a-r-r-i-s-h. I'm pleased to welcome the Air Force team to Interior Alaska, and thanks to the members of our community for coming out this evening to share their views on the draft environmental impact statement.

It was not so long ago that our Interior Alaska community came together in a forum like this to fight for the future of Eielson Air Force Base. In those hearings, we argued that Alaska remains the most strategic place on the globe from which to project air power to the Pacific, and we argued that the Joint Pacific Alaska Range Complex is the best place for the Air Force to train for future conflicts.

The Air Force's proposal to bed down the first two squadrons of F-35A joint fighter strike aircraft at Eielson Air Force Base indicates that the Air Force concurs with the arguments that were presented to them. Senator Murkowski strongly supports the proposed action and opposes the no-action alternative.

The Alaska congressional delegation intends to submit written comments on the draft environmental impact statement before the comment period closes, and Senator Murkowski invites members of the community who have thoughts about what

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ought to be included in those comments, write me through Senator Murkowski's website at www.murkowski.senate.gov.

It's important for Senator Murkow -- Senator Murkowski to understand any specific concerns that you have about the proposed action, so that way, we can work with the Air Force to mitigate those concerns. We expect the military to be good neighbors to Alaskans. In return, Alaskans support the men and women of our armed forces and our military families better than any other military community anywhere.

Throughout the years, Senator Murkowski's staff worked closely with the military leaders to resolve a variety of these concerns, including those about noise in military operation, potential conflicts between military operations and general aviation, as well as potential conflicts between military operations, hunting and fishing activities.

We find an early and open communication with them -- with the armed services is very beneficial in resolving concerns before they evolve into conflicts. At a time when our state's economy is coping with the dual challenges of crude -- reduced crude oil production and low global oil prices, the sitting of the F-35A should prove a shot in the arm to the Interior of Alaska economy. So the F-35A base is a win, win, win; a win for national security, a win for the Interior of Alaska, and it's a win for the airmen who will have the opportunity work and train in the best military

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community of all the United States. Senator Murkowski is proud to join with you in supporting the proposed action. Thank you.

COL. MITCHELL: Thank you, Mr. Parrish. Our next speaker will be Leslie Hajdukovich, special assistant to Senator Dan Sullivan. **OT-018**

MS. HAJDUKOVICH: Leslie Hajdukovich. Are you ready for this? H-a-j-d-u-k-o-v-i-c-h. I'm speaking on behalf of Senator Dan Sullivan, and I'm pleased to be here. I wish he -- or I knew -- I know he wished he could be. But in his place, I state this. Recently, Dr. Henry Kissinger boldly stated the United States has not faced a more diverse and complex array of crises since the end of the Second World War. From a man with his experience, that is not a statement we should ignore.

As a member of Senate Armed Services Committee, I have heard from countless experts, senior defense officials, and military leaders, who have reaffirmed Dr. Kissinger's assertation. The truth is that we live in an increasingly dangerous world. From Russia to China to North Korea, much of the world's instability resides in the Northern Hemisphere, the Pacific and the Arctic.

Here in Alaska, we find ourselves at the strategic crossroads of this instability. That's why Alaska already has two squadrons of F-22s. That's why Alaska is already the

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home to the backbone of the nation's missile defense. That's why Alaska already has two Army brigade combat teams. And it is why I'm fighting the Army's decision to downsize the 425 at JBER.

Right now, because of our location, Alaska already supports a whole host of tip-of-the-spear fore-structure for the U.S. That's why bringing the F-35 to our great state simply makes sense. And when paired with JBER's F-22s, these F-35s will make Alaska a hub for fifth generation combat air power for decades to come.

Now, getting the F-35 to Alaska has been a team effort, and it is one that wi -- is not yet finished until they start to touch down in 2019. Working with Senator Murkowski and Congressman Young, the Alaska co-del continues to advocate for Alaska. Every day we fight to ensure that Alaska, its strategic location, our great training ranges, and the great soldiers and airmen that use them remain forefront of what's going on in Congress and at the Pentagon. As your U.S. Senator, I am doing my part.

Today I'm proud to add my voice to your important comments. These comments are critical step in the process to bring the F-35 to the most strategic place in the world. One just has to turn to the TV to see a resurgent Russia conducting bare bomber runs across the Arctic and near Alaskan airspace. One just has to look to the newspaper to

read about an emergent China. One just has to go to YouTube to watch threatening propaganda videos made by the young and unpredictable leader of North Korea.

Thank you for the opportunity to speak here today. And thank you to Fairbanks, North Pole, Delta communities for their steadfast support of our nations armed forces. Thank you.

COL. MITCHELL: Thank you, Ms. Hajdukovich. Our next speaker will be Kim Stickler on behalf of Congressman Don Young. **OT-019**

MS. STICKLER: Good evening. My name is Kim Stickler, S-t-i-c-k-l-e-r. Thank you for providing me the opportunity to testify on behalf of Congressman Don Young regarding the United States Air Force F-35A Operational Beddown, Pacific Draft Environmental Impact Statement. While Congressman Young wasn't able to be here today, he asked me to testify on his behalf.

Congressman Young strongly supports the Air Force's proposed action, the basing of two F-35A squadrons here at Eielson Air Force Base. The basing of these F-35 squadrons will have many benefits for the people of the Interior. However, Congressman Young's support for this action is simple. It's about the mission.

In making its specific F-35 beddown decision, there is no other location in the Pacific that will allow the Air

Force to more easily accomplish its mission to train, equip, and deploy these F-35 squadrons than Eielson Air Force Base. Eielson Air Force Base offers unparalleled training areas, thanks to the Joint Pacific Alaska Range Complex, or JPARC.

The JPARC provides the Air Force with 65,000 square miles of training airspace. This airspace is nine times larger than the Nevada test and training range in Nellis Air Force Base, and more than twenty times larger than the Barry M. Goldwater range near Luke Air Force Base. It includes three bombing ranges, four hundred types of targets, and more than thirty threat simulators. Basing F-35s at Eielson will give our airmen the opportunity to train in the most engaging and diverse training range in the nation.

The large Army presence in Alaska, including the 4th Airborne Brigade Combat Team and First Striker Brigade Combat Team of the 25th Infantry Division, combined with Alaska's vast land training areas, provide the Air Force incredible joint training opportunities. This joint training is critical to replicate real world combat scenarios and crucial to ensure the Air Force and Army are prepared to conduct joint operations worldwide.

F-35s based at Eielson will be able to reach any location in the Northern Hemisphere in less than nine hours and will be able to quickly respond to any possible threats in the Asia Pacific. In both this and last year's

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house-passed national defense authorization, Congressman Young was able to secure provision expressing the sense of Congress that the Air Force place emphasis on five key traits critical to F-35 mission success; the ability to host large scale air training exercises, have sufficient airspace and range capability, have existing facilities to support the basing, have limited encroachment and one that minimizes construction costs. Congressman Young is pleased to see that the Air Force has listened to Congress through this decision, by picking Eielson Air Force Base as the home of its Pacific F-35s. Thank you.

COL. MITCHELL: Thank you, Ms. Stickler. Our next speaker will be Mayor Hopkins, the mayor of Fairbanks North Star Borough. **OT-020**

MR. HOPKINS: And thank you much for this opportunity. I'm Mayor Luke Hopkins, Fairbanks North Star Borough. I spoke on five items in the North Pole public hearing, so I -- I won't go over those, but I do want to elaborate. Once again, our communities are committed to being as helpful as possible to efficiently bring the Pacific Command Air Force joint strike fighters to Eielson Air Force Base.

And with that, within this year, we signed a formal community partnership with Eielson Air Force Base, and that has allowed us to solve some of the problems that you point to in your draft EIS comments. One of the items that we have

addressed is we operate an express bus service that goes within the 15-minute area of the Eielson response time, for where Air Force personnel will have to leave -- live. And that is an express run all the way into Fairbanks and then back out again. So we are able to go onto base with that, and that was with a partnership with Eielson Air Force Base to make that happen.

I also want to speak about there was a JPARC EIS, I believe it was at the end of last year, where we addressed the issues of the general use and public flight area, where there needs to be more SUAIS facilities, and that was noted both in our congressional offices and with the -- with the 11th Air Force, I believe, with General Handy. So these are -- these are issues that we are working on to reduce the impacts. AA-5

But there's also going to be other impacts in the short-term, and that's many of these overlapping construction projects that we have. So we just want to make sure that -- that beyond what you say in the section 5.2.1 of the draft EIS, you address the other issues, that we may have a temporary construction housing effort that may be very challenging. SO-2

And I say "may be" because we're not sure of the time schedules of the $1 billion missile defense agency MDA projects at Fort Greely going on at the same time as almost a

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billion dollar long-range discriminating radar facility in Clear Air Force Station, and then, of course, at Fort Wainwright the most minor of the projects. But absent this analysis, our communities cannot understand if it will be a significant impact on temporary housing.

So we ask you to ensure that you look at the schedules for this. We don't say -- we're not saying that we don't want to have them. We're saying just make sure that you look at them, because the office of economic development is also saying that there is funding available to plan and forecast for growth in our community with the military buildup that we so speak positively here.

So with that, I just want to say that, as you have heard many times, our -- our community can accommodate this, and we're ready to accommodate it, this growth. Thank you very much.

COL. MITCHELL: Thank you, Mayor Hopkins. Our next speaker will be Mr. Jim Williams, chief of staff for the City of Fairbanks.

OT-021

MR. WILLIAMS: Good evening. Mayor Eberhart is out ill this evening, and he wishes he could be here to read -- to read his statement. I'll do my best to relay his thoughts and concerns, and without repeating stuff that's already been said.

Basically, the mayor is strongly supportive of the

action alternative to beddown the two squadrons of F-35s at Eielson Air Force Base. Regarding the DEIS, he is pleased to know there's only four areas where the team identified needs for mitigations; the slight noise impact at some of the basic residential areas and classrooms, and constructions impacts in small wetland and flood plane areas. He's confident that collaboration with the Air Force will develop and implement any necessary mitigation steps.

One of this thoughts was about a day or so before the Air Force's 68th birthday, the -- Secretary James released a document that presents the future vision of the service, a document titled, The Air Force Future Operating Concept, a View of the Air Force in 2035, which outlines the future of Air Force operations. Basically, the document emphasizes that the future is about change and building capacity, and there's no better location to build on the future than right here in the Interior of Alaska.

Here's why. The F-35, by definition and design, is a key catalyst for Air Force change and will have the opportunity to explore its full capabilities in the inter -- in Interior Alaska's vast airspace and training areas. On the Air Force integration, the joint team is stated as key to realizing the future vision and can be thoroughly tested and validated right here in Alaska. Multinational operation coordination is stated as an essential enabler of the

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future -- for the future, and Red Flag Alaska offers unparalleled opportunities to hone that coordination and perfect the ability to fight together.

On behalf of the City of Fairbanks, it's my pleasure and the res -- on behalf of the City of Fairbanks and its residents, our neighbors throughout the region, it's my pleasure on behalf to the mayor to pledge commitment to ensure that personnel and families assigned to Eielson Air Force Base will enjoy the superior support for which Alaska's Golden Heart has been known for over seven decades. Thanks for considering our comments.

COL. MITCHELL: Thank you, Mr. Williams. I hope the mayor feels better soon. Our next speaker will be Representative Tammie Wilson. **OT-022**

MS. WILSON: Thank you very much. My name is Representative Tammie Wilson, W-i-l-s-o-n. I'll keep it really short. I -- I made my comments in North Pole. First of all, I want to thank you for being such a great partner. We love having you here. We're excited about having the planes, and we are ready for anything you're going to put forward. And with that, that's all I have to say. And we want to see you coming.

COL. MITCHELL: Thank you, Representative Wilson. Our next speaker will be Mr. Jerry Cleworth with the Fairbanks City Council.

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MR. CLEWORTH: Thank you very much for taking the time to be with us. You know, if the decision were yours and yours alone to make, without public testimony and everything else, my guess is one of the first criteria would be uncongested space, airspace, which is a problem with a lot of the Air Force bases in the states now. Fortunately, we don't have that problem. Second, of course, JPARC, you know, and you hear a lot about that. We're blessed to have that kind of airspace.

But more importantly, airspace for training that is not subject to encroachment right away, in the Air Force bases in the states, they are constantly trying to mitigate problems with the growing communities around them. We don't have that problem in that area, at least not yet and for years to come.

Second, the support of the community, if you talk to anybody that has served at Eielson or Fort Wainwright, you will know that we're second to none as far as support goes. This is a very welcoming community in which to serve and to raise a family.

And finally, years ago, we used to have Pan American Airways, which flew through Fairbanks. It had a kind of a glamour flight that took off from New York City and flew to Tokyo. We're on that flight path, basically, and they would stop here, pick up passengers and fuel. But it drove home the point, the strategic location of -- of Alaska when it

comes to the Pacific Rim, and that growing concern that you heard about earlier. If you're looking at the Korean Peninsula, Japan, China, there is no ground -- or no Air Force bases in the states that can really parallel what's here in Alaska. We just thank God for William Seward. And that's all I have to say. Thank you.

COL. MITCHELL: Thank you, Mr. Cleworth. Our next speaker will be Mr. Dan Schmidt with the Fairbanks School District.

OT-024

MR. SCHMIDT: Good evening. Dan Schmidt, S-c-h-m-i-d-t. At the April 1st, 2014, Fairbanks North Star Borough Board of Education meeting, the board passed a resolution supporting the stationing of the F-35 Lightning II Joint Strike Fighter at Eielson Air Force Base. School operations on Eielson Air Force Base have been an integral part of the district since we assumed responsibility of base schools in 1975, and we currently operate three schools on base. We're committed to meeting the educational needs of Eielson Air Force Base families now and in the future.

No other region in the country can offer the United States Air Force an area as strategic, cost effective, and welcoming for stationing the F-35 Lightning II aircraft. The Fairbanks School District supports the stationing of the aircraft at Eielson Air Force Base. Tonight, it is my pleasure to reaffirm that resolution.

The Fairbanks North Star Borough Board of Education strongly urges the Secretary of the Air Force, chief of staff of the Air Force, and Commander Pacific Air Force -- Air Forces to station the F-35 Lightning II Joint Strike Fighter at Eielson Air Force Base. Sincerely, Heidi Haas, Board President. Thank you.

COL. MITCHELL: Thank you, Mr. Schmidt. Our next speaker will be Kathryn Dodge of the Fairbanks North Star Borough Assembly.

OT-025

MS. DODGE: Thank you very much. My name is Kathryn Dodge, D-o-d-g-e. Thank you for the opportunity to testify on the F-35 draft environmental impact statement. I would like to go on record expressing my support for the action alternative to base the two squadrons of F-35s at Eielson Air Force Base.

As a long-time resident and current member of the Fairbanks North Star Borough Assembly, I can personally attest to the positive focus successive borough administrations and assemblies have place on our community working in concert with our military partners.

Not only do we recognize the contributions our military partners make to our community financially, culturally, and spiritually, but it's a community we have worked to ensure that our return contribution to our military partners is equal to or better than what we receive. As a member of the

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Assembly, I pledge to continue forging and improving that partnership. Thank you.

COL. MITCHELL: Thank you, Ms. Dodge. Our next speaker will be Mr. Bill Brophy. **OT-026**

MR. BROPHY: Good evening, sir. My name is Bill Brophy, B-r-o-p-h-y. I am just a proud American, representing no other organization. I fully support the deployment of two F-35 squadrons to Eielson Air Force Base, and I encourage you to accelerate that process, keeping in mind that it only took a year for us to build the Alaskan Highway. We ought to be able to get those F-35s here right away.

Our country is experiencing very challenging times. I am greatly concerned for the readiness of our military forces in this very fragile and uncertain world we live in today. If we are to maintain our position as a super power, the united States must have an overwhelming strong military. As American citizens, we owe our men and women in uniform the ability to train in difficult conditions in order to fight, win, and come home safely when our nation calls on them.

Our nation -- national leadership has refocused the transition of our military defense enterprise and military strategy to the Pacific Rim. Stationing the next generation fighter at Eielson Air Force Base is in keeping with the keystone mission of our national military strategy. Military

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forces stationed in Alaska are firmly established on U.S. soil and are capable of ready reaction on short notice to the major hot spots on the globe.

Interior Alaska offers the greatest training area of land and airspace to prepare our forces for combat operations. JPARC is the largest training area in the world for joint and combined operations, with a well-established headquarters. Our allied friends and -- depend on training at Eielson.

Eielson Air Force Base is well-established with a robust infrastructure. The base is located on a road system connected to the rail belt, adjacent to a pipeline, enjoys a wonderful school system, and is suffi -- self-sufficient with a power plant providing low cost electricity and heat to the entire installation, some of the lowest cost energy in Alaska.

Currently training areas support the full spectrum of U.S. Air Force training requirements, while maintaining a sincere respect for the environment of our natural resources. Despite the tough environmental conditions, rarely is weather a factor and a restriction for our military operations.

Nowhere else is there a patriotic bond between the local community and our military. Interior Alaska flourishes with Army, Air Force, active Guard, reserve, veterans, retirees, and proud patriotic Americans. Military land in

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impact areas, firing ranges, and airspace are virtually unimpeded and unencroached. The Alaska National Guard provides a vital air refueling capability for global reach. Eielson Air Force Base leaders have proudly served and have reached -- many look to the senior leadership.

There's critical time in our military to take advantage of the opportunities to petition -- position additional forces in Alaska. The F-35 simulator is a good example. I thank you for the opportunity to speak. Our sons and daughters are depending on you to make their -- them strong. We're counting on you for the right decision. Thank you.

COL. MITCHELL: Thank you, Mr. Brophy. Our next speaker will be Mr. Gary Atwood.

OT-027

MR. ATWOOD: Hi. (Indiscernible). Do I introduce myself or how do we do this here?

UNIDENTIFIED SPEAKER: Yes, please.

MR. ATWOOD: Yeah. It's Gary Atwood. I just want to give my personal opinion. And I've been involved with the military and I am a veteran. I've testified for more troops here, boots on the ground, and still do support that. With supporting that, I support more air support, even beyond the F-35s. I served up here. I've been here 60 -- over 60 years, so I kind of know the country.

And I ran dogs for the -- sled dogs for the Ninth Infantry recon back in the late '50s all over the state. We

were on recon to find out where massive amounts of troops could come into Alaska, where we could defend. And I think this country, national security is under a -- more of a threat now than it really has been for a long time, and I think anything we can do to improve it, we need to do it.

And as far as the environmental problems, I would much rather hear a whole bunch of sonic booms than enemy bombs blowing off around me with their missiles. So that's about all I have to say, that I'm all for. And God bless these guys and thanks for all their service.

And we got away from the dogs, the sled dogs, but we taught a bunch of platoons of ground-pounders how to survive in the Arctic. So that's -- and they learned a lot. Okay. That's all I got to say. Thank you.

COL. MITCHELL: Thank you, Mr. Atwood. Our next speaker will Dr. Suzanne Summerville. Is there a Dr. Summerville? Our next speaker then will be Mr. Hugh V. Fate, also known as Bud. **OT-028**

MR. FATE: My name is Hugh Fate. Last name is F-a-t-e. You have now met your fate. There's been some very positive testimony up here, so I will not take long. But there's one thing that appears to be missing. And even though in the presentation, you showed that the fish and wildlife and the Alaska Fish and Game were positive, it should be shown that, at least from the old scorpions in the mid '50s -- and I was

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here then -- for over 60 years there's been the sound of jets over in those flood plains on the Tanana River.

The -- the -- the wildlife has either remained stable or has increased during all those years, and that includes the wolf. So the -- the adaptation of that wildlife apparently -- apparently, they've learned to differentiate between a sonic boom and a high-powered rifle, because they certainly don't mind the sonic boom.

So with that, and the fact that -- that I think the people of Fairbanks, Alaska, through those 60 years, also actually -- actually, have come to relish the sound of those jets going over, because to most of us that sound kind of means the sound of freedom. Thank you for this opportunity, and hope that we can accelerate the F-35 squadrons. Thank you.

COL. MITCHELL: Thank you, Mr. Fate. Our next speaker will be Jerry Bowers. Jerry Bowers? Our next speaker will be Lance Roberts.

OT-029

MR. ROBERTS: Lance Roberts, R-o-b-e-r-t-s, giving testimony for myself. So I just want to make sure you really understand that this is a military community. Our two bases mean a lot to us. My mom taught out on Eielson when I was a kid, and I went to the third grade there. And plenty of my siblings have been in the military, and my sister works out there now.

A lot of the military people stay up here. They retire, and a lot of them live around Eielson. So this is -- they'll be fine with the expansion, and we, as a community, will be fine with the expansion. And we're ready. Thanks.

COL. MITCHELL: Thank you, Mr. Roberts. Our next speaker will be Jim Dodson.

OT-030

MR. DODSON: Thank you. My name is Jim Dodson, D-o-d-s-o-n. I am president of Fairbanks Economic Development Corporation. I appreciate the DEIS team coming to the Interior Alaska to listen to our opinions and concerns. I have reviewed the DEIS and would like to place on the record, that I and the board of directors of Fairbanks Economic Development Corporation support the action alternative, which would base two squadrons of F-35s at Eielson Air Force Base.

Our particular expertise at FEDC is the Fairbanks economy. With that knowledge, and from our research, we assure you that this community can absorb the economic impacts of this action.

However, one specific point of concern is the impact of the construction projects, 35 construction projects of F-35 support facilities between 2016 and 2019. These projects have a projected total economic impact of $454 million of construction money, as reported in the DEIS. These contracts can easily and expertly be handled by our Interior Alaska

arctic contractors and our highly skilled Alaska workforce.

However, one shortcoming of the DEIS is not assessing the local impact of HUB's own contracting. The Corps of Engineers, who typically manage military construction projects, recently has been awarding Interior military contracts to HUB's own contractors or contractors from disadvantaged areas.

