



Draft

Environmental Assessment

Addressing Beddown of F-35A
Developmental Test Aircraft

Eglin Air Force Base, Florida



July
2023

ACRONYMS AND ABBREVIATIONS

36 EWS	36th Electronic Warfare Squadron	EGTTR	Eglin Gulf Test and Training Range
96 TW	96th Test Wing	EIAP	Environmental Impact Analysis Process
350 SWW	350th Spectrum Warfare Wing	EIS	Environmental Impact Statement
ACM	asbestos-containing materials	EO	Executive Order
ADAIR	Adversary Air	ESA	Endangered Species Act
AFB	Air Force Base	ESQD	Explosive Safety Quantity Distance
AFFF	aqueous film forming foam	ETTC	Eglin Test and Training Complex
AGE	aerospace ground equipment	°F	degree Fahrenheit
AGL	above ground level	FCMP	Florida Coastal Management Program
AIM	Air Intercept Missile	FDEP	Florida Department of Environmental Protection
APE	Area of Potential Effects	FL	flight level
AST	aboveground storage tank	FONSI	Finding of No Significant Impact
ATCAA	Air Traffic Control Assigned Airspace	ft ²	square foot or square feet
AvFID	Aviation Foreign International Defense	FTU	Formal Training Unit
BASH	Bird/Wildlife Aircraft Strike Hazards	FY	fiscal year
BGEPA	Bald and Golden Eagle Protection Act	GBU	Guided Bomb Unit
BMP	best management practice	GHG	greenhouse gas
BO	Biological Opinion	gpd	gallons per day
CEQ	Council on Environmental Quality	GRASI	Gulf Regional Airspace Strategic Initiative
CFR	Code of Federal Regulations	HWMP	Hazardous Waste Management Plan
CO	carbon monoxide	I-	Interstate
CO ₂	carbon dioxide	IAP	Initial Accumulation Point
CO ₂ e	carbon dioxide equivalent	INRMP	Integrated Natural Resource Management Plan
CZMA	Coastal Zone Management Act	IRP	Installation Restoration Program
DAF	United States Department of the Air Force	JBLE	Joint Base Langley-Eustis
dB	decibel	JDAM	Joint Direct Attack Munition
dBA	A-weighted decibel	LBP	lead-based paint
DNL	day-night sound level	LF-	landfill
DoD	Department of Defense		
DT	Developmental Test		
EA	Environmental Assessment		

L _{max}	maximum sound level	PM _{2.5}	particulate matter measured less than or equal to 2.5 microns in diameter
LOA	Letter of Authorization		
L _{pk}	peak sound pressure level	POI-	Point of Interest
LUC	Land Use Control	POL	petroleum, oil, and lubricant
mgd	million gallons per day	POV	privately owned vehicle
Mk	Mark	R-	designated as restricted area
MMPA	Marine Mammal Protection Act	ROI	Region of Influence
MOA	Military Operating Area	§	Section
MSL	mean sea level	SEL	sound exposure level
NA	not applicable/not available	SHPO	State Historic Preservation Officer
NAAQS	National Ambient Air Quality Standards	SO _x	sulfur oxides
NAS	Naval Air Station	SPCC	Spill Prevention, Control, and Countermeasures
NAWS	Naval Air Weapons Station		
NEPA	National Environmental Policy Act	SR	State Road
NHPA	National Historic Preservation Act	SS-	Spill Site
NM	nautical miles	SUA	special use airspace
NMFS	National Marine Fisheries Service	SWPPP	Stormwater Pollution Prevention Plan
NO _x	nitrogen oxides	TA	Test Area
NPDES	National Pollutant Discharge Elimination System	tpy	tons per year
NRHP	National Register of Historic Places	U.S.	United States
O ₃	ozone	U.S.C.	United States Code
OSHA	Occupational Safety and Health Administration	USEPA	United States Environmental Protection Agency
OT	Operational Test	USFWS	United States Fish and Wildlife Service
PAA	Primary Aerospace Vehicles Authorized	VOC	volatile organic compound
PCBs	polychlorinated biphenyls	W-	designated as warning area
PFAS	poly- and perfluoroalkyl substances		
PFOA	perfluorooctanoic acid		
PFOS	perfluorooctane sulfonate		
PM ₁₀	particulate matter measured less than or equal to 10 microns in diameter		

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COVER SHEET

Draft Environmental Assessment Addressing Beddown of F-35A Developmental Test Aircraft Eglin Air Force Base, Florida

Responsible Agency: United States Department of the Air Force (DAF), 96th Test Wing.