While this practice may work well in states and communities which are in close proximity to each other, Alaska expands 650,000 square miles and has a population of only 750,000. If you are a contractor or a worker in the Fairbanks North Star Borough, you simply cannot drive to another town to get work. The closest town of any size to Fairbanks is more than 300 miles away, and our contractors and workers must leave this community, must leave their homes to get work, if they do not get local construction jobs.

We believe HUB's own contracting, their laudable (ph) and principle will, in practice, be devastating to our economy, to our contractors, and our workforce. We -- we request a review of this practice and its impacts on our community in the final EIS. SO-3

It has been proven in the past that Alaska construction projects that utilize arctic-trained contractors and arctic-trained workforce will not only benefit the local economy, but also will benefit the project owners by ensuring

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arctic-quality construction for every dollar spent. Thank you.

COL. MITCHELL: Thank you, Mr. Dodson. Our next speaker will be Tony Versandi. **OT-031**

MR. VERSANDI: My name is Tony Versandi, and it's V-e-r-s-a-n-d-i. I'd just like to come out and register my support for the F-35 placement at Eielson. Many of the speakers have already hit a lot of the important items to mention, specifically, the training area, the strategic location to project air power, and the impact on the community.

I'd also like to echo the comments made by Jerry Cleworth, that this community is, I think, one of the most welcoming and best prepared to welcome our Air Force men and women and their families. We -- we make a real effort to make them a part of our community and treat them as family, and will continue to do so, and be a very major asset to the Air Force and the men and women that serve. With that, that's all I have to say. Thank you.

COL. MITCHELL: Thank you, Mr. Versandi. Our next speaker will be Michael Pollen. **OT-032**

MR. POLLEN: Good evening. Michael Pollen. Last name spelled P-o-l-l-e-n. The -- I would like to speak to the infrastructure at Eielson Air Force Base. I've worked as a professional water-wastewater consultant with a testing

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laboratory company throughout Alaska, and have worked with Eielson for quite some time, since the 1980s. The infrastructure at Eielson, basically, most of the piping systems are in concrete utiladors. The water piping, along with the steam-heated piping, is co-located. And what tends to happen when you have a fairly low water usage, is you tend to get elevated temperatures and, of course, longer detention times. That's the current status right now.

So comparing the two alternatives, the alternative that you have with doing nothing, you have a situation now where you have long detention times and elevated water temperatures in the potable water system. That results in increased growth of biofilms, loss of (indiscernible) residual, increased formation of disinfection byproducts, and increased corrosion potential.

WR-2

How you mitigate that is by increasing the flow. So the alternative of increasing the population increases the flow. Your water gets better, and that will actually improve the public health of the 8,000 people that will be using the base. Oddly enough, this is one environmental impact that actually gets better as you increase the population of the base and the operation of the water system.

A similar effect occurs with the wastewater system. Wastewater plants are designed to run, more or less, at average capacity. Your current loading is under capacity.

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So when you have the additional population, the wastewater plant is going to run better. So you actually will have better operation of the infrastructure of both the water and the wastewater utilities under the proposed option, where you have increased population, increased demand.

That's pretty much what I wanted to offer. I did not notice this was in the EIS -- DEIS, and I thought you might want to take a look at that. But it is an environmental effect, more specifically a public health effect. It gets better with the increased population. Thank you for the opportunity to provide the comments.

COL. MITCHELL: Thank you, Mr. Pollen. Our next speaker will be Robert Shields. **OT-033**

MR. SHIELDS: So I guess I timed that bathroom break right. Yeah. Good evening. My name is Robert Shields, S-h-i-e-l-d-s. And as a U.S. citizen, I appreciate the -- the men and women of the armed services. Thank you very much. As a citizen of Fairbanks, I appreciate the revenue the military has brought into this town.

My concern, however, is the long-term impacts to the community. We are already suffering because of our short-sighted commitment to oil as an economic driver, and I don't want to see the same kind of boom-bust happen with this program as the political team -- climates change.

I love Alaska as a quiet, peaceful, and pristine oasis.

These proposals will change that. And while it might be only slight, this is how we lose our liberties, small steps at a time. While I am sure the environmental impact statements is thorough, and I'm sure the short-term economic benefits are nice, I am just as sure that the continued glorification of war is not in the best interest of our children.

As a nonpartisan climate candidate for the consideration of the Fairbanks North Star Borough mayor position, I would prefer to see the borough, the state, and the federal government invest in job training and education as the surest path to peace.

If the military is to continue operating in Alaska, I would only support peaceful industries, like aerospace, the one industry that has proven to unite the world as one family. Aerospace is the highest application of human imagination and intelligence. It requires high levels of education. And it requires engaged citizens. This is the path towards prosperity and a future I envision for our community. I invite everyone to join us in this exciting adventure.

Environmental impact statements, like economic analysis, often fail to capture the impacts of the lives of real people as a function of ensuring quality of life for generations. Because of these reasons, I cannot support the development and -- as it is presented. War is not a

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sustainable economic tool, and fear is not a motivator for an enlightened planetary civilization. Thank you.

COL. MITCHELL: Thank you, Mr. Shields. Our next speaker will be Lisa Herbert. **OT-034**

MS. HERBERT: Good evening. My name is Lisa Herbert, H-e-r-b-e-r-t. I, too, am a proud American and a military spouse of an airman out at Eielson Air Force Base. But tonight I am here representing the greater Fairbanks Chamber of Commerce as its executive director. We're a business advocacy organization with over 700 business members. And we advocate throughout the -- the Interior for a strong business environment.

I know that many in the room have already espoused the economic benefits, the strategic value, the quality of life attributes, and more, so I'm going to be really brief in my remarks. But for the record, the Fairbanks Chamber wholeheartedly supports the United States Air Force's proposed action to base two F-35 squadrons at Eielson Air Force Base. We welcome the increased fore-structure as a strategic location and recognize the value this basing action brings to the defense of our nation.

We do not believe that the standing up of these two squadrons would pose any unmanageable negative impacts on our community. From a strategic standpoint, though, it is difficult to conceive of a more appropriate location than

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Eielson Air Force Base for the F-35s. And as a voice for business in the Interior, we stand ready to offer our support to the military. From the service personnel and their family members to the contractors and new service sector jobs that will be created, the business community welcomes the long-term positive contributions that the F-35s will bring the Golden Heart community. We support the EIS proposed alternative, and I appreciate and thank you for coming to Fairbanks and hearing our -- our comments this evening. Thank you.

COL. MITCHELL: Thank you, Ms. Herbert. Our next speaker will be Chris Miller. **OT-035**

MR. MILLER: Chris Miller, M-i-l-l-e-r. Speaking basically about the noise impact tonight, being a design professional in the community, noise is a subjective thing. This community has been experiencing jet noise for many, many years, and I think we all smile when it happens. It's -- the maps show the 65 dB range being larger. That's a good thing.

We just expect the noise with the additional action as good action for the community, and we just want to remember it's a subjective kind of thing that noise is a problem. And this kind of noise, we've tend to accepted it, and we embrace it with open arms. We hear the firefighter tankers going over all summer, and we're proud of them when they're going. We hear Red Flag going over, and we're like, oh, good. We

have some visitors in from town. Hope to see them around town. So just support the -- support the basing of the F-35s, and we'll handle the noise. Thank you.

COL. MITCHELL: Thank you, Mr. Miller. Our next speaker with be Jennifer Imus.

OT-036

MS. IMUS: Good evening. Jennifer Imus, I-m-u-s. I'm wearing a couple different hats today. I am a business banking manager at Wells Fargo Bank, and also the greater chamber of Fairbanks board chair for 2015. In Alaska, many of us have family ties and community connections with the military. I think I speak for the business community when I say that we wholeheartedly support the basing of the F-35s at Eielson.

In the Fairbanks North Star Borough, over a third of our population consists of military families. The military is the largest employer in the Fairbanks North Star Borough. We have a very shallow labor pool in Alaska. We need quality people with proven leadership skills. Our veterans possess these essential interpersonal skills and make exceptional employees.

At Wells Fargo, we know that veterans and military spouses make great team members. Like many businesses in the Fairbanks North Star Borough, we rely on military spouses and dependents as integral members of our labor pool. The bank is a great example. Our entire North Pole team, 100 percent

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of the people working in that building, have ties to Eielson Air Force Base through a family member that's either active duty or a veteran.

While there's a national conversation about how to integrate military and civilians, these boundaries do not exist in Fairbanks. Wells Fargo has a commitment to employ 20,000 veterans by 2020, and Eielson Air Force Base is helping them to achieve those goals.

The community rallies together to support our military families with various efforts. Alaska Small Business Development Center has a boots to business program for veterans. Fairbanks Rescue Mission has a homeless veterans program. UA Museum of the North has free admission for all of our active duty military that Wells Fargo underwrites. We have military appreciation events. We support cell phone for soldiers, a drive that provides hundreds of calling cards for deployed troops.

So while the military is our communities' largest employer, again and again, I speak with Air Force families that tell me that Eielson is a different kind of duty station with a great quality of life and a welcoming community. Many will tell you they plan to stay or retire here. We have endless outdoor recreation opportunities, arts and entertainment, to include an opera and symphony, and the main campus of UAF.

For a community with a population of 1,000 -- 100,000, we have a unique combination of amenities. Pair that with the military discount offered at most local retailers and restaurants, and the support of Eielson Air Force Base is evident in our community. So, Colonel Mitchell, Colonel Lars, and, Ms. Ristau, thank you for coming to Alaska, and thank you for taking time to understand how much the military means to our community. Thank you.

COL. MITCHELL: Thank you, Ms. Imus. Our next speaker will be Kyle Perry. **OT-037**

MR. PERRY: My name is Kyle Perry. I'm a business agent with UA Local 375, Plumbers and Pipefitters Union. Last name P-e-r-r-y. Alaska is a state rich in natural resources, from the oil reserves on the North Slope to salmon fisheries to the south. Natural resources aren't just quantifiable by the number of barrels of oil flowing through the Trans-Alaska Pipeline system, how many fish are harvested from Alaska's waters, or how many ounces of gold have been recovered from Fort Knox Mine.

Alaska has natural resources that can't be found in any of the other -- excuse me -- in any of the 50 states, airspace. Eielson Air Force Base sits in the center of the largest state in this great union, and staging America's new flagship TAC fighter here is a decision that makes sense for the Fairbanks North Star Borough, Alaska, and the United

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States as a whole.

These aircraft can be proven in an environment that is as harsh as it is beautiful. They'll have wide open spaces to stretch their legs and prove to us and the rest of the world that America is the greatest nation ever conceived.

The Joint Pacific Alaska Range Complex provides the greatest volume of airspace with the least amount of potential interference from commercial and private aircraft, wide open areas to achieve supersonic flight with minimal impact to adjacent populations, and the ability to perform testing of what some will call the last manned fighter jet with little need to operate under the cover of darkness.

Alaska played host to the last nation -- last foreign nation's attempt to create a handhold on the United States when Japan invaded the Aleutian Islands in World War II. Having the world's most sophisticated TAC aircraft in our backyard ensures the United States will be able to respond to domestic threats at a moment's notice.

The environmental impli -- implications of moving 54 new aircraft here seem like little consequence to ensuring that Alaska's oil moves safely to market and that our way of life is protected from foreign threats. Thank you.

COL. MITCHELL: Thank you, Mr. Perry. Our next speaker will be Jerry Simon. Our next speaker will be Adam White.

MR. WHITE: Adam White, W-h-i-t-e. And I represent the

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Alaska Airman's Association, a group of over 2,000 members interested in preserving and protecting general aviation in Alaska. In reading the draft environmental impact statement, you mention SUAIS, the Special Use Airspace Information Service. General aviation pilots greatly appreciate that service that the military has been providing for many, many years as a mitigation for civilian and military aircraft conflicts.

While presently that service is marginal in its coverage and marginal in its effectiveness at -- at keeping traffic conflicts to a mi -- minimum, if the proposed enhancements and modernizations of the JPARC EIS that's still in process with the FAA -- if those airspace expansions are approved, SUAIS is going to be inadequate. AA-6 AA-5

When we bring in the F-35s, which the Alaska Airmen's Association supports, bringing in the F-35s with a 40 percent projected increase in the JPARC, SUAIS is going to need to be enhanced and modernized as well, and we want to support you in that effort. As been mentioned earlier, the Fairbanks North Star Borough supports enhancing SUAIS as well.

The mention of VFR corridors as a possible mitigation to the increased use of the JPARC with the F-35s, while it does reduce the military-on-civilian traffic conflicts, it actually enhances the possibility of a civilian-on-civilian traffic conflict. When we route high-speed military traffic

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in the JPARC and you give us a path to clear that airspace, we -- we appreciate that. The problem is, is when you now have shunted a large percentage of the civilian traffic into a very concentrated area, it increases the potential for me and other civilian pilots to have traffic conflicts. AA-7

Thank you for the opportunity to comment. We will be submitting a -- a written letter to basically the same effect and expanding on some of those tonight. Thank you.

COL. MITCHELL: Thank you, Mr. White. Our next speaker will be Tim Jones. OT-039

MR. JONES: My name is Tim Jones, J-o-n-e-s. Thank you for this opportunity to comment on this important basing action. I'm a retired Army colonel and now a -- a proud member of this community, who like most of the folks here, support the action to base two squadrons of F-35s here at Eielson Air Force Base. This is the right thing to do from a strategic, operational, and tactical perspective.

It's hard to beat Alaska's strategic location, providing a power projection platform that can reach out rapidly to not only the Pacific, but also to the world. Co-location with the 168th Air Refueling Wing, part of our nation's air bridge to the Pacific, allows for unparalleled responsiveness.

Operationally, basing here in the Interior pairs our most advance air capabilities with our preeminent ground

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forces. The Fort Wainwright Striker Brigade brings a full spectrum combat capability, while Fort Richardson's Infantry Brigade is the only airborne unit based in the Pacific. And Fort Wainwright just recently became the home station for our most advanced attack helicopter, the Apache, and the Gray Eagle unmanned aerial system.

Years of combat have taught us to train as we will fight. Alaska basing provides that opportunity with joint forces in one of the finest training areas in the world. The Joint Pacific Alaska Range Complex offers the finest tactical training on fully instrumented ranges. Whether air-to-air or air-to-ground, JPARC can't be beat. And the scope of our air and ground maneuver areas provides employment opportunities at the tactical and operational levels.

If that's not enough, the airmen who fly, crew, and support these squadrons, and just as importantly their families, will be living in a community that welcomes them and appreciates their service. Thanks, again, for the opportunity, and I look forward to seeing Alaska's first F-35 on short final.

COL. MITCHELL: Thank you, Mr. Jones. Our next speaker will be Suzanne Rich.

OT-040

MS. RICH: Hi. I'm Suzanne Rich, R-i-c-h. I don't have a prepared statement, but I see the issue, as it was shown to us on the screen, of the environmental impact was

minimal. I feel like the environmental impact should be zero, and that we should be getting on board to -- in the environmental movement. And that is our number one issue. It is uniting the world together, because we're all feeling the impacts. And this where we need to be putting our money. I feel like it's a total misuse of money. We need to wake up and deal with the effects of environmental impact.

I just have a family member down in California lost his home, the whole neighborhood. We having fires here. This is real. This is not an imagination. It's not in another country. It's all around us. We have fires here. Lots of them have been caused by the military. And I'm totally against this and would like to see us -- if I could wave a wand, I'd have everybody go home and learn how to garden. And that would be my wish. SA-4

COL. MITCHELL: Thank you, Ms. Rich. Our next speaker will be Heather Koponen. OT-041

MS. KOPONEN: Hello. My name is Heather Koponen, K-o-p-o-n-e-n. First, I'd like to thank the instructions and the excellent conducting you're doing. Contrary to the instructions you gave about testimony, I note that spees -- speeches sent by congressional delegate and many others tonight were -- used this hearing as propaganda platforms, rather than addressing the EIS. I thank those who actually have been addressing the EIS.

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Some things that I would like to see expanded or addressed in the -- in the EIS, restrictions on civilian aircraft and different zones outside of JPARC. It makes it sound in the draft EIS as if they're all in JPARC, and I don't think that's the case. Air: What effect does all this mixing up above 3,000 feet have on the ozone? SA-3 AQ-4

Could they analyze hunting and fishing, legal and nonlegal, but additional personnel using historical information? There have been periods in our Alaska history -- I was born here -- during which there was many transgressions by military personnel on hunting and fishing regulations. I don't know if that's still the case. Might not be. Might have been improved. RV-1

I didn't see in the draft EIS, any summary. I didn't recall a thing. Substantiation of the claim that there is no additional police use: Again, my lifelong memory showed that there have been many events of local police being called for problems. SO-4

We need an analysis of what equal monetary investment instead of being used on the F-35, if it were used on diplomacy, environment, education, instead of in the proposed action alternative. And how much does each Fairbanks North Star Borough resident pay for -- via our taxes, for F-35 boondoggle planning, building, training, deployment, et cetera? NI-2

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I have many other things. I realize my time is almost up, and I will write many of them. What is the effect on our civil liberties? How will they be protected when military has a very nondemocratic format that says you are sub -- subordinate, you may not speak out?

My mother worked with alternatives to violence counseling at the women's shelter years ago, and most of the court-ordered attendees of these trainings for alternatives to violence counseling were military personnel, because they were subordinate all day. They could not argue. They could not give reason. They just had to say, yes, sir. So they took it out on their families. I would like to see these socioeconomic and many other issues addressed much more completely. Thank you.

COL. MITCHELL: Thank you, Ms. Koponen. Our next speaker will be Phil Osborn. **OT-042**

MR. OSBORN: Hi. Thanks for this opportunity. My name is Phil Osborn, O-s-b-o-r-n. I don't need to repeat a lot of comments that have been made. There's a lot of positive energy here tonight. I -- I do have one comment on the EIS topic, and that is the sound issue. When I look up and I see an F-16 under full throttle, what I -- what I hear and what I feel is, how many months of heating oil did he just burn up in that -- in that one little maneuver?

It seems to me that what I've been hearing about the

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over budget and unproven and all the rest of it, the F -- F-35 isn't really wanted by the Pentagon, is what I was told. I would like to see the money that's spent on these kinds of programs spent in important ways, like supporting our disabled veterans, who are sorely in need of medical attention. Sorry about that. They could be -- they could be re-educated with money spent.

All this money from the military industrial complex, it strikes me that they -- they have far more impact than the Koch brothers ever thought they could. This is a huge thing going on. And I -- I'd like to see some of that money turned into sustainable, positive energy things. And I'll re -- I'll re -- I'll be reporting a lot more things in my written comments. Thank you.

COL. MITCHELL: Thank you, Mr. Osborn. Our next speaker will be Rob Mulford. **OT-043**

MR. MULFORD: Good evening. My name is Rob Mulford, M-u-l-f-o-r-d. I represent the North Star Borough chapter of Veterans for Peace. My issue with the EIS is socioeconomic. This past winter, I had a meeting with our borough mayor. I told Mayor Hopkins that there's a portion of the community that's really concerned with the economic development direction of our community.

I said, I come to economic development commission meetings, and I find Jim Dodson. I find members of the

military. Jim Dodson, one meeting said, JPARC is the jewel of Alaska. Not because of beautiful rivers, not because of the animals or anything, but because it has bombing ranges in it. That makes me real sad at my heart.

I asked Mayor Hopkins, I said -- I showed him a report from the University of Massachusetts economic development showing a much higher return of investment for investing in alternative energy, alternative transportation, and other issues other than spending on the military. Mayor Hopkins told me he was not interested in development -- economic development unless it has traction. I know an Abrams tank has more traction than my mountain bike, but my mountain bike is more environmentally sound.

And with the monies that we're spending, half a trillion dollars in the military every year, we can't afford to address the issues of global climate change, and those things are really important. They're going to destroy many people in the world. And -- and I'm sick at heart that this -- this community is -- members here are saying we -- our community supports. No, no, no. That's not true. The community does not support the F-35s. They do.

And I -- I personally believe that, as Martin Luther King said, the nation who spends more on weapons and military than it does on social uplift is experiencing spiritual death. And I think we're also experiencing the death of

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freedom and democratic rights, because -- because Mr. Hopkins, in his position as mayor of this community and members of Borough Assembly limit to me to five -- three minutes to speak, like we're speaking here, and limits my right and my community of interest rights to take part in the economic development discussions of this community. Thank you.

COL. MITCHELL: Thank you, Mr. Mulford. Our next speaker will be Jack Wilbur.

OT-044

MR. WILBUR: Good evening. I'm Jack Wilbur, W-i-l-b-u-r. And I'd like to thank the Air Force for the timely completion of the F-35 draft environmental impact statement under consideration to base up to two squadrons of F-35s at Eielson Air Force Base. I have reviewed the DEIS and assessed the challenges and opportunities the Fairbanks community will encounter from stationing the F-35 at Eielson.

I'm here to go on record as a supporter of alternate one, to beddown two squadrons of F-35A aircraft at Eielson Air Force Base. I see no downside to implementation of this alternative. I was bear -- I was born in Fairbanks a long time ago, prior to the original construction of Eielson, so I have long been a party to the positive relationship that has developed between Eielson and our community over the years.

The economic impact of Eielson on our community is important and well-known. Just as important, is our

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relationship with the Eielson airmen. They are a welcome part of our community. Their presence also has a positive impact. I promise you that this community will welcome two new squadrons of F-35s and their affiliated support crews and their families to our community with open -- open arms. Thank you.

COL. MITCHELL: Thank you, Mr. Wilbur. Our next speaker will -- will be Karl Gohlke.

OT-045

MR. GOHLKE: We must be getting close to the end, hey. Good evening. My name is Karl Gohlke, G-o-h-l-k-e, with the Mechanical Contractors of Fairbanks, representing 15 Interior contractors and their team members, who build and maintain mechanical and pipeline facilities from the Interior to the North Slope.

We support the selected proposed action alternative of adding two squadrons of the F-35 to existing missions at Eielson Air Force Base, Alaska. We know the price of freedom isn't free, and the 1 percent of the men and women who defend America's population of over 300 million people need Alaska to train for their compative [sic] and protective task.

Alaska has the air and ground space for the American military to train in all types of condition and along side American allies. Assigning the F-35s to Eielson Air Force Base will maintain efficient combat capability, effective responsiveness to the neighboring threats, and a stabilizing

presence within the Pacific region and the Northwest Passage.

The economic impact to the Interior comes at a time of uncertainty and fills a gap for our members and their team. Within a four-year buildup, the F-35s coming will contribute direct, indirect, and induced 2,340 jobs, $193 million in labor income, and over $450 million in construction projects. The operations and maintenance jobs and dollars continue after the buildup, averaging an annual labor economic impact to the Interior of over 400 mi -- $450 million.

In respect to the removal of 13 acres from the Alaska's 130 million wetland acres, we have no objections and consider it a modernization to the future. The proposed actions alternative is a positive action and a morale boost to the majority of the citizens who live in the Interior of Alaska.

And I want to ditto Jim Dodson in regards to the hub zone situation. That is a serious consideration for us in the Interior. Thank you for the opportunity to address the Mechanical Contractors of Fairbanks support for the beddown and operation of two squadrons of F-35s at Eielson Air Force Base, Alaska.

COL. MITCHELL: Thank you, Mr. Gohlke. Our next speaker will be Ron Dearborn.

OT-046

MR. DEARBORN: Good evening. Ron Dearborn. D-e-a-r-b-o-r-n. I'm a local pilot, pri -- private pilot based here in Fairbanks. I look forward to welcoming the

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F-35s to Fairbanks, to the neighborhood. We do hope that you'll be good neighbors. Specifically, I have a concern about the continued safe use of the MUAS, which are mutually used airspace. With the 40 percent increase in military operations in the MUAS, the current -- there's a need to expand the SUAIS range control. It is not adequate to meet -- it's just barely adequate to meet current needs. It is not adequate to meet the increased needs, either in the expansion in JPARC or in the eastern portion of the existing MUAS. AA-5

The -- without an upgrade in the range control communication ability, we civilian pilots and the Air Force pilots are a hazard to each other. This is true in bo -- again, in both the new and -- both in the old and the proposed JPARC function. We look -- we local pilots and local pilot groups look forward to working with you. Thank you.

COL. MITCHELL: Thank you, Mr. Dearborn. Ladies and gentlemen, at this time, we have now heard from everyone who signed up to speak except for the three individuals who I called and were -- weren't present. So if you signed up to speak and I mispronounced your name so poorly that you didn't recognize that I was calling you, could you please raise your hand?

And I'll tell you the other feedback I got because I

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kept saying negative response because that's what I say in courtrooms. And I was told that negative response is, well, too negative. So instead, I'll say that I do not see any hands raised at this point. We have no remaining speakers at this time.

Pursuant to the notice of the public hearings, which were published in the local newspapers, the hearing officer, which is me, may adjourn the hearing after all audience members have had an opportunity to comment. It's currently 2042, or 8:42. So I'm going to recess this hearing for 30 minutes.

During this recess, if you decide that you would like to make oral comment and have them be part of the record, let me know or one of our staff members know, and I will reopen this hearing. If there are no other comments, then in 30 minutes, I will formally adjourn this hearing after this 30-minute recess.

MR. WHITE: I would like to talk.

COL. MITCHELL: I have a gentleman here who would like to comment. Sir, if you want to come up at this time. And, sir, I'm going to ask you, did you fill out a sign-in sheet?

MR. WHITE: Yes, I did fill out a piece of paper up there, and they run out of the formal piece of paper. I did fill one out and -- but I didn't fill one out to speak.

COL. MITCHELL: And just for the court reporter,

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because I have -- I made the mistake of asking you a question when you were not at the microphone. So I'm going to summarize your answer and you can correct me if I'm wrong. But you indicated you had filled out a comment card, but you had not necessarily indicated you wanted to speak. Is that correct?

MR. WHITE: That is more -- mo -- that's better, yeah.

COL. MITCHELL: Sir, if you could provide us your name, if you care to do so.

MR. WHITE: Yeah.

COL. MITCHELL: Spell your last name, and then your three minutes will begin.

OT-047

MR. WHITE: My name is Chris White. And White, W-h-i-t-e. And I -- I don't think this is such a good idea overall, not just because of the dangers involved. But I think if you bring in these squadrons and people of other countries see these squadrons there, they're going to go, holy smokes. These guys are really getting geared up for a fight. And they're going to get geared up.

And you may accidentally -- you don't mean to start this arms race. And it's going to get away from somebody, and somebody is going to fire a shot, and you're going to have a war. And anybody that I've ever talked with that's been in a war really don't -- they don't want to do this very often. They don't like to do it, because it's bad. It's

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really bad stuff. And especially when you're dropping these big bombs, you're going to take out children, women, you know, just -- and bust things up. And that's what armies do. They go in and they bust things up.

Now, so I think you can kind of -- not kind of. You -- you are going to start probably an arms race with the Chinese and that crazy guy from Korea. And, you know, he's going to look out there and see these weapons, and he's going to say, well, let's go. And if you're for -- prepared for that, that's -- might be what will happen. They're going to say, these guys are dangerous. They're getting geared up for a fight. And this is bad.

So I wouldn't -- there's much better uses for this money, as a lot of the people are pointing out here, for this money to go and help make it a better world, a safer world. And if you really want to shut them down, you use a general strike. I'm a union delegate for the IWW, and I'm not speaking for them. I'm just saying that's what we would do. We would try to create a situation where there is a general strike. And that's the least violent way of changing things. Thank you very much.

COL. MITCHELL: Thank you, sir. And I've been told that there is at least one more person who'd like to speak.

MS. WINTERS: Oh, I'm Nadine Winters, and I filled out my card, but didn't check the right box. I'm here to

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enthusiastically support the proposed action. It just seems like just, you know, having the F-35s here, it's good for national security, it's good for Eielson, and it's extremely good for our local economy. Seems like a perfect fit. We have the infrastructure. We have the services that can take the influx of people without a huge expenditure of additional resources. I don't think I've ever used the word "giddy" in a sentence before, but when I look at those direct, indirect, and induced jobs, I have to say it's giddy.

I would say in terms of the EIS for stuff that -- for topics that would be good to further look at, Senator Coghill at the North Pole meeting basically talked about the noise impacts on the schools on post. In that, I think the draft EIS says that there might be some mitigation mem -- measures. And I think the senator, and I would guess locally as well, that we'd be really willing to work with you on that, because I think they were talking about interrupted learning for the kids.

I'd like to echo the comments about civil aviation community. Currently, I think Eielson has worked really well with that community. With this influx, I think there's going to be -- probably be more to be doing about that communication.

And then, you know, lastly I would say on the economic impacts, it would -- it's our fervent hope that local

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contractors and local workers get to work on that construction, that they're not imported from outside. So whether that's HUB's own or a bidding process or whatever, but we would definitely ask you to take a look at that. And with that, you know, having said that, enthusiastic support. You're really not going to find another community that's more supportive of the military or more willing to work with you on any issues. And thank you for the opportunity.

COL. MITCHELL: Thank you, ma'am. And let me ask is there anyone else who would like to make comments at this time -- so could you --

MS. KOPONEN: If we already commented, but ran out of time, can we continue?

COL. MITCHELL: So the question was from Ms. Koponen.

MS. KOPONEN: Koponen.

COL. MITCHELL: Koponen. Was that if you previously spoke, can you have an additional three minutes. And the answer is, yes, you may. Would you like to speak again? **OT-049**

MS. KOPONEN: All right. Last name, again, K-o-p-o-n-e-n. So I'll pick up where I left off. I didn't see in the DEIS whether there will be any restrictions on use by public of the Richardson Highway at any time. Perhaps not. I felt that the issue of decibels was inadequately addressed, not enough about the effects on children and others, and on stress and what happens with the stress of

PA-1

AE-5

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high noise levels that are persistent, because these were averages for a day of 65 and up to 85 listed. Also, these additional high levels on wildlife, on the traffic.

And then also with forest fires and what steps will be taken to prevent more forest fires. As you must be aware, this was not addressed in the EIS about the incidents of forest fires started by ordnance. We have had some devastating forest fires that have caused local evacuations, and that needs to be addressed, how that will be prevented in the future. SA-4

Also, how to not squelch somebody's so -- First Amendment rights. I have firefighter acquaintance who said that he cannot tell me about the incidents of personnel doing -- the military using live ordnance in where the firefighters have to fight it, because he would face retribution. I feel that that's abridging his and my First Amendment rights of free speech.

Okay. Live ordnance, ES13, how will it be dealt with? Would there be nuclear armaments, such as B61-12, which F-35s can carry? This is not mentioned in the EIS, but I would suspect that they would be here. How would these and the public be protected? PA-3 PA-4 SA-5

What will be the consequences for transgressors and what notification of the public for deviation from designated flight paths? I've heard testimony from various other locals

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that jets often fly out of their designated flight paths. And I risk -- I experienced this on the Yukon River rapids far from any of these mapped flight paths, where they were flying super fast, where there's an S-curve between -- they were below the top of the hilltops. People there fly out in floatplanes, which are not at all maneuverable. Perhaps the jet could maneuver and avoid a crash. But if a flight -- floatplane pilot tries to take fast evasive action, it is very likely to cause an accident. Thank you. SA-6

COL. MITCHELL: Thank you. Is there anyone who hasn't spoken that would like to speak? Anyone who has previously spoken who would like an additional three minutes? I see no hands raised for both of those questions.

(END OF REQUESTED PORTION)

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TRANSCRIBER'S CERTIFICATE

I, Marci L. Lynch, hereby certify that the foregoing pages numbered 3 through 54 are a true, accurate, and complete transcript of the public comments excerpt of the USAF DEIS meeting held at Fairbanks, Alaska, on September 23, 2015, recorded by Teresa A. Larabee and transcribed by Linda Chastain from a copy of the electronic sound recording, to the best of my knowledge and ability.

_____ _____

(***Date) Marci L. Lynch, Court Reporter
Notary Public in and for the
State of Alaska
Commission Expires: 11/11/2015

S E A L

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Comments Submitted at Hearings

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Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-001

Comment Sheet

Location: North Pole
Date: 9-21

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

I'm supportive of the F-35 bed-down at EAFB. I beleive the Alaskan environment makes for a tougher service member (both physically and mentally).

EAFB is fortunate to have a "wide-open" surrounding area. I beleive that noise disturbances for the surrounding community (around North Pole and Fairbanks) will be minimal.

Over for more space →

Please Print

Name: Chad Hutchison
Address:
Fairbanks, AK 99709

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes X **No** ____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-002

Comment Sheet

Location: North Pole
Date: 9-21-15

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

We are very supportive of having the F-35s to Eielson!

Over for more space →

Please Print

Name: Frank Dunaklee

Address:
North Pole AK 99705

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No**____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-003

Comment Sheet

Location: NP Middle
Date: 9-21-15

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

SEE ATTACHED

Over for more space →

Please Print

Name: BRYCE WARD
Address: NP AK 99705

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes X **No**____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Comments on the Draft Eielson AFB Environmental Impact Statement (DEIS)
United Stated Air Force F-35A Operational Beddown - Pacific

I am Mayor Bryce Ward of North Pole and I strongly support the Proposed Action Alternative to Beddown two squadrons of F-35A aircraft at Eielson AFB as an addition to all existing mission activities. Thank you and the F-35 Beddown Team for your time and attention to the comments submitted on the DEIS and Proposed Action Alternative by the residents of Interior Alaska.

North Pole, as the closest community to Eielson AFB, has always enjoyed a special relationship with the men, women and families who defend our Nation from the top of the world. The increasing recognition that Eielson AFB is special in many ways – strategic location, home to training areas nearly as large as the entire Lower 48 States and school house for American and Allied Forces from around the world to name a few – is gratifying and brings great responsibility to overcome the challenges presented. As Mayor Hopkins noted, Eielson AFB is a part of Interior Alaska's family and our communities work tirelessly to support that family. I and my fellow citizens of North Pole are honored to be home to both the installation and many of its airmen, civilian workers and their families.

My comments will address what I consider to be an area of the DEIS requiring more detail, and potentially more analysis – housing for the permanently assigned airmen, civilians, and contractors and their families who will call Eielson AFB home in the future. **SO-2**

Section 3.6 of the DEIS discusses Housing characteristics of the Fairbanks North Star Borough (FNSB) and projects the availability of some rental housing in North Pole to help satisfy the needs of personnel that will support the F-35As assigned to Eielson AFB. Section 4.6.2.2 provides a bit more detail by identifying an additional 314 households living off base for a total of 682 in the future (368 currently). The analysis indicates the addition 314 households will potentially take up 9 percent of available rental housing in the FNSB.

My concern is the DEIS does not provide the detailed discussion necessary to understand if the assumed rental housing to be used will be both suitable for our military families and located in areas that can realistically support personnel working at Eielson AFB. Given that the FNSB represents 7,361 square miles – roughly the size of the State of New Jersey – rental housing must not only be available, it must be in close proximity to Eielson AFB. The unofficial motto of the 354th Fighter Wing's *Icemen* is "Ready to Go at 50 Below!" That statement is a direct reflection on just one of the challenges presented to the Interior Alaska Family each winter. I would appreciate the DEIS Team clearly demonstrating that the determination **SO-5**

is that there will be sufficient suitable and suitably located housing to support Eielson AFB personnel. If this is not the case, I will work with the other Mayors and regional officials to ensure the personnel arriving in the region will have the opportunity to secure suitable housing in areas suitable for commuting between home and Eielson AFB when they must be, "Ready to Go at 50 Below."

My community and our neighbors throughout the region are committed to ensuring the personnel assigned to PACAF's Joint Strike Fighters will be welcomed to the Interior Alaska Family and enjoy the same superior level of support as those who have been assigned over the last 71 years. Thank you for considering our comments.

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-004

Comment Sheet

Location: DELTA JUNCTION AK
Date: 22 SEP 2015

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS: SAFETY

IN CONSIDERATION OF THE INCREASE OF AIR TRAFFIC AND ACTIVITIES IN VICINITY OF PAEI AND PABI (BIG DELTA - ALLEN ARMY AIRFIELD AT FORT GREELY), IT IS IMPORTANT TO ASSURE THE NOAA NWS CONTRACT WEATHER OFFICE BE MAINTAINED AT FORT GREELY. LOCATED AT BLDG T-100 IN OFFICE 101. THIS AUGMENTED ASOS (AUTOMATED SURFACE OBSERVATION SYSTEM) OFFICE SHOULD CONTINUE TO BE STAFFED BY WEATHER OBSERVERS AT LEAST AT ITS PRESENT LEVEL. SA-7

Over for more space → NOTE: I AM A WEATHER OBSERVER WORKING PART TIME AT THIS STATION SINCE 1997.

Please Print

Name: BRUCE GROSSMANN

Address: DELTA JUNCTION

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes X **No** ____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

CITY OF FAIRBANKS
John Eberhart, Mayor
800 CUSHMAN STREET
FAIRBANKS, ALASKA 99701-4615
OFFICE: 907-459-6793
FAX: 907-459-6787
mayor@ci.fairbanks.ak.us

September 22, 2015

United States Air Force

Re: Comments on the Draft Eielson AFB Environmental Impact Statement (DEIS)
United Stated Air Force F-35A Operational Beddown – Pacific

Dear United States Air Force Leaders:

As Mayor of the City of Fairbanks, I am excited about Eielson AFB becoming home to PACAF's Joint Strike Fighters and strongly support the Proposed Action Alternative to Beddown two squadrons of F-35A aircraft at Eielson AFB as an addition to all existing mission activities. I wish to add my thanks to you and the F-35 Beddown Team for your time and attention to the comments submitted on the DEIS and Proposed Action Alternative by our residents.

I was pleased when I learned the Air Force's environmental analysis would consider only the Proposed Action and the No Action Alternative – there is no reasonable alternative. Reading the DEIS, I was even more pleased to know there are only four areas where your team identified the need for mitigations – slight noise impacts in some base residential areas and classrooms and construction impacts in small wetland and floodplain areas. I am confident that collaboration with the Air Force will develop and implement any necessary mitigation steps.

In addition to confirming that Eielson AFB satisfies the strategic, geographic, and training requirements of the Air Force, your team has concluded that personnel assigned to Eielson AFB will enjoy the educational, healthcare, transportation, recreational, and other community attributes that contribute to a superior quality of life in Interior Alaska.

As the primary host to Fort Wainwright, the assignment of F-35As at Eielson AFB will add to the quality of training for the Army-Air Force Team. Fort Wainwright units already train with Eielson AFB's F-16s and during Red Flag-Alaska multinational exercises. The Gray Eagle Unmanned Aerial Vehicles and AH-64 Apache attack helicopters will also benefit from the more robust and transformational Air Force presence and focus.

On September 17, one day short of the Air Force's 68th birthday, Secretary James released a document that presents the future vison for the service. *The Air Force Future Operating Concept: A View of the Air Force in 2035*, outlines the future of Air Force operations. It notes that success will depend on close relationships with "members of the Joint Team" and assumes the outline will be fleshed out through "examination, experimentation, and capability development … and [the integration of] new technologies." The document emphasizes it "is about change" and building capability. There is no better location to build on the Joint Team, examine, experiment, develop capabilities, and integrate the

new technologies to underwrite the new vision than Interior Alaska. There is no more capable team than the Active and Reserve Component forces assigned to Eielson AFB and Fort Wainwright. Let me quickly explain:

- The F-35 is, by definition and design, a key catalyst for Air Force change and will have the opportunity to explore its full capabilities in Interior Alaska's vast airspace and training areas. The Air Force has stated this cannot be done in the Lower 48 states.
- Army – Air Force integration (the Joint Team) is stated as key to realizing the future vision and can be thoroughly tested and validated in Alaska.
- Multinational operational coordination is stated as an essential enabler for the future and Red Flag-Alaska offers unparalleled opportunities to hone that coordination and perfect the ability to fight together.

There are many other examples of why Eielson AFB and Interior Alaska is the perfect home for PACAF's Joint Strike Fighters – 67,000 square miles of airspace in the Joint Pacific Alaska Range Complex, 40,000 square miles of sea surface, subsurface and overlying airspace off our coast, and complementary forces at JBER are to name a few.

The needs of the Air Force, the United States, and nations around the world have led the evaluation team to correctly conclude that Eielson AFB is the only place PACAF's F-35As will best support the Global Vigilance – Global Reach – Global Power that define the Core Missions of the Air Force.

On behalf of the City of Fairbanks, its residents, and our neighbors throughout the region, I pledge my commitment to ensure that personnel and families assigned to Fort Wainwright and Eielson AFB will enjoy the superior support for which Alaska's Golden Heart has been known for over seven decades. Thank you for considering our comments.

Yours sincerely,

Mayor John Eberhart

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-006

Comment Sheet

Location: WEST VALLEY HS
Date: 9/23/15

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

WE BOTH APPROVE OF THE F35'S BEING STATIONED AT EAFB

Over for more space →

Please Print

Name: MARK + DEBRA GREER
Address:
FAIRBANKS AK

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes ✓ **No** ____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

WE SUPPORT
ALASKA
F35s
www.AlaskaF35s.com

At the April 1, 2014 Fairbanks North Star Borough Board of Education meeting, the board passed a resolution supporting the stationing of the F-35 Lightning II Joint Strike Fighter at Eielson Air Force Base.

School operations on Eielson Air Force Base have been an integral part of the district since we assumed responsibility of base schools in 1975, and we currently operate three schools on base. We're committed to meeting the educational needs of Eielson Air Force Base families, now, and in the future.

No other region in the country can offer the United States Air Force an area as strategic, cost effective and welcoming ~~alternative~~ for stationing the F-35 Lighting II aircraft. The Fairbanks School District ~~joins the Fairbanks North Star Borough Assembly and the Greater Fairbanks Chamber of Commerce~~ in supporting the stationing of the aircraft at Eielson Air Force Base. Tonight, it is my pleasure to re-affirm that resolution.

Read the resolution here.

FAIRBANKS NORTH STAR BOROUGH BOARD OF EDUCATION

RESOLUTION 2014-14:

SUPPORTING THE STATIONING OF THE F-35 LIGHTNING II JOINT STRIKE FIGHTER AT EIELSON AIR FORCE BASE

WHEREAS, the United States Air Force is currently conducting a Strategic Basing Analysis to determine the most strategic and cost effective location for stationing F-35 aircraft to be assigned to the Pacific Air Forces in support of the Asia-Pacific Theater; and

WHEREAS, in 2013 a strategic assessment of Pacific Air Forces installations affirmed the critical, long-term and strategic value of Eielson Air Force Base; and

WHEREAS, Eielson Air Force Base anchors the Joint Pacific Alaska Range Complex comprised of 67,000 square miles of airspace, 1.6 million acres of maneuver training lands, and related 48,000 square miles of surface, subsurface and overlying airspace in the Gulf of Alaska; and

WHEREAS, the training venues of Interior Alaska are recognized as national treasures; have unparalleled size, capability, and characteristics; are essential to joint, combined and coalition training of the United States forces and those of its global allies; and cannot be replicated elsewhere; and

WHEREAS, the majority of Eielson Air Force Base's personnel and families live in the Fairbanks North Star Borough, making them valued members of the "Fairbanks Family" and part of the social and cultural fabric of Interior Alaska providing essential services to our community and serving as educators, support staff, and other educational professionals within the school district; and

WHEREAS, school operations on Eielson Air Force Base have been an integral part of the Fairbanks North Star Borough School District since the district assumed responsibility of base schools in 1975; and

WHEREAS, the district currently operates three schools on Eielson Air Force Base, as well as five schools in the nearby community of North Pole, and is well prepared to provide the influx of families as a result of the F-35 stationing with exceptional educational opportunities; and

WHEREAS, the district's commitment to meeting the educational needs of Eielson Air Force Base families is further demonstrated by the fact that Eielson is represented by a delegate on our Board of Education, which has been the case for close to 40 years; and

WHEREAS, no other region of the country or the United States Pacific Command Area of Responsibility can offer the United States Air Force as strategic, cost effective and welcoming alternative for stationing the F-35 *Lightning II* aircraft; and

~~NOW, THEREFORE, BE IT RESOLVED~~, the Fairbanks North Star Borough Board of Education strongly urges the Secretary of the Air Force; Chief of Staff of the Air Force; and Commander, Pacific Air Forces to station the F-35 *Lightning II* Joint Strike Fighter at Eielson Air Force Base, Alaska.

PASSED AND APPROVED: April 1, 2014

Heidi Haas

Heidi Haas, President
Board of Education

ATTEST:

Sharon Tuttle

Sharon Tuttle
Executive Assistant to the Board

Fairbanks North Star Borough School District

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-008

Comment Sheet

Location: FAIRBANKS, AK
Date: 9-23-15

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

There should be no real concerns in basing F-35's at Eielson AFB. Even if there is significant more noise & traffic, that is of no or little concern in light of the increased security for the U.S. & Alaska & the positive impact on the Alaskan economy.

I've flown 3000 hrs. in interior Alaska & spent many years flying through MOA's & never once has there been a problem. The ~~[illegible]~~ Airforce & their Pilots have always been ~~[illegible]~~ extremely professional.

I have total confidence & trust in F-35 basing at Eielson AFB.

Over for more space →

Please Print

Name: DENNIS DOUGHERTY
Address: _____
FAIRBANKS, AK. 99709

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No**____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson Air Force Base, AK 99702

Re: Environmental Impact Statement to assess proposed basing of two F-35A squadrons at Eielson Air Force Base

Dear Sir or Ma'am,

North Pole is located 14 miles southeast of Fairbanks between Fort Wainwright and Eielson Air Force Base. The greater North Pole area is the fastest growing area of the borough and is known as the city where the spirit of Christmas lives year round. The land surrounding North Pole experienced significant growth and development over the past decade. Yet much land remains undeveloped and is road and utility accessible, making the area suitable for development. The regulatory climate is conducive to development as well.

An estimated forty percent of Eielson military families live off post, so it makes sense to talk about housing. Housing for ownership and rental is affordable and available. Roughly 53% of homes in and around North Pole are valued between $200,000 and $499,000. The remaining 47% of homes are valued below $200,000, roughly the same as the number for the entire borough. The median home value in North Pole is $205,500, the City of Fairbanks is $194,600 and the median value in the entire borough is $213,500. Land in the greater North Pole area and within the borough is relatively inexpensive with relaxed land use.

Education is a quality of life issue. We are lucky to have great K12 schools. Two statistics speak to this – the dropout rate and how well kids learn in our schools. There are three high schools. North Pole High's dropout rate is the lowest at 3.1%, Lathrop High School's rate is 7.6% and West Valley High rate is 4.0%. The overall dropout rate is 4.9%, lower than the national rate of 7%. A second measure of quality in our schools is the number of students who are proficient or advanced in academics. Using reading as an example, all three high schools had 81% or more students that were proficient or advanced in reading. Schools in the immediate vicinity of Eielson – Anderson Elementary, Ben Eielson Junior Senior High, Crawford Elementary, North Pole Elementary, North Pole Middle, North Pole High, Ticasuk Brown Elementary and Salcha Elementary - can collectively accommodate an additional 1,061 students.

Thank you for the opportunity to provide input into scoping process for the proposed basing of two F-35A squadrons at Eielson Air Force Base. Please take into consideration the availability and affordability of housing, the regulatory and land use environment that is conducive to new development and the quality of our schools when drafting the EIS.

Sincerely,

Wesley Madden
CEO | Madden Real Estate, LLC
810 Barnette Street, Fairbanks, AK 99701
Office: 907.452.3000

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-010

Comment Sheet

Location: West Valley HS
Date: 9/23/15

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:
My friend Vlad doesn't want the F-35s here. He says it is provocative.
I want you here.

Over for more space →

Please Print

Name: Gary Woody
Address: Fairbanks AK 99710

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No** X

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

September 23, 2015

EIS Review Committee:

Alaska is a state rich in natural resources, from the oil reserves on the North Slope to the salmon fisheries to the south. Natural resources aren't just quantifiable by the number of barrels of oil flowing through the Trans-Alaska Pipeline System, how many fish are harvested from Alaska's waters, or how many ounces of gold have been recovered from Fort Knox Mine. Alaska has a natural resource that can't be found in any other of the 50 states, airspace.

Eielson Airforce base sits in the center of the largest state in this great union and staging America's new flagship attack aircraft here is a decision that makes sense for the Fairbanks North Star Borough, Alaska and the United States as a whole. These aircraft can be proven in an environment that is as harsh as it is beautiful. They will have wide open spaces to stretch their legs and prove to us and the rest of the world that America is the greatest nation ever conceived.

The Joint Pacific Alaska Range Complex provides the greatest volume of airspace with the least amount of potential interference from commercial and private aircraft, wide open areas to achieve supersonic flight with minimal impact to the adjacent populations, and the ability to perform testing of what some will call the last manned fighter jet with little need to operate under the cover of darkness.

Alaska played host to the last foreign nation's attempt to create a handhold on United States when Japan invaded the Aleutian Islands during WWII. Having the worlds most sophisticated attack aircraft in our back yard ensures that the United States will be able to respond to domestic threats at a moment's notice. The environmental implications of moving 54 new aircraft here seem like little consequence to ensuring that Alaska's oil moves safely to market and that our way of life is protected from foreign threats.

Kyle Perry

William S. Brophy
301 Snowy Owl Lane
Fairbanks, AK 99712

Commanding Officer
F35A Pacific Basing EIS
354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Mr. J. Dale Clark, 22 September 2015

I submit the following comments in reference to the USAF F-35A Operational Beddown – Pacific, Draft Environmental Impact Statement, August 2015. I favorably support Eielson AFB for stationing of two F35 squadrons.

Our country is experiencing very challenging times. I am greatly concerned for the readiness of our military forces in this very fragile and uncertain world we live in today. If we are to maintain our position as a super-power, the United States must have an overwhelming, strong military. As American citizens we owe our men and women in uniform the ability to train in difficult conditions in order to fight, win, and come home safely when our nation calls on them.

1. Pacific Orientation - Our national leadership has refocused and transitioned its defense enterprise and military strategy to the Pacific Rim. What is in the best interest for PACAF Strategy? Alaska serves as the "top cover" for the USA. Early warning at Clear AFS, missile defense at Ft Greely, along with maritime and ground forces serve to deter hostile aggression from the north. Stationing of the next generation fighter at Eielson AFB is in keeping with the keystone mission of our National Military Strategy.
2. Strategic location – Military forces stationed in Alaska are firmly established on US soil and are capable of ready reaction on short notice to the majority of "hot spots" on the globe. History is replete with examples that serve as testimony. Alaska is a strong foothold that was well proven during World War II. Military forces stationed in Interior Alaska can quickly deploy to Europe, Middle East, and Asian locations. Alaska is the preeminent location to influence future Arctic issues. Numerous deployments of our Alaska based war-fighters into combat during the past decade have proven the strength and steel of service-members trained in Alaska.
3. Abundance of training area - Interior Alaska offers the greatest training area on land and in the air to prepare our forces for combat operations. If a military formation can fight and win in arctic/subarctic conditions, they can win anywhere on the globe. JPARC is the largest training area in the world for joint and combined operations with a well established headquarters

located at Eielson AFB. Our allied friends depend on training at Eielson AFB to maintain their military strength.

4. Existing military infrastructure – Eielson AFB is well established with a robust infrastructure. The base is located on the road system, connected to the rail-belt, adjacent to the pipeline, enjoys a wonderful school system, and is self sufficient with a power plant providing low cost electricity and heat to the entire installation - some of the lowest cost energy in Alaska. The training areas for air and ground maneuver forces are unmatched. Eielson AFB is well established with a world-class runway, hangars, maintenance facilities, and housing. The sophisticated systems of the Red Flag operations are unmatched and currently have in place the equipment and a talented workforce to maintain the equipment. Nowhere on the globe is there another military training installation that can accommodate long range weapon systems and freedom of movement for air and ground maneuver units. Current training areas support the full spectrum of USAF training requirements while maintaining a sincere respect for the environment and our natural resources. Base operations are well suited for additional forces. New modern facilities include: BX/Commissary, child care, chapel/religious services, on-base housing, MWR services and educational institutions.
5. All Weather location - Despite the tough environmental conditions, rarely, if ever, is weather or terrain a restricting factor for the full suite of military and non-military operations in Interior Alaska. Eielson AFB runway serves as an alternate airfield for many transient aircraft of all sizes and configurations, both military and civilian aviation.
6. Civil-Military Relationship - Nowhere else is there a patriotic bond between the local community and our military. Interior Alaska flourishing with Army, USAF, active, guard, reserves, veterans, retirees, and proud patriotic Americans. The synergy is profound and perhaps difficult to quantify but easily understood - an affair of the heart; the sound of freedom; aim high. Visit Interior Alaska and feel the vigor and vitality.
7. Encroachment - Military land, impact areas, firing ranges, and airspace are virtually unimpeded by encroachment.
8. One Force - The Alaska Air National Guard 168 ARW is well equipped, well manned, and well trained to provide aerial refueling vital for global reach. The Alaska National Guard and active duty military have a long-standing professional relationship.
9. Leadership/Command Opportunities - Eielson AFB, 354 FW has a tremendous legacy of producing leaders within the Air Force that go on to become the senior leadership in our military.
10. Room to expand - This is a critical time in our military to take advantage of opportunities to position additional forces at Eielson AFB in order to achieve a cost saving for the entire USAF. Stationing the F35 systems and forces at Eielson AFB will achieve an attractive economy of scale. Even a quick review will result in savings based on existing joint facilities such as: Bassett Army Community Hospital, PX/BX, child care, chapel/religious

services, on-post/on-base housing utilization, MWR services and educational institutions.

11. F35 Simulator – The expenditure of $35 million to install an F35 flight simulator at Eielson is another strong commitment of precious military funds that points to a conclusion for stationing the war fighting system at Eielson AFB.

I appreciate the opportunity to contribute comments to the EIS process and fully support stationing two F35 fighter squadrons at Eielson AFB.

Please include my name, email address, and mailing address as below to be able to receive future information on the F35 Stationing Plan.

Fly, fight and win. Our sons and daughters are depending on you. Make them strong. We are counting on you.

With best regards,

Bill

Bill Brophy
301 Snowy Owl Lane
Fairbanks, AK 99712
(907) 457-1178
bill@usibelli.com

explore FAIRBANKS ALASKA

101 Dunkel Street, Suite 111
Fairbanks, Alaska 99701-4806
(907) 457-3282 • Fax (907) 459-3787
www.explorefairbanks.com

September 23, 2015

F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

RE: COMMENTS ON DRAFT EIS FOR PROPOSED BASING OF F-35A AIRCRAFT AT EIELSON AIR FORCE BASE

To Whom It May Concern:

On behalf of the Board of Directors of Explore Fairbanks – the destination marketing and management association for the Fairbanks region – we enthusiastically support the proposal to base F-35A aircraft at Eielson Air Force Base.

Regarding the positive economic impact on the community, according to the Alaska Visitors Statistics Program VI, the Visiting Friends and Relatives (VFR) market constitutes the following percentage of visitors in Fairbanks:

10 percent (or 32,500 visitors) in summer (May-September)
14 percent (or 7,000 visitors) in winter (October-April).

While we cannot quantify how many of the VFR market is here visiting air force personnel, we do know anecdotally that a high percentage of VFR come take the opportunity to enjoy Alaska when visiting family and friends stationed here.

The Explore Fairbanks Visitors Services Staff provides Fairbanks information monthly at the Eielson First Term Airmen Center (FTAC) as well as participates in the Winter Seminar on base. During these programs, we provide an overview of activities, tours, and attractions available not only in the region but throughout the State of Alaska. At our information center at the Morris Thompson Cultural and Visitors Center located in downtown Fairbanks, Explore Fairbanks staff assists in helping many Eielson residents and their guests learn how to enjoy the bounty of Alaskan experiences.

We trust that you will consider the valuable economic impact that the additional squadrons at Eielson will have on tourism in our community. And that you will consider the quality-of-life enhancement for those military, their families and their VFR whose exposure to the vast wilderness, natural beauty, and cultural opportunities here in the Fairbanks region will be unparalleled in their experience.

Over and over again, we receive positive comments to Explore Fairbanks's social media postings by military, their family and friends who hold their time in the Fairbanks region as one of the highlight of their lives.

As a few examples:

> Earlier this year, Albert Nygren posted in response to the Explore Fairbanks video on YouTube, "I saw a Northern Lights when I was stationed in the Air Force near Fairbanks that was similar to the one in this video but even more awesome. It lasted for at least a 1/2 hour and I will never forget it."
>
> Commenting on a photo of the aurora on the Explore Fairbanks FB page, retired airman Robert Rasmussen, said, "Remember sitting on top of a C-135 watching those dance overhead and listening to the hiss in the cold air."
>
> Susan Rozinski posted: "My daughter and son in-law are stationed at Eielson. So I've been blessed with 3 trips to AK and I love the area…My second trip I met my best friend in Vancouver and cruised to Seward. In Anchorage, she flew home and I took the gold dome train to Fairbanks. I'd do that whole trip every year if I could. A friend I worked with said he could tell me about AK and show me hundreds of photos but until I went and 'felt' it I wouldn't understand. I do now and envy all of you lucky enough to live there."
>
> Michael Principe recounted: "We were stationed at Eielson A.F.B. back in 1969 to 1972 and I hope someday I can return back to Alaska soon – to take the Alaska Railroad train ride. Thank you Alaska."

We could go on and on citing the complimentary and heartfelt comments made by those who were stationed or visiting at Eielson and inspired by their time here in Alaska. Please check them out on Facebook at https://www.facebook.com/explorefairbanks and on YouTube at https://www.youtube.com/watch?v=UT7L9QDcfU0

Thank you in advance for your consideration of the location of these F-35 squadrons to Eielson. If you have any questions, please feel free to me at (907) 459-3770 or dhickok@explorefairbanks.com.

Warm Regards,

Deb Hickok
President and CEO

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-014

Comment Sheet

Location: West Valley H.S. Fairbanks, AK
Date: 9/23/2015

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

Please choose the Proposed Action Alternative to beddown up to 54 F-35As at Eielson AFB. This community supports our military personnel and we are honored to have been chosen as the only Preferred alternative site. As a community we will not disappoint you in our support of the mission and the families that you bring North.

Over for more space →

Please Print

Name: Diane L. Hutchison
Address:
Fairbanks, AK 99712

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No** X

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-015

Comment Sheet

Location: FAIRBANKS AK
Date: 23 SEP 2015

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

I FULLY SUPPORT THE BEDDING DOWN OF THE F-35'S AT EIELSON AFB. HAVING WORKED WITH EIELSON ON NUMEROUS RED FLAG EXERCISES I KNOW THAT THEY ARE RESPECTFUL OF THE ENVIRONMENT.
NO ISSUES WITH THE BASING PLAN.

Over for more space →

Please Print

Name: ROBERT D FATT

Address:
FAIRBANKS AK 99709

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes X **No** ____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

WC-016

Comment Sheet

Location: Fairbanks
Date: 09 - 23 - 2015

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS: Yes! F35s should be based at EAFB
- Closer to trouble spots of the world
- More air space for training
- Facilities already exist to support
- Supportive community of active duty military & veterans

Over for more space →

Please Print

Name:

Address:

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No**____

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

STATE CAPITOL
P.O. Box 110001
Juneau, AK 99811-0001
907-465-3500
fax: 907-465-3532

550 West Seventh Avenue, Suite 1700
Anchorage, AK 99501
907-269-7450
fax 907-269-7461
www.Gov.Alaska.Gov
Governor@Alaska.Gov

Governor Bill Walker
STATE OF ALASKA

September 23, 2105

F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Sirs and Madams:

It is with great pleasure that I submit these comments regarding the Draft Environmental Impact Statement concerning the basing of PACAF's F-35s at Eielson Air Force Base. Alaska, and the Interior of Alaska particularly, has a long history of welcoming the military to our communities. It is within that historical context, combined with a keen look to the future that I strongly endorse the basing of these aircraft at Eielson Air Force Base.

I am confident that no insurmountable challenges stand in the way of completing the basing task. That said, it is important to complete a comprehensive review of environmental impacts.

While it is understood that trade and other Interior Region workforce requirements will be strained, given Alaska's ability to draw from a larger State-wide workforce pool, combined with the ability to train and educate Alaskans to meet workforce needs, I am again confident that an efficient and eager workforce will be available. Alaska looks forward to working with the Air Force to ensure that all workforce needs are met.

Communities throughout the Interior will plan and implement changes needed to deal with the impacts associated with the F-35 basing. The State looks forward to working with the Air Force and local communities to ensure that Community needs are met.

The State and the Fairbanks North Star Borough have long supported the JPARC training area and required facilities. These facilities will be instrumental to assuring the readiness of the F-35 as a state of the art weapons platform. The State will continue its efforts to ensure that JPARC is viewed as the premier training ground for land and air training in the United States.

I am gratified that Alaska is being recognized for its strategic value given the military's Asia-Pacific Shift. It must also be said that the security of Alaska, and the nation, must be reconsidered given a resurgent Russia. Alaska's geographic value cannot be over-stated, nor can the value of Alaska's natural resources be understated. For these reasons, and the inherent associated security threat, I am pleased to stridently support the basing of F-35s at Eielson Air Force Base.

Sincerely,

Bill Walker

Bill Walker
Governor

CITY OF FAIRBANKS
John Eberhart, Mayor
800 CUSHMAN STREET
FAIRBANKS, ALASKA 99701-4615
OFFICE: 907-459-6793
FAX: 907-459-6787
mayor@ci.fairbanks.ak.us

September 23, 2015

United States Air Force

Re: Comments on the Draft Eielson AFB Environmental Impact Statement (DEIS)
United Stated Air Force F-35A Operational Beddown – Pacific

Dear United States Air Force Leaders:

As Mayor of the City of Fairbanks, I am excited about Eielson AFB becoming home to PACAF's Joint Strike Fighters and strongly support the Proposed Action Alternative to Beddown two squadrons of F-35A aircraft at Eielson AFB as an addition to all existing mission activities. I wish to add my thanks to you and the F-35 Beddown Team for your time and attention to the comments submitted on the DEIS and Proposed Action Alternative by our residents.

I was pleased when I learned the Air Force's environmental analysis would consider only the Proposed Action and the No Action Alternative – there is no reasonable alternative. Reading the DEIS, I was even more pleased to know there are only four areas where your team identified the need for mitigations – slight noise impacts in some base residential areas and classrooms and construction impacts in small wetland and floodplain areas. I am confident that collaboration with the Air Force will develop and implement any necessary mitigation steps.

In addition to confirming that Eielson AFB satisfies the strategic, geographic, and training requirements of the Air Force, your team has concluded that personnel assigned to Eielson AFB will enjoy the educational, healthcare, transportation, recreational, and other community attributes that contribute to a superior quality of life in Interior Alaska.

As the primary host to Fort Wainwright, the assignment of F-35As at Eielson AFB will add to the quality of training for the Army-Air Force Team. Fort Wainwright units already train with Eielson AFB's F-16s and during Red Flag-Alaska multinational exercises. The Gray Eagle Unmanned Aerial Vehicles and AH-64 Apache attack helicopters will also benefit from the more robust and transformational Air Force presence and focus.

On September 17, one day short of the Air Force's 68th birthday, Secretary James released a document that presents the future vison for the service. *The Air Force Future Operating Concept: A View of the Air Force in 2035*, outlines the future of Air Force operations. It notes that success will depend on close relationships with "members of the Joint Team" and assumes the outline will be fleshed out through "examination, experimentation, and capability development … and [the integration of] new technologies." The document emphasizes it "is about change" and building capability. There is no better location to build on the Joint Team, examine, experiment, develop capabilities, and integrate the

new technologies to underwrite the new vision than Interior Alaska. There is no more capable team than the Active and Reserve Component forces assigned to Eielson AFB and Fort Wainwright. Let me quickly explain:

- The F-35 is, by definition and design, a key catalyst for Air Force change and will have the opportunity to explore its full capabilities in Interior Alaska's vast airspace and training areas. The Air Force has stated this cannot be done in the Lower 48 states.
- Army – Air Force integration (the Joint Team) is stated as key to realizing the future vision and can be thoroughly tested and validated in Alaska.
- Multinational operational coordination is stated as an essential enabler for the future and Red Flag-Alaska offers unparalleled opportunities to hone that coordination and perfect the ability to fight together.

There are many other examples of why Eielson AFB and Interior Alaska is the perfect home for PACAF's Joint Strike Fighters – 67,000 square miles of airspace in the Joint Pacific Alaska Range Complex, 40,000 square miles of sea surface, subsurface and overlying airspace off our coast, and complementary forces at JBER are to name a few.

The needs of the Air Force, the United States, and nations around the world have led the evaluation team to correctly conclude that Eielson AFB is the only place PACAF's F-35As will best support the Global Vigilance – Global Reach – Global Power that define the Core Missions of the Air Force.

On behalf of the City of Fairbanks, its residents, and our neighbors throughout the region, I pledge my commitment to ensure that personnel and families assigned to Fort Wainwright and Eielson AFB will enjoy the superior support for which Alaska's Golden Heart has been known for over seven decades. Thank you for considering our comments.

Yours sincerely,

Mayor John Eberhart

Mailed Comments (Emails and Letters)

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Name: Morris

Comment: Eielson AFB is a strategic base for the nation. It is important to maintain any and all aircraft in Alaska for the protection of Alaska and our nation.Any military movement impacts my business and the local economy of Alaska.

Name: Raymond

Comment: I think bringing the F-35s to Eielson Air Force base would be intelligent from a strategic perspective and a great help for the community. The Interior is a very supportive environment for the military, offers unparalleled access to training on air / land, and provides a high quality of life for families. As we are located in close proximity to Russia and SW Asia, we are one of the first lines of defense against foreign aggression. Also, the Arctic has emerged as an area where many foreign governments are attempting to establish a presence or rights to natural resources. Having a world-class unit with the latest technology with a short flight to the crucial areas would be a major deterrent to military posturing by Russia, China, et al. I believe the aircraft would also be positioned where they could be easily relocated to hotspots in the Pacific theatre. Being co-located with the KC-135s would also given an extended range for operations. They would also serve as an additional layer of defense for the assets at Fort Greeley. I support the arrival of F-35 aircraft and personnel at Eielson Air Force base and I hope the Air Force cements the decision soon. It will be good for the Air Force, national security, and the citizens of the Interior.

Name: Bennett

Comment: The placement of fighters at Eielson will provide economic strength for Eielson, North Pole and Fairbanks.That being said, restrictions on General Aviation's movements through the MOA's, I would not support. A reasonable Floor and Ceiling that a GA aircraft can achieve and operate in, VFR and IFR, during "HOT" times would be the best option.Prudent use of "Range Control" is a must. AA-8

Name: Chumbley

Comment: Since World War II Fairbanks has been a military town and the symbiotic relationship between the bases and the community has been very good. As a realtor I know that the Fairbanks area processes more VA loans per capita than any other region in the U.S. This is because so many of the military personnel choose to stay after their terms are completed because they love it here. We need to continue this relationship, and the addition of the F-35s will help insure that this is the case.

Name: Koester

Comment: With RUSSIA having 41 ICE breakers. The USA has 2. WE need as much USAF support as possible in case any other country decides they would like to obtain ALASKA. IT is stupid to take out the AIR FORCE OUT OF ALASKA !! We need the Air Support, with only one road leaving Alaska what happens to Alaska ? We need as much military as we can get to be in Alaska to protect the people, our oil and gas. We need to have troops at FT WW and Air Support at Eielson. This can happen. Sept 11 did happen. Wake up and support the USAF EIELSON and FT WW. Bring as much USAF and ARMY to Alaska as POSSIBLE !!Wife of RETIRED 21 year USAF ALASKAN !!

Name: Koester

Comment: With RUSSIA having 41 ICE breakers. The USA has 2. WE need as much USAF support as possible in case any other country decides they would like to obtain ALASKA. IT is stupid to take out the AIR FORCE OUT OF ALASKA !! We need the Air Support, with only one road leaving Alaska what happens to Alaska ? We need as much military as we can get to be in Alaska to protect the people, our oil and gas. We need to have troops at FT WW and Air Support at Eielson. This can happen. Sept 11 did happen. Wake up and support the USAF EIELSON and FT WW. Bring as much USAF and ARMY to Alaska as POSSIBLE !!Wife of RETIRED 21 year USAF ALASKAN !!

Name: Dodson

Comment: F-35 DEIS Comments 9/23/2015My name is Jim Dodson (D O D S O N) I am President of FEDC. I appreciate DEIS Team coming to the Interior to listen our opinions and concerns. I have reviewed the DEIS and would like to place on the record that I and the Board of Direct of FEDC support the Action Alternative which would base two squadrons of F-35 at Eielson Air Force Base. Our particular expertise at FEDC is the Fairbanks economy. With that knowledge and from our research we assure you that this community can absorb the economic impacts of this action.We do have a specific point of concern which is the impacts of constructing an additional 35 F-35 support facilities between 2016 and 2019 on EAFB. These projects have projected total economic impact of $454 million construction dollars as reported in the DEIS. These contracts can be easily and expertly be handled by our Interior Alaska arctic contractors and our highly train work force. However, one short coming in the DEIS is not assessing the local impacts of Hubzone contracting. The Corp of Engineers, who typically manage military construction projects has recently been awarding Interior military contacts to Hubzone Contractors or contractors from disadvantaged areas. While this practice may work well in State and communities which are in close proximity to each other, Alaska expands 650,000 square mile and only has a population of 750,000 and few of our communities are in close proximity.If you are a contractor or a worker in the FNSB you cannot simply drive to another town to get work. The closes town of any size to Fairbanks is more than 300 miles away and our contractors and workers must leave this community, must leave their home to get work if they do not get local construction jobs. We believe Hubzone contracting, though laudable in principal, will be in practice be devastating to our economy, to our contractors and to our workforce. We request a review of this practice and its impacts on our community in the final EIS. It has been proven in the past that Alaska construction projects that utilizes arctic trained contractors and an arctic trained workforce will not only benefit the local economy but will also benefit the project owner by insuring Arctic quality construction for each dollar spent.

SO-3

Name: Stewart

Comment: F-35 DEIS Comments 9/23/2015My name is Nicole Stewart. I have lived in the Fairbanks area for almost 15 years. I have reviewed the DEIS and would like to state for the record that I support the addition of two squadrons of F-35s at Eielson Air Force Base. Interior Alaska has long welcomed military members into our community. Alaska has the largest population of veterans per capita in the nation. This is evidence of the quality of life military personnel have enjoyed during their assignments. Out of all the places they were based, they decided to build their lives in Alaska after their service. It's a statistic we should be proud of.It would appear that the environmental impacts of the additional aircraft at Eielson would be minimal. However, the strategic importance of basing the new F-35s in America's largest air training space would be significant. This new class of weaponry will need a world-class training area, and we have it to offer.As reported in the DEIS, The impact of constructing the additional F-35 support facilities between 2016 and 2019 on EAFB would have a projected total economic impact of $454 million construction dollars. These contracts can be easily and expertly handled by our Interior Alaska arctic contractors and highly-trained work force. We can also easily absorb these new military families into both our housing market and school systems.I appreciate the opportunity to add my remarks to the final EIS, and look forward to welcoming this new group of military personnel and their families to our community.Respectfully submitted,Nicole Stewart

Name: Osborn

Comment: I am opposed to bedding down the F35 at Eielson, for the following reasons:It's a scandalous waste of dwindling federal dollars that really should go to helping people and rebuilding our crumbling infrastructure.I believe the F35 to be a boondoggle that the pentagon does not support, is overpriced, is fraught with problems, is primarily a cash cow for the maker.The concept of ever actually using a supersonic fighter is very hard to fathom - we will be engaged on the ground or through drones or icbms before a dogfight is used.The skies thundering with noise really only tells me we are following an unsustainable course. Our world needs intelligent leadership, not more and more deadly force to impose our will on the world.The Eielson childrens' hearing loss is a problem impacting their future health.I think we would do better to put the billions of dollars into renewable energy - Eielson could be covered with thousands of solar panels to provide jobs and power for Fairbanks.The F35 is an unnecessary expensive symbol of empire building and should not be praised or implemented.Thank you for listening, Phil Osoborn

Name: Hallgren

Comment: Gentlemen, As we come upon the deadline for comments from affected local Governments in Alaska on the U.S. Air Force F-35 Operational Basing-Pacific, we would once again let you know that the City of Delta Junction, Alaska and its surrounding unincorporated area is by far the largest aggregation of people (population 4,536) located between Eielson AFB and JBER (Elmendorf AFB) near Anchorage and Mat-Su. We adjoin Allen Army Airfield at Fort Greely and Fort Wainwright Donnelly Training Area ("DTA"). The City ("Delta") is thus intimately involved and affected by all training by the Air Force and joint training by the Air Force and the U.S. Army. Delta continues to approve of the national defense provided by the United States military and utilization of our area as "fail safe" military training grounds. We applaud the potential F-35 aircraft at Eielson AFB brings and wish to work with the military to enhance and expedite their experience in the Alaska Interior. We have one area of concern. We do not consider this concern an objection, but as an opportunity to work together and avoid long term problems. Sonic booms, even under the current Air Force policies and regulations ("Red Flag" and other training events) continue to be an unsettling annoyance and element of some property damage to the Delta area. We again suggest that the Air Force investigate relocating some potentially supersonic training further away (to the west) from downtown Delta Junction in instances where it would not hinder training. By making a larger loop around our populated area, you could avoid much of the effect of booms on the community. We hope that you have investigated the effects of increased low level sonic booms and low level general noise potential from such low altitude training, especially east of the Delta River and that there is now a plan for amelioration. Being an agricultural community, these noises have an effect on farm animals, as well as the humans and pets in the area. We also hope that you studied the effect of MOA-29 between the Army and Delta on joint training at DTA east of the Delta River. Again, we wish to reiterate that this concern is not an objection to the highly desired siting of the F-35, but are our way of trying to avoid potential problems. We stand ready to work with you and continue to provide any information and aid that we can. We welcome the F-35s to the "Friendly Frontier" here in Delta Junction.

AA-9

AE-6

SA-9

FOUO-PRIVACY SENSITIVE: Any misuse or unauthorized disclosure may result in both civil and criminal penalties.

Name: Herbert

Comment: Dear Sir,The Greater Fairbanks Chamber of Commerce would like to take this opportunity to comment on the referenced Draft Environmental Impact Statement. The Greater Fairbanks Chamber of Commerce supports the US Air Force and its missions in Alaska. As such, we endorse the proposed action to base two F-35A squadrons at Eielson Air Force Base. We welcome the increased force structure at this strategic location and recognize the value this basing action brings to the defense of our Nation, with no unmanageable negative impacts on our community.The airspace and surface ranges in Alaska offer our military unparalleled opportunities for realistic, full-spectrum, joint and combined training operations. The joint military training ranges and facilities, located within the Joint Pacific Alaska Range Complex (JPARC) far surpass in quality and quantity those found in other U.S. locations. The massive size of the ranges allows for the use of live ammunition from all Army, Air Force, and Navy platforms and weapons systems; allows the Air Force to fly at combat speeds well over Mach 1; allows for joint exercises between the Army, Air Force, Marines, Navy, Coast Guard and our Allies in weather conditions ranging from sub-zero arctic temperatures to hot humid summer days; and results in the finest training opportunities for soldiers, sailors, and airmen within the United States. From a strategic standpoint, it is difficult to conceive of a more appropriate location than Alaska. The recent shift of our National Security Strategy focus to the Pacific region, changing climatic conditions that are opening trafficability in the Arctic, and renewed interest and activity by Russia, China, and other international competitors dictate the need for American presence in the Arctic. Eielson Air Force Base offers this presence, in a community with a long history of support to our military. Thank you for the opportunity to offer comment on the Draft EIS for the proposed basing action. The Greater Fairbanks Chamber of Commerce looks forward to continuing a productive relationship with Alaska Command, Pacific Command, and the U.S. Air Force. Sincerely,GREATER FAIRBANKS CHAMBER OF COMMERCELisa Herbert Jennifer Imus Tim JonesExecutive Director Board of Directors, Military Affairs, Chair Chair

FOUO-PRIVACY SENSITIVE: Any misuse or unauthorized disclosure may result in both civil and criminal penalties.

Name: Walker

Comment: To Whom it May Concern,On behalf of State of Alaska, we welcome the commencement of the Air Force's (USAF) environmental review process, leading to the successful stationing of two F-35A Lightning squadrons at Eielson AFB. Since its founding as "26 Mile Strip" in 1943, Alaskans have strongly supported the growth and transformation of the base from the remote operation of weather reconnaissance aircraft to the front line for fleets of bombers, aerial tankers, and fighters and the gateway to the premier training airspace in the world. I am confident you will recognize our unwavering commitment to the success of USAF missions stationed at Eielson will continue as we prepare for the next generation of aircraft stationed at the base. A combination of unshakable community support and unparalleled training opportunities has enabled USAF units stationed at Eielson Air Force Base to excel. I am proud of the men and women, the "Icemen" at Eielson who continue to rise to every mission. In addition, we in Alaska strongly support the Joint Pacific-Alaska Range Complex (JPARC), which offers every Eielson-stationed squadron training opportunities unlike any in the world. With over 62,000 square miles of airspace alone, the JPARC is five times larger in area than the Nevada Test and Training Range at Nellis Air Force Base in Nevada. In addition, there are multiple locations where both inert and live air-to-ground munitions drops are authorized, and several portions of the range provide opportunities for wide varieties of weapons training, and our ranges include instrumentation to provide time, space, and position information of practice air battles for precise after-action review. This unencroached remote airspace offers the only venue in the US appropriate for large exercises of fifth generation fighters such as the F-35.Colonel Billy Mitchell's vision of Alaska as the most important strategic place in the world holds true today. Eielson-based aircraft can respond to hot spots in Asia, the Middle East, or Europe from shorter distances than can units at bases on the West or East Coasts of the continental United States. As the United States implements the pivot towards Asia and the Pacific called for by President Obama, Eielson's key location is exemplified by the Great Circle routes from the continental United States, meaning aircraft from the Lower 48 need to spend hours just to reach Alaska before proceeding on to Asia. Alaska's geopolitical and strategic military significance is undeniable. Alaska is the logical place to deploy F-35A Lightnings.I am firmly committed to work with USAF to station F-35s at Eielson and remain confident you will find Alaskans eager to welcome this important and exciting new mission. We will proudly assimilate a new generation of Airmen into our military-friendly local communities, where the people and the quality of life make Alaska a uniquely desirable place to live.Sincerely,Bill WalkerGovernor

FOUO-PRIVACY SENSITIVE: Any misuse or unauthorized disclosure may result in both civil and criminal penalties.

MC-013

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS,
TRIBAL AND PUBLIC
AFFAIRS

September 17, 2015

Toni Ristau
354th Fighter Wing, Public Affairs Office (354 FW/PA)
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Ms. Ristau:

Thank you for the opportunity to review the United States Air Force F-35A Operational Beddown – Pacific Draft Environmental Impact Statement (EPA Project No. 15-0022-DOD). We have reviewed this Draft EIS in accordance with our responsibilities under Section 309 of the Clean Air Act, the National Environmental Policy Act, and the Council on Environmental Quality regulations for implementing NEPA.

Overall we find the Draft EIS to be well-written and clearly organized. We appreciate the numerous colored maps, summary tables and index. We also commend the Air Force for conducting such extensive stakeholder outreach and consultation efforts. Including the actual scoping comments received by the Air Force, instead of a scoping summary report was also helpful.

However, based on our review, we have identified concerns regarding the potential impacts on waters of the U.S., contaminated sites and noise receptors, as well as the limited range of alternatives. Therefore, we have assigned a rating of EC-2 (Environmental Concerns – Insufficient Information) to the Draft EIS. For your reference, a copy of the rating system used in conducting our review is enclosed.

Wetlands Impacts

In our April 16, 2015 scoping letter we recommended that the Draft EIS include information that demonstrates compliance with the Clean Water Act 404(b)(1) guidelines. This information is not contained in the Draft EIS. We recommend that the Final EIS include information regarding the types and functions of wetlands to be impacted by the proposed action. We believe this information is useful, not only for compliance with the 404(b)(1) guidelines but also for full evaluation and disclosure of impacts under NEPA. For facilities that are currently proposed for placement in floodplains and wetlands, we would like to see more information about alternatives considered for more upland placement (e.g., a more northwest placement of the new storage hangar along the South Loop). This information could be included in Appendix D: Detailed Resource Information, in a separate appendix or in the body of the Final EIS document.

NR-1

WR-1

Comprehensive Environmental Response, Compensation and Liability Act Sites

As stated in our April 16, 2015 scoping letter, we believe the proposed action has the potential to impact known CERCLA Operable Units as well as sites that may not be identified to date. We continue to recommend precaution in the development of any areas for new construction. We are pleased that the Draft EIS notes that close coordination with the Alaska Department of Environmental Conservation and

the Environmental Protection Agency will occur. Specifically we encourage close coordination with the Remedial Project Engineer for Eielson AFB (Carolyn Tallant, Air Force Civil Engineering Center, carolyn.tallant@us.af.mil or (907) 377-1666) to ensure that all required steps are taken to comply with the institutional and land use controls prior to any ground disturbance as well as the EPA Region 10 Remedial Project Manager, Jackie Kramer (kramer.jackie@epa.gov or (907) 271-3541), on any proposed construction or operational activities that have the potential to impact sites identified in the various CERCLA Records of Decision.

Additionally, we recommend that language on page 3-93 under *Environmental Restoration Program* be revised to more accurately reflect that the State of Alaska does not regulate any contaminated sites under the Resource Conservation and Recovery Act, which sites containing CERCLA contaminants are ERP-sites, and the State-led petroleum sites are Compliance Restoration Program sites. We suggest the following language: "The U. S. EPA and State of Alaska jointly regulate the sites with CERCLA contaminants. Petroleum-contaminated sites are designated as Compliance Restoration Sites and are addressed under State of Alaska regulations." HZ-1

Also, we believe statements pertaining to remedies that are in place are not accurate. Following the 2013 Five Year Review, most of the remedies were found to be not protective, and Eielson is re-opening the Remedial Investigations for many of these sites. We recommend that wording be changed to reflect the actual effectiveness of existing remedies. HZ-2

Noise Impacts

Additionally, we are concerned with the increase in occurrence and change in type of noise impacts, particularly to sensitive populations in the Eielson-Moose Creek area. The Draft EIS states there is potential for significant impacts both on-base and off-base, and that noise exposure mitigation measures will be identified through agency and public review and input.

We recommend that the Air Force develop a working group comprised of interested and potentially affected stakeholders to specifically address this issue. This working group should be informed of common mitigation measures successfully employed elsewhere for these types of operations and then be offered the opportunity to provide recommendations for inclusion in the Final EIS. They should also be provided with a summary of Appendix E: Noise Modeling, Methodology and Effects. Because noise impacts have the potential to be significant, we believe clear and measurable mitigation measures need to be included in the Final EIS. We also recommend that such impacts be considered fully in the Environmental Justice and Health Impacts analyses in the Final EIS. AE-7 EJ-2

Range of Alternatives

In our April 16, 2015 scoping letter we requested that the Draft EIS evaluate a reasonable range of alternatives, including alternatives that may minimize environmental degradation. The Draft EIS evaluates one action alternative, the Air Force's Proposed Action (stationing of up to 54 F-35A aircraft at Eielson Air Force Base) and the No Action alternative. Additional action alternatives were eliminated based on an "Enterprise-Wide Study"; however, the Draft EIS does not provide detailed explanation as to why other action alternatives were not considered or why some were eliminated. For example, it does not explain whether basing one squadron at a particular location and another at a different location was or was not reasonable.

Because the proposed action will result in substantial changes at Eielson AFB, including an increase of nearly 50% of the installation's current population of service members, family members and contractors, it would seem that additional, reasonable alternatives would exist. If other alternatives were evaluated early in the process, and determined to be not reasonable, it may be that the standards used to rule out such alternatives were restrictive and limiting to the point that they precluded the ability to seriously consider a full range of reasonable alternatives. We recommend that the Final EIS either provide more detailed information concerning other action alternatives or fully evaluate additional, reasonable action alternatives. PA-5

Thank you for the opportunity to review and comment on this Draft EIS. If you have questions about our comments, please contact me at (206) 553-1601 or reichgott.christine@epa.gov, or contact Jennifer Curtis of my staff at (907) 271-6324 or curtis.jennifer@epa.gov.

Sincerely,

Christine B. Reichgott

Christine B. Reichgott, Manager
Environmental Review and Sediment Management Unit

Enclosure:
1. US EPA Rating System For Draft Environmental Impact Statements

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections

The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns

EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections

EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory

EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate

EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

Fairbanks North Star Borough Mayor's Office
809 Pioneer Road PO Box 71267 Fairbanks, Alaska 99707-1267 (907)459-1300 FAX (907)459-1102

October 16, 2015

To: F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

From: Fairbanks North Star Borough, Alaska
Mayor Luke Hopkins
Post Office Box 71267
Fairbanks, AK 99707

Subject: Comments on the United States Air Force F-35A Operational Beddown – Pacific Draft Environmental Impact Statement, August 2015

Dear Sir:

Thank you and the PACAF F-35 Beddown Team for your time and attention to the comments that may be submitted on the DEIS and Proposed Action Alternative by our constituents and others. Eielson AFB has been an integral part of the Fairbanks North Star Borough (FNSB) since it was established as a aircraft weather alternate, the Mile 26 Airfield, for Fort Wainwright in 1944. Its strategic location, key missions supporting U.S. and Allied forces around the world and operational imperatives strengthen the Nation's security. Our local jurisdictions realize the significance of Eielson AFB and its missions and have worked diligently with installation leaders for over 70 years to integrate the installation, its airmen, family members and civilian employees into our communities. We are extremely proud to have Eielson AFB and military missions as part of the Borough and its communities.

We strongly support the Proposed Action Alternative to Beddown two squadrons of F-35A aircraft at Eielson AFB as an addition to all existing mission activities. We believe there is no reasonable alternative.

We want to draw attention to two comment areas. The first is to make it unequivocally clear our communities will work diligently with the Air Force to develop and implement the necessary mitigations to address the slight noise impacts in base residential areas and classrooms and construction

impacts in small wetlands and floodplain areas. The second area is to request more detail and analysis, if needed – concerning the potential cumulative impacts of significant, overlapping construction programs in the region. The other mayors and members or our community will offer additional comments you may find helpful as you finalize the EIS.

Section 5.2.1 of the DEIS discusses cumulative environmental impacts resulting from federal and nonfederal agency actions with the potential to impact the assignment of two (2) squadrons of F35As to Eielson AFB. The document notes the potential *"Infrastructure and Operational Support for the 25th Aviation Regiment Company D Unmanned Aircraft System and Stationing (or Gray Eagle)* and *Army 2020 Force Structure Realignment at Fort Wainwright"* as the only two (2) other military actions which could impact the F-35 Beddown analysis. The DEIS notes the impacts of locating the Gray Eagle system are being analyzed in a separate NEPA document and identifies a loss of 73 soldiers from the Army's latest announcement; however, it fails to note the gain of approximately 552 in a 2014 Army stationing announcement. While the growth is not that large, it is known and will contribute to the availability for military members, their families, civilian employees and contractors who will live in the FNSB. CU-1

You will receive comments about long-term housing considerations from Mayor Ward of North Pole, Alaska. Confident the long-term housing requirements of assigned personnel and their families will be satisfied; we are concerned about the short- to mid-term adequacy given the potential for a shortage of temporary construction workforce housing as a cumulative impact consideration in the DEIS. Similar comments were submitted as part of the Army's Gray Eagle Stationing Draft Environmental Assessment. SO-2

While the arrival of soldiers and family members of Gray Eagle Company at Fort Wainwright will probably occur well prior to significant F-35A impacts, we believe there may be impacts in the local communities that may occur due to overlapping construction projects. There are significant projects in addition to those supporting F-35A activities, military members and families, and civilian and contractor personnel that will occur in the region. These include projects to locate the Gray Eagle at Fort Wainwright, announced and ongoing construction projects worth approximately $1 billion to support Missile Defense Agency (MDA) projects at Fort Greely and a new, $950 million Long Range Discrimination Radar (LRDR) at Clear Air Force Station. The cumulative demands to support the foregoing construction programs **may** make it difficult to house temporary construction CU-2

personnel in the local communities. Given Interior Alaska's climate and its adverse impacts on travel much of the year may make housing outside the region unsuitable.

While community analysis on the long-term impacts on permanent housing needs indicate no significant impact, short- to mid-term housing shortages may make supporting temporary construction workers very challenging. Until the addition of temporary construction workers in the Borough is analyzed against a realistic timeline, flow of projects and personnel (both permanent and temporary) and compared with suitable housing availability, the impacts cannot be known. Absent this analysis, our communities cannot understand if there will be a significant impact on housing in the Fairbanks area attributable to the construction of projects directly supporting national security needs. It is essential the clear impacts on the Fairbanks area be analyzed, and if necessary, the most substantial impacts be mitigated through coordination with the Borough jurisdictions. SO-5

We have already begun discussions with DoD's Office of Economic Adjustment (OEA) to apply for a planning grant that would be used to produce a community growth plan to forecast and plan for community needs to mitigate impacts in a number of areas that planned, and ongoing military growth will cause in the Borough in coming years. However, a clear characterization of need is necessary to move this process forward. Housing for construction workers is one area that is expected to be analyzed in the community planning process. If it is determined that there is a problem with construction worker housing, a mitigation plan will be developed and implemented. The mitigation could include actions that would support F-35A Beddown construction requirements.

Another concern that should be included in an impact analysis is the transportation stream - the availability - of construction materials transported into the community for the short construction periods in Interior Alaska. It is my understanding this issue was an unanticipated impact at Hill AFB when numerous construction projects were underway at the same time. SO-6

Our communities are committed to being as helpful as possible to efficiently bring PACAF's Joint Strike Fighters to Eielson AFB and to continue providing outstanding community support for the airmen, family members, civilians and contractors assigned to the 354 Fighter Wing. Quality of life issues are very important to USAF families that regularly arrive in the subarctic for tours of duty. Our *Community Partnership* program is very valuable in identifying issues that can be resolved through the now established shared services and identifying program leads as methods to improve quality of life issues.

Prior to the *Community Partnership* being established, the FNSB community through the Borough Mayor's Office provided our bases with projects that support mission growth and enhanced community services. These efforts have been structured to begin with issue awareness by weekly broad-based community group and regular monthly military-civilian meetings to discuss issues that pertain to resources that add to military value and military family quality of life in and around our Borough. The Fairbanks North Star Borough has developed and implemented specific programs through locally authorized funding. Beginning with a JLUS study begun in 2006, the current status is that over 64 identified issues have been resolved through local government interactions with our two bases. The Borough established an express bus route to serve EAFB with regular AM and PM stops on base to serve the on-base work force. A similar bus route serving FWW with multiple stops allows veterans easy access to medical services. These two bus routes connect to the transit center for connections to other town routes including frequent service to the University of Alaska Fairbanks campus. Recent FEMA flood plain maps have been issued and adopted by the Borough. The new flood elevations have impacted military, public and private lands. The Borough has taken issue over the FEMA methodology. Local funding was approved to research more accurate base flood elevations and submit new data through the FEMA community partnership program that could lead to new flood elevations being issued that would remove both a portion of Eielson base property and many local parcels from the critical flood zone in effect lowering flood insurance premiums for many of the residents in that area. Another project received local support for a 14 mile bike path along the national highway, Richardson Highway, that serves EAFB and nearby communities where many military families associated with the F-35 Beddown are expected to reside. This locally approved project has been submitted to the Alaska Department of Transportation for inclusion in a future transportation improvement program (STIP). Recently, the Borough Assembly approved $200,000 in local funding to request proposals (RFI & RFP) to begin a borough-wide recycling program and for a capital project to develop a 10% design for a central recycling facility. Other local support actions have been to raise the importance of the SAMIS communication systems within the JPARC. This effort involves constructive dialogue between private pilot organization, military and congressional offices to ensure that the impacts of training activities primarily based out of Eielson are managed and mitigated through local community support. Another highly successful program involving Fairbanks being a" hockey town" is the local support our community has put into that part of military quality of life - and this is no small measure - for an annual Army / Air Force hockey game by providing major financial support to allow free attendance for military families who fill the arena. Again all this has been initiated and undertaken

as the measure of community support for the military value and quality of life that is available to support the increases associated with the Beddown of PACAF's F-35's and the increases in personnel at EAFB in our community.

Included in this DEIS are comments related to the increased noise levels, particularly related to the base schools. These facilities are owned and operated locally by the Borough. The FNSB has initiated a review of what facility improvements have been made to those schools and how those improvements might relate to actual noise reductions and what else could be done to the facilities to mitigate the possible noise impacts during daily instructional times.

We have included an Appendix of Attachments with supporting documents. We are proud to do our part to ensure the 354th Fighter Wing's *Icemen* remain "Ready to Go at 50 Below!"

Thank you for considering our comments.

Luke Hopkins, Mayor

Fairbanks North Star Borough

907.459.1304 office

William S. Brophy
301 Snowy Owl Lane
Fairbanks, AK 99712

Commanding Officer
F35A Pacific Basing EIS
354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Mr. J. Dale Clark, 22 September 2015

I submit the following comments in reference to the USAF F-35A Operational Beddown – Pacific, Draft Environmental Impact Statement, August 2015. I favorably support Eielson AFB for stationing of two F35 squadrons.

Our country is experiencing very challenging times. I am greatly concerned for the readiness of our military forces in this very fragile and uncertain world we live in today. If we are to maintain our position as a super-power, the United States must have an overwhelming, strong military. As American citizens we owe our men and women in uniform the ability to train in difficult conditions in order to fight, win, and come home safely when our nation calls on them.

1. Pacific Orientation - Our national leadership has refocused and transitioned its defense enterprise and military strategy to the Pacific Rim. What is in the best interest for PACAF Strategy? Alaska serves as the "top cover" for the USA. Early warning at Clear AFS, missile defense at Ft Greely, along with maritime and ground forces serve to deter hostile aggression from the north. Stationing of the next generation fighter at Eielson AFB is in keeping with the keystone mission of our National Military Strategy.
2. Strategic location – Military forces stationed in Alaska are firmly established on US soil and are capable of ready reaction on short notice to the majority of "hot spots" on the globe. History is replete with examples that serve as testimony. Alaska is a strong foothold that was well proven during World War II. Military forces stationed in Interior Alaska can quickly deploy to Europe, Middle East, and Asian locations. Alaska is the preeminent location to influence future Arctic issues. Numerous deployments of our Alaska based war-fighters into combat during the past decade have proven the strength and steel of service-members trained in Alaska.
3. Abundance of training area - Interior Alaska offers the greatest training area on land and in the air to prepare our forces for combat operations. If a military formation can fight and win in arctic/subarctic conditions, they can win anywhere on the globe. JPARC is the largest training area in the world for joint and combined operations with a well established headquarters

located at Eielson AFB. Our allied friends depend on training at Eielson AFB to maintain their military strength.

4. Existing military infrastructure – Eielson AFB is well established with a robust infrastructure. The base is located on the road system, connected to the rail-belt, adjacent to the pipeline, enjoys a wonderful school system, and is self sufficient with a power plant providing low cost electricity and heat to the entire installation - some of the lowest cost energy in Alaska. The training areas for air and ground maneuver forces are unmatched. Eielson AFB is well established with a world-class runway, hangars, maintenance facilities, and housing. The sophisticated systems of the Red Flag operations are unmatched and currently have in place the equipment and a talented workforce to maintain the equipment. Nowhere on the globe is there another military training installation that can accommodate long range weapon systems and freedom of movement for air and ground maneuver units. Current training areas support the full spectrum of USAF training requirements while maintaining a sincere respect for the environment and our natural resources. Base operations are well suited for additional forces. New modern facilities include: BX/Commissary, child care, chapel/religious services, on-base housing, MWR services and educational institutions.
5. All Weather location - Despite the tough environmental conditions, rarely, if ever, is weather or terrain a restricting factor for the full suite of military and non-military operations in Interior Alaska. Eielson AFB runway serves as an alternate airfield for many transient aircraft of all sizes and configurations, both military and civilian aviation.
6. Civil-Military Relationship - Nowhere else is there a patriotic bond between the local community and our military. Interior Alaska flourishing with Army, USAF, active, guard, reserves, veterans, retirees, and proud patriotic Americans. The synergy is profound and perhaps difficult to quantify but easily understood - an affair of the heart; the sound of freedom; aim high. Visit Interior Alaska and feel the vigor and vitality.
7. Encroachment - Military land, impact areas, firing ranges, and airspace are virtually unimpeded by encroachment.
8. One Force - The Alaska Air National Guard 168 ARW is well equipped, well manned, and well trained to provide aerial refueling vital for global reach. The Alaska National Guard and active duty military have a long-standing professional relationship.
9. Leadership/Command Opportunities - Eielson AFB, 354 FW has a tremendous legacy of producing leaders within the Air Force that go on to become the senior leadership in our military.
10. Room to expand - This is a critical time in our military to take advantage of opportunities to position additional forces at Eielson AFB in order to achieve a cost saving for the entire USAF. Stationing the F35 systems and forces at Eielson AFB will achieve an attractive economy of scale. Even a quick review will result in savings based on existing joint facilities such as: Bassett Army Community Hospital, PX/BX, child care, chapel/religious

services, on-post/on-base housing utilization, MWR services and educational institutions.

11. F35 Simulator – The expenditure of $35 million to install an F35 flight simulator at Eielson is another strong commitment of precious military funds that points to a conclusion for stationing the war fighting system at Eielson AFB.

I appreciate the opportunity to contribute comments to the EIS process and fully support stationing two F35 fighter squadrons at Eielson AFB.

Please include my name, email address, and mailing address as below to be able to receive future information on the F35 Stationing Plan.

Fly, fight and win. Our sons and daughters are depending on you. Make them strong. We are counting on you.

With best regards,

Bill

Bill Brophy
301 Snowy Owl Lane
Fairbanks, AK 99712
(907) 457-1178
bill@usibelli.com

STATE CAPITOL
P.O. Box 110001
Juneau, AK 99811-0001
907-465-3500
fax: 907-465-3532

550 West Seventh Avenue, Suite 1700
Anchorage, AK 99501
907-269-7450
fax 907-269-7461
www.Gov.Alaska.Gov
Governor@Alaska.Gov

Governor Bill Walker
STATE OF ALASKA

September 23, 2105

F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

Dear Sirs and Madams:

It is with great pleasure that I submit these comments regarding the Draft Environmental Impact Statement concerning the basing of PACAF's F-35s at Eielson Air Force Base. Alaska, and the Interior of Alaska particularly, has a long history of welcoming the military to our communities. It is within that historical context, combined with a keen look to the future that I strongly endorse the basing of these aircraft at Eielson Air Force Base.

I am confident that no insurmountable challenges stand in the way of completing the basing task. That said, it is important to complete a comprehensive review of environmental impacts.

While it is understood that trade and other Interior Region workforce requirements will be strained, given Alaska's ability to draw from a larger State-wide workforce pool, combined with the ability to train and educate Alaskans to meet workforce needs, I am again confident that an efficient and eager workforce will be available. Alaska looks forward to working with the Air Force to ensure that all workforce needs are met.

Communities throughout the Interior will plan and implement changes needed to deal with the impacts associated with the F-35 basing. The State looks forward to working with the Air Force and local communities to ensure that Community needs are met.

The State and the Fairbanks North Star Borough have long supported the JPARC training area and required facilities. These facilities will be instrumental to assuring the readiness of the F-35 as a state of the art weapons platform. The State will continue its efforts to ensure that JPARC is viewed as the premier training ground for land and air training in the United States.

I am gratified that Alaska is being recognized for its strategic value given the military's Asia-Pacific Shift. It must also be said that the security of Alaska, and the nation, must be reconsidered given a resurgent Russia. Alaska's geographic value cannot be over-stated, nor can the value of Alaska's natural resources be understated. For these reasons, and the inherent associated security threat, I am pleased to stridently support the basing of F-35s at Eielson Air Force Base.

Sincerely,

Bill Walker

Bill Walker
Governor

Public Hearing
Pacific Air Forces (PACAF) F-35A Beddown
Environmental Impact Statement (EIS)

Comment Sheet

MC-017

Location: West Valley HS, Fairbanks
Date: 9/23/2015

Thank you for providing your comments on the PACAF F-35A Beddown Draft EIS. Please note, comments will be published in the Final EIS. The name, city, and state locations of persons making comments will appear in the Final EIS. Specific street address information of commenters and meeting attendees will not be printed in the Final EIS, but will be used to create a mailing list for the document.

COMMENTS:

One of your noise abatement ideas presented at the public hearing was to limit flying/noise in the Salcha River during the period September 1 thru 20. This I'm sure is meant to not disrupt hunting season which occurs during this period. However, moose season begins 9/1 and ends 9/25, in this area. So, I would suggest extending this period to 9/25, instead of 9/20. AE-8

Thank you! And God bless the USAF!

Over for more space → I personally enjoy the airshow that occurs while these aircraft are training here. The lower and louder, the better!!

Please Print

Name: Garry Hutchison
Address: 140 Falcon Drive
Fairbanks, AK 99712

Do you wish to be sent a CD of the F-35 Operational Basing Final EIS?

Yes____ **No** ✓

Please place this form in the box indicated at the hearing, give it to one of the Air Force Representatives, or mail by October 20, 2015 to:
F-35A Pacific Basing EIS, 354 FW/PA
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702
If additional space is required, attach additional pages as needed.

Nadine Winters
Owner

PO Box 83272
1670 Howling Dog Trail
Fairbanks, AK 99708

Phone: 907 457-6258
Fax: 907 451-6540
Mobile: 907 590-0024

email@nadine@acsalaska.net

MC-018

Winters & Associates

October 19, 2015

F-35A Pacific Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson Air Force Base, AK 99702

Thank you for the opportunity to comment on the United States Air Force F-35A Operational Beddown – Pacific Draft Environmental Impact Statement – August 2015. I strongly support basing the F35s at Eielson AFB. The communities surrounding Eielson Air Force Base are well equipped to accommodate an influx of Air Force personnel, their families and civilian contractors.

In anticipation of a decision to base the F-35As at Eielson, the Fairbanks Economic Development Corporation conducted an assessment of housing needs in the Fairbanks North Star Borough. The DEIS indicates a number of families (an estimated 314) will need housing off post. The Housing Market Area (HMA) encompasses North Pole, Moose Creek and a small portion of Salcha. A preliminary analysis found that there are adequate vacancies within the Fairbanks North Star Borough as a whole, but there may be a shortage of acceptable housing in the narrower geographic area of the HMA. The vacancy rates in the community are expected to be adequate for the influx of people/families expected as the result of military construction and the direct, indirect and induced jobs resulting from ongoing maintenance and operations of the F-35A operational beddown. **SO-2**

I have attached a copy of the *Fairbanks North Star Borough Housing Needs Assessment, September 2015* for your information. Thank you again for the opportunity to comment.

Sincerely,

Nadine Winters
Winters & Associates

October 19, 2015

F-35A Pacific Operational Basing EIS
354 Fighter Wing Public Affairs Office
354 Broadway Avenue, Suite 15A
Eielson AFB, AK 99702

RE: Draft EIS for F-35A Beddown at Eielson Air Force Base

Dear U.S. Air Force,

Thank you for the opportunity to comment on the U.S. Air Force F-35A Operational Beddown – Pacific Draft Environmental Impact Statement (EIS). The National Parks Conservation Association (NPCA) is a nonpartisan advocacy organization dedicated to protecting and enhancing America's national parks for our children and grandchildren. Founded in 1919, NPCA has more than one million members and supporters of which over 2,000 reside in Alaska.

We provide these comments in regards to potential impacts to Yukon-Charley Rivers National Preserve. Yukon-Charley lies beneath airspace commonly used by military aircraft for training purposes, specifically Military Operations Areas (MOAs) Yukon 1, Yukon2, Yukon 3A and Yukon 4. The addition of 54 aircraft at Eielson AFB is a tremendous increase from the 32 aircraft currently housed there. We are concerned with the impacts this will have on the natural resources, visitors, hunters and local subsistence users of Yukon-Charley Rivers National Preserve.

Yukon-Charley Rivers National Preserve is a unit of the National Park Service. It was created by Congress in 1980 to protect wildlife and habitat in an undeveloped, natural condition for public benefit. Activities by locals and visitors include river floats, whitewater paddling, exploring remnants of the gold rush, hunting, fishing, camping, dog mushing, and use of public use cabins. Local rural residents may also practice subsistence hunting and fishing. The ability to hear primarily the sounds of nature, not the man-made world, are an important part of an experience when recreating in one of our nation's most protected areas. Similarly many species of wildlife, such as Dall sheep, are vulnerable to noise especially during critical periods such as lambing. Frequent military overflights, large-scale training exercises, low-level flights and sonic

Alaska Regional Office

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booms can disturb wildlife and recreational users and are not in keeping with the values and purposes of our country's national park system.

Please consider our suggestions below to limit the impact to Yukon-Charley Rivers National Preserve. Ideally, we ask you to avoid flying over the preserve whenever possible. When not possible, we request you consider the following measures.

1. Fly 2,000 feet above ground level (AGL)
   NPCA appreciates the mitigation measures to protect peregrine falcons by flying 2,000 feet AGL over the Upper Yukon and Charley River corridors April 15th – September 15th. However we wonder why this requirement isn't in effect over the entire Preserve, all year long? Flying 2,000 feet AGL over noise sensitive areas (such as recreational areas, parks, wildlife refuges, and wilderness areas) is standard procedure in most areas and is recommended by the FAA (FAA Advisory Circular No: 91-36D). AA-10

2. Fly below supersonic speeds
   NPCA recognizes that military training flights have been occurring in this region for many years. However, we were surprised to read in the EIS that supersonic flights occur regularly and sonic booms are heard throughout the preserve, as frequently as 30 per month (page 4-31). While the proposed action estimates an increase of only one boom per month, we find any sonic booms over a national preserve to be incompatible with the purposes and values of the unit. AE-9

3. Eliminate combat maneuvers over the preserve.
   It was unclear to us whether the following actions take place in the MOAs over the preserve. If so, we request the following combat maneuvers be eliminated: AA-11
   - chaff releases
   - defensive flares
   - strafing (repeatedly firing at a target)
   - air to ground detonation of ordnance or munitions.

4. Emphasize compliance to pilots
   As a member of the Denali Aircraft Overflights Advisory Council, I became aware of problems in the Susitna MOA where it overlaps areas frequently used for flightseeing tours. Local air tour and air taxi pilots report numerous instances of military pilots flying jets unsafely, outside of the designated areas, even at altitudes below them, and occasionally needing to take evasive action. Please emphasize to military pilots the location of sound sensitive areas and the importance of following procedures to minimize impacts. AA-1

5. Advertise reporting procedures
   Please provide NPS staff and local residents with information on how and when to report problems should they occur. AA-12

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The military is an essential and valued part of our country. Similarly, our nation's most treasured natural areas are also highly valued and important to our country. Indeed, in times of war (or any stressful experience) peaceful areas where Americans can go to relax and quiet their souls become increasingly important. Thank you for considering our suggestions to reduce the number of flights and types of activities in MOAs Yukon 1, 2, 3A and 4. We are hopeful the Air Force will be able to find adequate training areas while also protecting the recreational users, hunters, local subsistence users, wildlife and natural soundscape of Yukon-Charley Rivers National Preserve.

Sincerely,

Joan Frankevich

Joan Frankevich
Program Manager

Alaska Regional Office

750 W., 2nd Ave, Suite 205 | Anchorage, AK 99501 | **P** 907.277.6722 | **F** 907-277-6723 | npca.org

City of Delta Junction

P.O. Box 229, Delta Junction, Alaska 99737
Ph 907-895-4656 Fax 907-895-4375
www.ci.delta-junction.ak.us
city@ci.delta-junction.ak.us

Welcome to the Friendly Frontier

October 16, 2015

F-35A Pacific Basing EIS
354 FW/PA
354 Broadway Avenue
Suite 15A
Eielson AFB, Alaska 99702

Gentlemen,

As we come upon the deadline for comments from affected local Governments in Alaska on the U.S. Air Force F-35 Operational Basing-Pacific, we would once again let you know that the City of Delta Junction, Alaska and its surrounding unincorporated area is by far the largest aggregation of people (population 4,536) located between Eielson AFB and JBER (Elmendorf AFB) near Anchorage and Mat-Su. We adjoin Allen Army Airfield at Fort Greely and Fort Wainwright Donnelly Training Area ("DTA"). The City ("Delta") is thus intimately involved and affected by all training by the Air Force and joint training by the Air Force and the U.S. Army.

Delta continues to approve of the national defense provided by the United States military and utilization of our area as "fail safe" military training grounds. We applaud the potential F-35 aircraft at Eielson AFB brings and wish to work with the military to enhance and expedite their experience in the Alaska Interior.

We also continue to have two areas of concern. We do not consider these concerns objections, but as an opportunity to work together and avoid long term problems.

Item 1: Extreme wildfire danger to the community from military operations

The information we have seen indicates that the F-35 in Alaska would have an emphasis on air-to-ground munitions and the use of a 25-millimeter cannon for close air support and anti-armor missions.

We hope that you investigated the past and recent history of military-caused wildfires in the Delta Junction/Deltana area and worked in viable, enhanced responses to ameliorate the possibility of damage and destruction to private and State owned homes, structures, timber, and lives in our area. SA-8

Massive wildfires caused by military training and originating on military training areas leased from the BLM are still a real threat during fire season. In 1999 the massive wind-driven Donnelly Flats Fire advanced on Fort Greely and Delta. Fort Greely was evacuated and lost several structures, including the main entrance guard shack. Before the wind shifted, the City was also on the verge of evacuation as hot cinders fell on homes.

In 2013 the 67,000-acre Mississippi Fire started on a military training area about 20 miles south of town on the west side of the Delta River. It burned past the town to the north onto State of Alaska timber land. That fire was fought by a federal "Type 1" Incident Management Team consisting of over 700 on-site personnel, heavy equipment, air tankers, and other equipment for several weeks.

During 2014 the 100 Mile Creek Fire, another Delta area fire, burned over 23,000 acres and again Delta hosted firefighters, air tankers, and heavy equipment.

The potential for "burning down the community" is not hyperbole and continues to be **our greatest fear. With respect to fires on the east side of the Delta River we have a negotiated** binding agreement (MOA-29, dated May 16, 2006) with U.S Army Alaska (USARAK) restricting Army training and firefighting east of the Delta River in certain fire danger conditions. We hope that you have studied how the MOA-29 might impact joint Air Force training exercises with the Army. SA-9

Item 2: Training Noise, particularly sonic booms and increased low level aircraft noise

Sonic booms, even under the current Air Force policies and regulations ("Red Flag" and other training events) continue to be an unsettling annoyance and element of some property damage to the Delta area. We again suggest that the Air Force investigate relocating some potentially supersonic training further away (to the west) from downtown Delta Junction in instances where it would not hinder training. By making a larger loop around our populated area, you could avoid much of the effect of booms on the community. AA-9

We hope that you have investigated the effects of increased low level sonic booms and low level general noise potential from such low altitude training, especially east of the Delta River and that there is now a plan for amelioration. Being an agricultural community, these noises have an effect on farm animals, as well as the humans and pets in the area. We also hope that you studied the effect of MOA-29 between the Army and Delta on joint training at DTA east of the Delta River. AE-6

Again, we wish to reiterate that these concerns are not objections to the highly desired siting of the F-35, but are our way of trying to avoid potential problems. We stand ready to work with you and continue to provide any information and aid that we can. We welcome the F-35s to the "Friendly Frontier" here in Delta Junction.

Thank you for this opportunity to express our concerns. Please feel free to contact City Administrator Mary Leith at City Hall (907-895-4656) with questions or for help.

Sincerely,

Peter Hallgren

Peter Hallgren
Mayor

THE STATE of ALASKA
GOVERNOR BILL WALKER

Department of Natural Resources
DIVISION OF PARKS AND OUTDOOR RECREATION
OFFICE OF HISTORY AND ARCHAEOLOGY
550 West 7th Avenue, Suite 1310
Anchorage, AK 99501-3565
Main: 907.269.8721
Fax: 907.269.8908

MC-021

September 1, 2015

File No.: 3130-1R Air Force
2015-01380

Ms. Julene May, Chief
Installation Management Flight
354 CES/CEI
2310 Central Avenue
Eielson AFB 99702

Subject: Basing of Two F-35A Operational Squadrons at Eielson Air Force Base (AFB), Alaska

Dear Chief May:

The Alaska State Historic Preservation Office (AK SHPO) received the correspondence from Lt. Col. Justin W. Morrison (signed for Lt. Col. Morrison by Michael E. Lee) (dated July 31, 2015) on August 5, 2015. Following our review of the documentation provided, we offer the following comments:

- We concur that a finding of **no historic properties affected** is appropriate for the No Action Alternative.
- Given the extensive survey and identification efforts completed thus far at Eielson Air Force Base (AFB), we concur that a finding of **no historic properties affected** is appropriate with respect to the potential for direct/indirect effects to archaeological sites and/or districts, regardless of the alternative selected.
- We concur that a finding of **no adverse effect** is appropriate with respect to the proposed stationing of two squadrons of F-35As at Eielson AFB, adding military and civilian personnel, and operation of the aircraft.
- We are unable to concur at this time that a finding of 'no adverse effect' is appropriate for the proposed construction and/or modification of facilities at Eielson AFB. Before we are able to provide our concurrence, we offer the following specific comments:
    - The documentation provided does not provide corresponding Alaska Heritage Resource Survey (AHRS) site numbers (e.g., the Quarry Hill Historic District is designated XBD-00334). The absence of AHRS numbers throughout complicates and delays our review and suggests that the AHRS was not utilized while compiling this documentation (page 5 states that the NRHP database was searched, but does not mention the AHRS database). As a critical resource for baseline research and analysis, we want to ensure that the AHRS was accessed and that its information is incorporated appropriately into this analysis. **CR-1**
    - Table 1 on page 2 of the documentation provided lists a significant amount of new construction, however, the assessment of effects provided in the remainder of the documentation seems to focus only on the effects to known historic districts. At a minimum, the documentation should provide the age (date of construction), an AHRS number for each building proposed for renovation (shown in Attachments 4a – 4i), and a brief description of its current eligibility status. Our records indicate that most, if not all of the buildings and **CR-2**

structures on Eielson AFB have been assigned AHRS numbers. Many of them have been assessed for NRHP-eligibility in the past and many have not. If a building has not previously been evaluated for its eligibility for listing in the National Register of Historic Places, then a determination of eligibility should be completed. It is important to note that some resources may gain significance over time and that a re-evaluation of NRHP-eligibility is sometimes warranted. If any properties are found to be potentially eligible (either individually or as part of a historic district), the criteria of adverse effect (per 36 CFR 800.5[a][1]) should be applied to determine if any of the proposed renovations will result in adverse effects to historic properties. If they are not eligible, no additional consultation regarding the effects of this proposed undertaking is necessary.

- Please provide a figure or map that shows the boundary of the Engineer Hill Munitions Historic District (FAI-01766), as well as a depiction of the activities proposed within or adjacent to the district. **CR-3**
- Please provide additional justification as to why the construction of six new munitions igloos within the Quarry Hill Munitions Historic District (XBD-00334) will not result in an adverse effect to that district (per 36 CFR 800.5[a][1]). While the Program Comment entitled, *Program comment for World War II and Cold War Era (1939 – 1974) Army Ammunition Production Facilities and Plants* does appear to apply to the Quarry Hill Munitions Historic District, please provide additional information as to why, under section III. Applicability, the third exception does not apply. It states, *"Facilities and Plants listed or eligible National Register of Historic Places districts where the ammunition production facility is a contributing element of the district and the proposed undertaking has a potential to adversely affect such historic district. This third exclusion does not apply to ammunition production-related historic districts that are entirely within the boundaries of an ammunition production plant. In those cases the Program Comment would be applicable to such districts."* **CR-4**
- We recommend that the Air Force develop a more robust Discovery Plan for this undertaking that also includes more detailed information on how the discovery of human remains will be handled. Perhaps the Eielson Integrated Cultural Resource Management Plan (ICRMP) has this information and can be cited. If these critical protocols are not addressed in the ICRMP, they should be developed more fully for this undertaking. **CR-5**

Please note that as stipulated in 36 CFR 800.3, other consulting parties such as the local government and Tribes are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations. Receipt of our comment letter does not end the 30-day review period provided to other consulting parties.

Thank you for the opportunity to comment. We look forward to continued consultation on the subject undertaking. Please contact Sylvia Elliott at 269-8724 or sylvia.elliott2@alaska.gov if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner
State Historic Preservation Officer

JEB:sad

RESPONSE TO COMMENTS

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Airfields and Airspace-AA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AA-1	OT-006, MC-019	Military aircraft (local and visiting) do not necessarily honor airspace regulations of JPARC airspace both during the major exercises and by local military pilots.	All military aircraft pilots flying in JPARC airspace are briefed and provided the 11th Air Force Alaska Airspace Handbook about restrictions, limitations, and avoidance areas. If needed, the Handbook would be updated to reflect F-35A aircraft and their related procedures and operations. If there are observations of military aircraft not following these procedures, then please inform the 11th Air Force at: 1-800-538-6647. This information was added to section 3.2.2.2 of the EIS. See also response AA-12.
AA-2	OT-006	Important to us that the 11th Air Force and the local base continue to regularly meet with the appropriate parties to resolve impacts to civil or commercial aviation activities, routes, and restrictions.	The 11th Air Force continues to participate in the Alaska Civil-Military Aviation Council to work with the community to address issues concerning resource protection/mitigation, public information, research, and monitoring. Participation in the Special Use Airspace Information Service (SUAIS) continues to ensure the safety of civil, commercial, and military airspace users.
AA-3	OT-014	Can you create at least a 30-mile radius and unlimited altitude sonic boom avoidance bubble over Delta Junction?	Implementation of this mitigation would place a significant limitation on employment of training Tactics Techniques and Procedures within the JPARC. A 30-nm ring preventing supersonic flight around Delta Junction will eliminate the ability to conduct supersonic weapon deliveries in Restricted Area 2202 – a specific task that was approved in the JPARC Record of Decision (2013): Realistic Live Ordnance Delivery. Supersonic flight is currently restricted to above 30,000 feet MSL over the Delta MOAs/Delta ATCAA. Restricting supersonic flight within 30 nm of Delta Junction would make the airspace less viable for future training. Using realistic training tactics that include supersonic operations are critical to national defense and both the location and size of the recommended mitigation hinders the ability to prepare our Air Force and coalition aircrew for combat by limiting realistic tactics in the heart of the JPARC.
AA-4	OT-015	How can I interact with you when I am going to Game Management 20A; is there any way you can conduct the Red Flags other than September because that is the peak use for civilians.	No major flying exercises are authorized in September. As presented in section 3.2.2.2, the Air Force is proactive in publicizing MOA and Restricted Area times of use through informational pamphlets as well as radio and telephone service known as the Special Use Airspace Information Service (SUAIS). The 11th Air Force and Eielson AFB will continue to work with communities to ensure that concerns within and under military airspace are addressed. Additionally, the 11th Air Force identifies when major exercises are scheduled through their website at http://www.jber.af.mil/11af/alaskaairspaceinfo/.

Airfields and Airspace-AA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AA-5	OT-020, OT-038, OT-046	With expanded airspace and increases in activities, there needs to be an expanded Special Use Airspace Information Service (SUAIS) system and facilities.	The Special Use Airspace Information Service (SUAIS) has been successfully used in aiding military and civilian traffic de-confliction in Alaska for over 20 years. During that time the Air Force has safely shared the Joint Pacific Alaska Range Complex (JPARC) airspace with civil aviation aircraft making SUAIS one of the most successful communication networks available to Alaskan aviators. Understanding that radio coverage is not complete in the JPARC, in order to make the system as effective as possible, it needs be supplemented by additional sources of flight information through comprehensive flight planning and execution. At the present time, there is no funding available to expand the SUAIS, but expansion of the service is being considered by the 611 Range Control Office. The SUAIS radio coverage is not designed to be an independent de-confliction solution. It is most effective and efficient when used in concert with supporting sources of information. The JPARC SUA activation information is available for flight planning support 24 hours in advance of activation via an FAA website at http://sua.faa.gov. Same-day flight planning support can be obtained through a live or recorded toll-free contact at 1-800-758-8723 (in state only) or 907-372-6913. While in flight, activation times and real time use are available from Eielson Range Control on frequency 125.3.
AA-6	OT-038	Are the enhancements and modernizations identified in the JPARC EIS still in process at the FAA?	Yes, as presented in section 4.2.2.2, the FAA issued a Notice of Proposal to Modify, Expand and Establish Special use Airspace for the Joint Pacific Alaska Range Complex on February 24, 2015. This initiated the comment period that closed on April 10, 2015. To date, no announcement that these proposed enhancements have been adopted has been made by the FAA.
AA-7	OT-038	The problem is, is when you now have shunted a large percentage of the civilian traffic into a very concentrated area, it increases the potential for me and other civilian pilots to have traffic conflicts.	As presented in section 4.5.2.2, continued pilot attentiveness to safe flight practices, as well as maintenance of situational awareness, and use of available communications for tracking the scheduled and near real-time status of the Special Use Airspaces (SUAs) maintains a safe flying environment for all concerned.
AA-8	MC-003	Will there be any restrictions in the MOAs: A reasonable floor and ceiling that General Aviation can achieve and operate in, VFR and IFR, when the airspace is in use would be the best option.	No additional restrictions in MOAs or other airspaces are proposed as a result of the F-35's use of the airspace. The Northern JPARC airspace restrictions, limitations, altitude identification, and avoidance areas (seasonal and otherwise) are provided in the 11th Air Force Alaska Airspace Handbook. All pilots operating in this airspace must follow these strictures and such would be the case for F-35A pilots. See Appendix D, section D.1, Table D-1 for details of flight restrictions.

Airfields and Airspace-AA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AA-9	MC-010, MC-020	Suggest that the Air Force investigate relocating some potentially supersonic training further away (to the west) from downtown Delta Junction in instances where it would not hinder training. By making a larger loop around our populated area.	Delta Junction is located within the heart of the JPARC airspace and it is not viable to deviate routing around the community and still employ modern tactics. The community has both the benefit of being critical to combat force employment from Allen Army Airfield and Fort Greely but also the negative aspect of being centrally located for major training events. Maintaining the present level of access to airspace over Delta Junction for major flying exercises and local training is critical to the usefulness of the JPARC for national defense training events. Currently, aircraft are required to be above 30,000 feet MSL if supersonic within the Delta corridor airspace (Delta MOAs, Birch/Buffalo MOAs, Delta ATCAA). Additional restrictions significantly reduce the effectiveness of training missions/exercises.
AA-10	MC-019	Appreciates mitigation to protect peregrine falcons by flying 2,000 feet AL over the Upper Yukon and Charley River corridors April 15 - September 15. Why is this requirement not over the entire Preserve, all year long.	Given the size and geographic location of the Yukon-Charley Rivers National Preserve in relation to this critical low altitude training airspace, making such a change would nearly eliminate all value in low level training within the Yukon airspace. Based on evaluations of airspace use, this area offers a unique capability to train essential combat tactics. Peregrine Falcon habitat areas along the Yukon and Charley Rivers are already excluded from the MOA, surface to 2,000 feet AGL, from 15 April to 15 September. F-35s will comply with existing flight avoidance areas established by 11th Air Force. Additionally, as presented in section 2.2.2.3, *Airspace Operations:* "Due to its capabilities and expected tactics, the F-35A would occasionally (9 percent or less) fly below 5,000 feet AGL, and would consistently operate (60 percent) from 23,000 feet MSL to above 30,000 feet MSL."
AA-11	MC-019	Eliminate combat maneuvers over the preserve (Yukon-Charley Rivers National Preserve), specifically: chaff releases and use of defensive flares	This request was considered, but due to mission training requirements, it was determined that it would still be necessary to employ chaff and flares within the airspace over the Yukon-Charley Rivers National Preserve. Maintaining the present level of access to airspace over the Yukon-Charley Rivers National Preserve for training is critical to the usefulness of the JPARC for national defense training events. It is important to note that flare use throughout the majority of the JPARC is limited to 2,000 feet or 5,000 feet AGL, depending on the time of year. Chaff is authorized at all altitudes throughout the majority of the JPARC. The F-35s will comply with chaff and flare restrictions, as established by the 11th Air Force Airspace Handbook, the same as the aircraft currently operating in the JPARC airspace.
AA-12	MC-019	Please provide NPS staff and local residents with information on how and when to report problems should they occur.	As identified in section 3.3.2.1, problems can be reported to the 354 Fighter Wing Public Affairs Office at 907-377-2116, the 11th Air Force Public Affairs Office at 1-800-538-6647, or the 3rd Wing Public Affairs Office at 907-552-5756. Noise complaints can be lodged by calling 1-800-JETNOIS.

Acoustic Environment-AE			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AE-1	OT-001	Commenter requested information on the decibel levels produced by the F-22s at Joint Base Elmendorf-Richardson (JBER), in particular, as they impact schools near the base.	An EIS is currently underway which will include analysis of the noise impacts of the F-22s at JBER on the local community. Announcements of the Draft EIS availability will be made in the Anchorage Area.
AE-2	OT-011	Main concern is sonic booms and the potential for breaking windows, killing chickens, and startling wildlife.	Please refer to Appendix E, Section E.2.10 to E.2.13 where sonic booms are discussed and potential to cause physical damage to structures and humans are addressed. Section E2.14.1 identifies potential effects on domestic animals (i.e., domestic fowl) and wildlife (Section E2.14.2).
AE-3	OT-013	Any increase in the number of sonic booms is an issue that all Delta people are concerned with.	See section 4.3.2.2 and Appendix E. The number of booms projected in the busiest month (i.e., in those months when there are major flying exercises) is identified in Table 4.3-17 and range from a low of 1 per month in the Yukon 3B MOA to a high of 36 in the Yukon 1 MOA. An increase of two sonic booms during the busiest month are anticipated for the Delta area. See also response to AE-6.
AE-4	OT-013	There is going to be a lot of testing and fly-throughs over Delta Junction, can you limit it to two a day?	To maintain combat readiness pilots must perform realistic training, which includes operations in the Delta MOAs during major flying exercises. Table 4.2-1 provides the projected annual operations of all aircraft in northern JPARC airspace. The current flight restrictions prohibit pilots from flying within 5 nautical miles (NM) below 3,000 feet AGL over Delta Junction.
AE-5	OT-049	Not enough about the effects on children and others of persistent noise.	In section 4.3.2.1, potential hearing loss caused by persistent noise is evaluated in terms of daily exposure to noise over a normal lifetime of 40 years, with exposure lasting 8 hours per day for 5 weeks per week. It was concluded that because no residential areas or schools, on or adjacent to Eielson AFB would be exposed to DNL greater than or equal to 80 dB, then the potential for hearing loss is not anticipated. This conclusion is justified because no one would be exposed on a daily basis, over a lifetime of 40 years, lasting 8 hours per day for 5 days per week, by DNL greater than or equal to 80 dB. Non-auditory effects are addressed in section 3.3.2.1, *Population and in* Appendix E, section E.2.6. Potential noise effects on children are elaborated in section E.2.8.
AE-6	MC-010, MC-020	Have you investigated the effects of increased low level sonic booms and low level general noise potential from such low altitude training, especially east of the Delta River and that you studied the effect of MOA-29 between the Army and Delta on joint training at DTA east of the Delta River.	As indicated in section 4.3.2.2, aircraft operations would occur only at altitudes currently authorized for supersonic activities. In terms of general noise effects from low-altitude training, this is addressed in the subsonic discussion in section 4.3.2.2 and in Appendix E, Section E.2. Average noise levels during the busiest month for representative points of interest (including those east of the Delta River) are presented in Table 4.3-14; the estimated number of sonic booms during the busiest month for northern JPARC airspace was identified in Figure 4.3-10 with representative points of interest. Table 4.3-17 listed the estimated number of sonic booms that representative points of interest could experience if the proposed action were implemented. See also response AE-2 and SA-9.

Acoustic Environment-AE			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AE-7	MC-013	We recommend that the Air Force develop a working group comprised of interested and potentially affected stakeholders to specifically address this [noise] issue	The Air Force recognizes the importance of being good neighbors and proposes to address noise issues through our Air Installations Compatible Use Zone (AICUZ) program. Once the F-35A aircraft are operational at the base, the Air Force intends to follow-up the analysis in this EIS with a subsequent noise evaluation at Eielson AFB to validate the operational profiles and noise levels, and address those results through the AICUZ program. An important factor of the AICUZ program is public involvement. The Air Force will meet and engage with the community on the AICUZ findings and discuss their concerns. Although no formal working group will be established with the community, individuals have access to the Eielson Public Affairs Office to lodge noise complaints and concerns.
AE-8	MC-017	One of your noise abatement ideas presented at the public hearing was to limit flying/noise in the Salcha River during the period September 1 through 20; however, moose season runs to September 25 so suggest to go from September 1 through 25.	The 11th Air Force Airspace and Range Team discusses requests for changes in flight restrictions such as this with Alaska Department of Fish and Game to determine appropriateness of flight mitigations. However, the current restriction of no major flying exercises during the month of September, reduces the impact of noise during the GMU 20A hunting seasons.
AE-9	MC-019	We read in the EIS that supersonic flights occur regularly and sonic booms are heard throughout the [Yukon-Charley Rivers National] preserve, as frequently as 30 per month (page 4-31). While the proposed action estimates an increase of only one boom per month, we find any sonic booms over a national preserve to be incompatible with the purposes and values of the Unit.	Delta Junction is located within the heart of the JPARC airspace and it is not viable to deviate routing around the community and still employ modern tactics. The community has both the benefit of being critical to combat force employment from Allen Army Airfield and Fort Greely but also the negative aspect of being centrally located for major training events. Maintaining the present level of access to airspace over Delta Junction for major flying exercises and local training is critical to the usefulness of the JPARC for national defense training events. Currently, aircraft are required to be above 30,000 feet MSL if supersonic within the Delta corridor airspace (Delta MOAs, Birch/Buffalo MOAs, Delta ATCAA). Additional restrictions significantly reduce the effectiveness of training missions/exercises.

Air Quality-AQ			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
AQ-1	OT-011	Concerns about more wood-burning devices.	The percentage of wood-burning devices is expected to stay the same as at present. The analysis, presented in section 4.4.2.1, determined that there is expected to be a housing increase in the North Pole-Moose Creek-Salcha area to support the incoming personnel and their dependents. However, the increase in housing is not anticipated to significantly increase air pollutants, from wood stoves or oil-fired home heating units. Appendix F specifies the emissions that would be generated due to construction, F-35 aircraft operations, and commuting personnel under the Proposed Action Alternative.
AQ-2	OT-011	There will be more ice fog from the vehicles and power plant.	Ground fog could increase slightly due to increased motor vehicle traffic (water vapor is the major exhaust component), but this is anticipated to be minimal and would not alter the overall air quality. Emissions that would be generated by proposed action activities were calculated and presented in Tables 4.4-2 and 4.4-3. Analysis determined that if the proposed action were implemented, none of the criteria pollutants would experience an increase of more than 1.5 percent when compared to no-action conditions. This minor incremental increase would not further deteriorate air quality in the region.
AQ-3	OT-013	Did you consider all the extra vehicles, heating, and electricity use in the greenhouse gas emissions analysis?	Yes, please refer to Appendix F, page F-5, which provides the emissions generated by the anticipated increase in the number of vehicles associated with this proposal. Power and heating falls under the stationary Title V permitting process and is accounted for in that regulatory process and have been included in this EIS. Total greenhouse gas emissions were calculated for all stationary and mobile sources, to include F-35 operations.
AQ-4	OT-041	What effect does the action have on ozone below the mixing height of 3,000 feet?	The air quality analysis in Section 4.4 included precursor pollutants that contribute to ozone creation up to 3,000 feet (see Sections 3.4.1 and 3.4.2). However, ground level ozone is a function of emissions and incoming solar radiation, and is more of a southern latitude consideration. The overall small increase in hydrocarbons and oxides of nitrogen, which are the prime precursors of ozone, should not result in any significant increase in ozone. See also response to comment AQ-2.

Cultural Resources-CR			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
CR-1	MC-021	The consultation package does not provide corresponding Alaska Heritage Resource Survey (AHRS) site numbers.	The consultation package, found in the SHPO consultation section of Appendix C, December 2015 letter (Attachment 1), was updated to include the AHRS site numbers.
CR-2	MC-021	The consultation documentation should provide the age, an AHRS number for each building proposed for renovation, and a brief description of its current eligibility status.	The December 2015 consultation package at Table 1, Attachment 1, was updated to include the information requested. See Appendix C for a copy of the revised letter and accompanying documentation sent to the SHPO on December 3, 2015.
CR-3	MC-021	In the consultation package, please provide a figure or map that show the boundary of the Engineer Hill Munitions Historic District and a depiction of the activities proposed within or adjacent to the district.	Figure 1 (Attachment 1) identifies the boundary of the Engineer Hill Munitions Historic District; however, no proposed activities are planned within or adjacent to the district. This was clarified in the revised consultation package, refer to Appendix C, SHPO consultation, December 3, 2015 letter.
CR-4	MC-021	Provide justification in the consultation package as to why the construction of six new munitions igloos within the Quarry Hill Munitions Historic District will not result in an adverse effect for that district.	See Appendix C, SHPO consultation December 2015 letter. Justification was provided as follows: Regarding the construction of six new storage igloos in the Quarry Hill Munitions Storage Area, our position remains that the Program Comment entitled: Program Comment for World War II and Cold War Era (1939 – 1974) Ammunition Storage Facilities applies to this action. Under Section III. Applicability, third exclusion: "ammunition storage facilities in listed or eligible National Registers of Historic Places districts where the ammunition storage facility is a contributing element of the district and the proposed undertaking has the potential to adversely affect such historic district. This third exclusion does not apply to historic districts that are made up solely of ammunition storage facility properties. In those cases the Program comment would be applicable." Both Engineer Hill and Quarry Hill Munitions Districts fall within this category, as the contributing elements consist solely of ammunition storage facilities. As the Air Force has met its specific mitigations requirements, as well as the DoD-wide Mitigations, the following actions are authorized under Section V. Effect of the Program Comment: "ongoing operations, maintenance and repair, rehabilitation, renovation, mothballing, cessation of maintenance, new construction, demolition, deconstruction and salvage, remediation activities, and transfer, sale, lease and closure of such facilities. Accordingly, DoD installations are no longer required to follow the case-by-case Section 106 review process for such effects."
CR-5	MC-021	Recommend the Air Force develop a more robust Discovery Plan for this undertaking that also includes more detailed information on how the discovery of human remains will be handled.	Attachment 5 of the revised December 2015 consultation package (a copy is found in Appendix C) provides a more thorough description of how the discovery of human remains will be handled.

Cumulative Impacts-CU			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
CU-1	MC-014	Section 5.2 fails to recognize the gain of approximately 552 soldiers in a 2014 Army stationing announcement.	The comment is correct, this action was added in Section 5.1.1 to the cumulative impacts section to recognize that up to 550 soldiers (numbers vary) in the 70th Brigade Engineer Battalion that joined the 1st Stryker Brigade at Fort Wainwright in the fall of 2014.
CU-2	MC-014	What effect will construction projects at Fort Greely in support of the Missile Defense Agency and the Long Range Discrimination Radar at Clear Air Force Station have for the local area to support short term housing.	Inclusion of these two proposals and the effects to housing was added in Sections 5.1.1 and 5.2.1. There should be no effect, as both sites are too distant to be within commuting distance of North Pole, Moose Creek, or Fairbanks.

Earth Resources-EA			
Response Number	***Comment Number***	***Comment Description***	***Response***

No comments received on Earth Resources.

Environmental Justice-EJ			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
EJ-1	OT-1	… is there something that the state or the municipality can do to help maybe some of the noise reduction in the school building?	Children playing outside would be exposed to increased noise levels; however, to reduce classroom learning interference in the four on-base and one off-base learning facilities, noise-attenuating measures could be implemented. These could include, but are not limited to, installing sound absorbing materials in the ceiling and walls, fixing cracked window panes, sealing any gaps between the walls, floor, and ceiling, and installing insulation in building cavities. Since the Air Force does not own the schools either on or off base, the undertaking of noise attenuation measures would be the responsibility of the FNSB School District. The American National Standard Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools, Parts 1 and 2 from the American National Standards Institute S12.60 provide guidance for noise attenuating design criteria. Discussion of these noise mitigations have been added to Table 2.5-1 and Section 4.3.3.
EJ-2	MC-013	Recommend that noise impacts be fully considered in the Environmental Justice and Health Impacts analyses.	As presented in Section 4.9, the EIS identified minority and/or low-income populations, as well as concentrations of children and the elderly that could be affected by the Proposed Action Alternative within the region of influence. The region of influence for health and safety effects was defined by projected noise levels produced by F-35A operations. If it was found that these population groups were present, they were specifically identified as to where they were located. Impacts would be considered significant if these population groups were exposed to adverse health and safety impacts. As presented in Section 4.9.2.1, aircraft-generated DNL noise levels equal to greater than 65 dB would increase for some areas outside of base boundaries but would not exceed 65 dB for any of the concentrations of children or the elderly (see Figure 4.9-1), minority population areas (see Figure 4.9-2), or low-income populations (see Figure 4.9-3). Noise levels less than 65 dB DNL are typically considered compatible with all land uses and sensitive receptors such as children and the elderly. Supplemental noise analysis, however, indicated that classroom learning interference would increase at all three on-base schools and a child development center because of increased aircraft operations (see Table 4.3-10). These impacts would be considered adverse and potentially disproportionate. Off base, the Loving Learning Day Care center would experience a one-event per hour increase with windows open, an increase of one compared to the No-Action and baseline conditions. No residential areas or areas of concentrations of children and the elderly outside of Eielson AFB would be exposed to DNL greater than or equal to 80 dB. Therefore, neither a potential for hearing loss nor non-auditory health effects are anticipated to impact environmental justice populations, children, and the elderly.

Hazardous/Toxic Materials and Waste and Contaminated Sites-HZ			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
HZ-1	MC-013	Revise text on page 3-93 to read "The USEPA and State of Alaska jointly regulate the sites with CERCLA contaminants. Petroleum-contaminated sites are designated as Compliance Restoration Sites and are addressed under State of Alaska regulations."	Text changed per comment. See Section 3.13.2.1 - Environmental Restoration Program.
HZ-2	MC-013	Suggest wording be changed to reflect the actual effectiveness of existing remedies.	Text changed per comment. See Section 3.13.2.1 - Environmental Restoration Program.

Land Management-LM			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***

No comments received on Land Management.

Natural Resources-NR			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
NR-1	MC-013	Include information regarding the types and functions of wetlands to be impacted	This information was added in Section 4.10.2

NEPA Process/Public Involvement-NI			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
NI-1	OT-002	Were the people affected by the proposed action personally contacted through postcard or some other form?	No, however, people who requested copies of the Draft EIS during the Public Scoping Period received them by mail along with information on the Public Hearings. The public involvement process used to notify the public is described in Section 1.3.3. The Draft EIS was distributed for review and comment to government agencies, local organizations, Alaska Native tribal entities, the public who had requested a copy, and libraries. The Draft EIS was also available for review or download on the project website at https://www.PACAF-F35aeis.com beginning on September 1, 2015. Advertisements announcing the Notice of Availability for the Draft EIS ran in newspapers on September 4. Advertisements also appeared for three consecutive days, one week before the Public Hearings, and supplied the dates, times, and locations of the hearings in North Pole, Delta Junction, and Fairbanks.
NI-2	OT-041	We need an analysis of what equal monetary investment instead of being used on the F-35, if it were used on diplomacy, environment, education, instead of in the proposed action alternative.	How the money would be spent if not on this proposed action, or the proportion of the cost that would be borne by local residents through taxes, is beyond the scope of this EIS.

Proposed Action-PA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
PA-1	OT-001	Will the Richardson Highway be closed down or restricted?	The Richardson Highway would not be closed down or restricted; however, the existing South Gate is proposed for expansion (see Figure 2.2-6 for the construction footprint). Section 4.6.2.2, *Transportation and Utilities,* was updated to indicate that upgrades along the Richardson Highway, for entering and exiting vehicles, would not restrict traffic but are being constructed to ease congestion at the Main Gate.
PA-2	OT-011	Where are you going to get all your fuel for the planes?	Currently, JP-8 comes directly via a pipeline from the North Pole refinery. Diesel, vehicle gas, JP-4 (for helos), and other types of fuel are delivered by trucks from outside sources. At this time, no fuel capacity issues have been identified; however, there are available storage tanks on base to accommodate any increased needs.
PA-3	OT-049	How will live ordnance be dealt with?	See section 2.2.1.3 and Appendix D.1.4.2 for discussion of ordnance. In summary, live ordnance storage, transport, and use is closely regulated by the Air Force (e.g., Air Force Manual 91-201 and Air Force Instruction 21-201) to ensure the health and safety of their airmen and the public. These rules are currently applied during all regular and major flying exercises and would continue if the F-35As were based at Eielson AFB. F-35As would deploy live ordnance only in authorized JPARC restricted airspace and ranges. These include R-2202 and the underlying Donnelly Training Area, R-2205 and the associated Yukon Training Area, and R-2211 over the Blair Lakes Impact Area in the Tanana Flats Training Area.
PA-4	OT-049	Will there be nuclear armaments?	No, there are no plans for F-35As at Eielson AFB to train with nuclear armaments or to store nuclear armaments at the base.
PA-5	MC-013	Recommend the Final EIS either provide more detailed information concerning other action alternatives or fully evaluate additional, reasonable action alternatives.	Text has been revised in Section 2.1 to more clearly identify the Air Force reasoning for analysis of only the proposed action and the no action alternatives in this EIS. Splitting the aircraft between Joint Base Elmendorf-Richardson and Eielson AFB would not meet the purpose and need of bedding down both squadrons at one location. Splitting the squadrons would unreasonably complicate command and control of the aircraft.

Purpose and Need-PN			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***

No comments received on Purpose and Need.

Recreational and Visual Resources-RV			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
RV-1	OT-041	Military personnel commit transgressions of hunting and fishing regulations.	Section 3.14.2.2, *Recreation,* was revised to reflect that all military personnel are required to follow state and local fish and game regulations and are so briefed upon arrival at Eielson AFB. If a violation is observed, as is the case for any fish and game violation, please contact the Alaska Wildlife Trooper office (in charge of enforcement) through local offices in Fairbanks, Delta Junction, and Tok or report violations via the Fish and Wildlife Safeguard organization at 1-800-478-3377.

Safety-SA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
SA-1	OT-011	Concern about fuel spills from refueling and wrecked airplanes in the JPARC airspace.	In terms of mid-air refueling spills, the speed of the aircraft and altitude at which this operation performs transforms the liquid to a vapor. There would be little likelihood of actual fuel reaching the ground. For aircraft mishaps (see section 4.5.2.2), no midair collisions and few reported near misses have occurred within northern JPARC airspace. Ongoing interaction between Eielson AFB, state, and federal agencies, as well as continued use of the Special Use Airspace Information Service (SUAIS), ensures continued compatibility of military and commercial/civil aviation in the JPARC airspace. Section 4.13.2.2 describes the procedures that would be followed in the event of an aircraft mishap.
SA-2	OT-011	Animals will get killed from the ordnance explosions.	As discussed in Sections 2.2.1 and 2.2.2, ordnance and munitions will be used only in those ranges already authorized for such activities (see Table 2.2-6). The following revisions were made in section 4.10.2.2: The one aspect of the proposed action that may cause the injury or death of wildlife is the use of live munitions on the three impact areas designated for this training requirement (see Table 2.2-6 identifying the Tanana, Yukon, and Donnelly Training Areas). Due to the mobility of wildlife, it is likely that moose and caribou may be within the target zones of the impact areas, at the beginning of daily live-fire activity. This could result in the death of any wildlife present on the ranges. The Air Force anticipates that this number would be small. The loss of a small number of animals would not be adverse through continued adherence to wildlife management actions identified in the U.S. Army Garrison Integrated Natural Resource Management Plan in Sections 4.3.6, Tanana Flats Training Area Management Prescriptions, 4.4.6, Yukon Training Area Management Prescriptions, and 4.5.6, Donnelly Training Area Management Prescriptions (U.S. Army 2013).
SA-3	OT-015, OT-041	Concerned about conflicts with civilian aircraft and military training.	As presented in section 4.2.2.3, ongoing interaction between Eielson AFB, the state, and federal agencies, as well as continued use of the Special Use Airspace Information Service (SUAIS), ensures continued compatibility of military and commercial/civil aviation in the JPARC airspace.
SA-4	OT-040	There will be an increase in fires caused by the military.	All guidance, regulations, and instructions for ordnance delivery and flare use at the three impact areas would be adhered to; fire response and suppression capabilities would continue to meet all requirements. As presented in section 4.5.2.2, mutual aid agreements and coordination between Air Force personnel and wildland fire-fighting personnel regarding fire detection and response would continue.
SA-5	OT-049	How will the public be protected from ordnance?	Ordnance and munitions would be used only at authorized ranges and airspace. Figure 2.2-3 shows the locations of the impact areas in relationship to population centers. The public is prohibited entry at the land-based ranges, and airspace over the ranges is restricted to only military aircraft when it is in use. See sections 3.2.2.1 and 4.5.2.2.

Safety-SA			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
SA-6	OT-049	Low flying military aircraft can cause crashes of less maneuverable civilian aircraft like float planes.	Safety is of prime importance, all military pilots operating out of Eielson AFB must follow 354 Fighter Wing Instruction 11-250, *Flying Operations and Local Flying Procedures* , to ensure flight safety. Additionally, to assist military aircrews in complying with the many documents that protect all aviators in and near the JPARC airspace, 11th Air Force publishes an Alaska Airspace Handbook (11th Air Force 2015) as a consolidated source of airspace information. Information in the handbook includes, but is not limited to, geographical descriptions of Alaskan MOAs, MOA groupings, Restricted Areas, ATCAAs, Air Defense Areas, and the 11th Air Force Noise/Flight Sensitive Areas List. See Appendix D.1 for further information on the handbook.
SA-7	WC-004	Concerned that with increase in air traffic it is important to assure the NOAA MWS Weather Office be maintained at Fort Greely.	Thank you for your comment; however, a decision of whether or not to keep the NOAA MWS Weather Office at Fort Greely is outside the scope of this EIS.
SA-8	MC-020	Hope you investigated the past and recent history of military-caused wildfires in the region	Please refer to Section 3.5.2.2 where Fire Risk and Management are addressed under existing conditions (including a short history of wildfires in the region). Section 4.5.2.2 evaluates potential fire risk in terms of F-35A operations. Three primary management actions are used to prevent wildfires. First, a fire danger rating system is used to reduce the likelihood of a fire by limiting military activities. Certain military activities are restricted when thresholds of wildfire risk are reached. Second, wildfire danger is reduced through the removal of accumulated fuels (e.g., prescribed burning and/or construction and maintenance of fire or fuel breaks). Third, when military operations are occurring and high and extreme fire danger conditions exist, an Initial Attack Response Team remains on alert to provide a rapid initial response to wildfires in the area. Additionally, coordination between Air Force personnel and wildland fire-fighting personnel regarding fire detection and response would continue under the Proposed Action Alternative. To minimize fire risk, the following standard measures would continue to be implemented: 1) continue use of firefighting materials and equipment by all units on ranges or training areas during high and extreme fire risk index rating periods and 2) limit the use of certain ammunition and pyrotechnics during periods of elevated fire risk indices.
SA-9	MC-10, MC-020	Have you studied how the Memorandum of Agreement 29 (MOA-29) will affect training?	Delta Junction is located within the heart of the JPARC airspace and it is not viable to deviate routing around the community and still employ modern tactics. The community has both the benefit of being critical to combat force employment from Allen Army Airfield and Fort Greely but also the negative aspect of being centrally located for major training events. Maintaining the present level of access to airspace over Delta Junction for major flying exercises and local training is critical to the usefulness of the JPARC for national defense training events. Currently, aircraft are required to be above 30,000 feet MSL if supersonic within the Delta corridor airspace (Delta MOAs, Birch/Buffalo MOAs, Delta ATCAA). Additional restrictions significantly reduce the effectiveness of training missions/exercises.

Socioeconomics (including Public Services, Transportation, and Utilities)-SO			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
SO-1	OT-011	The area has a shortage of teachers.	Revised Section 4.6.2.2 reads: the School Board has stated its commitment to meet the educational needs of Eielson AFB students both now and in the future.
SO-2	OT-020, WC-003, MC-014, MC-018	Concerned there will not be enough housing.	Section 4.6.2.2 was revised. New findings based on information provided by the FNSB Economic Development Council and the 2000 and 2020 Census Data indicate that there will be no shortage of housing for rental or purchase in the communities of North Pole, Moose Creek and Salcha. This applies to both the short-term construction phase of the proposed action, as well as the long-term arrival of the additional F-35 personnel and dependents. Construction worker housing requirements for future projects at Fort Greely and Clear Air Force Station were not considered because these areas are too far away from the Fairbanks area to be within commuting distance.
SO-3	OT-030, MC-007	We believe that HUB contracting should not be done because it will hurt our economy and request a review of this practice in the EIS.	The Historically Underutilized Business Zones (HUB Zone) program is run by the U.S. Small Business Administration (SBA). The Air Force has no control over SBA's rules or how they are applied or over USACE contracting processes. Analyzing those are outside the scope of this EIS
SO-4	OT-041	Where is there substantiation of there being no need for additional police.	Section 4.6.2.3 was revised to address concern: Existing health, fire, and crimes response services provided on Eielson AFB, along with planned improvements, would support additional demand for on-base services associated with the Proposed Action Alternative. This requirement has been accounted for in the increases in firefighting and security forces personnel being added under this proposal. Discussions with FNSB representatives indicate that the additional off-base residential population made up of military personnel and dependents is not anticipated to strain the capacity of current health, fire, and crime response services in the region; additional tax revenues generated in the FNSB through normal growth would be used to increase health, fire, and crime response personnel if needed. Therefore, no adverse impacts to health, fire, and crime response services are anticipated.
SO-5	WC-003, MC-014	Would like more information on whether the rental housing is suitable and located in areas that can realistically support personnel working at Eielson AFB.	Section 4.6.2.2 has been revised. New findings based on information provided by the FNSB Economic Development Council and the 2000 and 2010 Census Data indicate that there would be no shortage of housing for rental or purchase in the communities of North Pole, Moose Creek and Salcha. This applies to both the short-term construction phase of the proposed action, as well as the long-term arrival of the additional F-35 personnel and dependents.
SO-6	MC-014	Given the short construction period in Interior Alaska, what will be the availability of construction materials to support the short season.	The Air Force does not anticipate difficulty in supplying material for the construction projects. As for all projects in this remote location, transportation and storage will all go into the planning process so that materials arrive when needed.

Water Resources-WR			
Response Number	***Comment Number***	***Comment Description***	***Response to Comment***
WR-1	MC-013	Provide more information about alternatives considered for placement in the floodplains.	There are no practicable alternatives to placement in the floodplain as explained in section 2.2.2.2.
WR-2	OT-032	..when you have a fairly low water usage, you get elevated temperatures and longer detention times, as is the situation now on Eielson AFB. That results in increased growth of biofilms, increased formation of disinfection byproducts, and increased corrosion potential. You mitigate this by increasing the flow (the same can be applied to wastewater). So increasing the population mean your water gets better.	While these specific aspects of water quality and wastewater were not examined in the EIS, the commenter is correct that water quality would be expected to improve on Eielson AFB if there is an increase in water flow.