Affected Location: Eglin Air Force Base (AFB), Florida.

Report Designation: Draft Environmental Assessment (EA).

Abstract: This EA describes DAF's proposal to beddown four F-35A aircraft and associated personnel at Eglin AFB in Okaloosa County, Florida as part of a weapons Developmental Test (DT) program to facilitate the integration of air-to-air and air-to-ground weapons on the F-35A aircraft (project purpose). This integration is done through a Weapons DT program, which is a routine procedure for fielding any combat aircraft weapon system. The Proposed Action is needed to conduct developmental testing of weapon systems to be integrated onto the F-35A aircraft to evaluate whether the new systems fulfill design specification; verify the design and manufacturer process per the design specifications; and validate how the systems integrate into the aircraft, fulfill design requirements, and meet performance standards for safety, function, and effectiveness. Weapons DT would involve the loading, carriage, employment (targeting and firing), and other testing functions using both inert and live weapons. Testing must be conducted at an installation that has the operational and airspace capacity to support the required flight and munitions expenditure activities; weapon development testing expertise; and properly sized, configured, and instrumented ranges that can track and control weapon system tests.

The Proposed Action includes the beddown of four F-35A DT aircraft and associated personnel at Eglin AFB; approximately 2,346 airfield operations per year comprised of 2,322 operations at Eglin AFB and 24 operations at Tyndall AFB; munitions expenditures in the Eglin Test and Training Complex and the Gulf Regional Airspace Strategic Initiative Air Traffic Control Assigned Airspace; and construction and renovation activities at Eglin AFB including construction of a 2-bay aircraft maintenance hangar and aircraft parking area; construction of a 2-bay aircraft test hangar; an addition to Building 64; renovation of four existing support facilities; and installation of temporary facilities. F-35A DT aircraft would be delivered to Eglin AFB on a phased arrival schedule between January 2026 and November 2026. Personnel arrivals also would be phased on that timeline.

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and renovation activities to support the F-35A DT program, would not occur.

This EA analyzes the potential for significant environmental impacts associated with the Proposed Action and No Action Alternative and aids in determining whether a Finding of No Significant Impact can be prepared, or an Environmental Impact Statement is required.

Written comments and inquiries regarding this document should be directed by mail to Ms. Ilka Cole, 96 TW/PA, 1010 West D Avenue, Eglin AFB, FL 32542, or by email to 96CEG.CEIEA.NEPAPublicComments@us.af.mil. Please reference the F-35A DT EA in the subject line of the correspondence.

Privacy Advisory

This Environmental Assessment (EA) was provided for public comment in accordance with the National Environmental Policy Act, Council on Environmental Quality regulations for implementing the National Environmental Policy Act (Title 40 Code of Federal Regulations §§ 1500–1508, as amended by 85 FR 43304-43376), and 32 Code of Federal Regulations § 989, *Environmental Impact Analysis Process*.

The Environmental Impact Analysis Process provides an opportunity for public input on United States Department of the Air Force (DAF) decision making, allows the public to offer input on alternative ways for DAF to accomplish what it is proposing, and solicits comments on DAF's analysis of environmental impacts.

Public commenting allows DAF to make better-informed decisions. Letters or other written or oral comments provided may be published in this EA. As required by law, comments provided are addressed in this EA and made available to the public. Providing personal information is voluntary. Private addresses may be compiled to develop a mailing list for those requesting copies of this EA. However, only the names of the individuals making comments and specific comments are disclosed. Personal information, home addresses, telephone numbers, and email addresses are not published in this EA.

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1 Purpose of and Need for the Proposed Action

1.1 Introduction

The United States (U.S.) Department of the Air Force (DAF) proposes to beddown four F-35A Developmental Test (DT) aircraft and associated personnel at Eglin Air Force Base (AFB) in Okaloosa County, Florida as part of a Weapons DT program to facilitate the integration of air-to-air and air-to-ground weapons on the F-35A aircraft. To support the F-35A DT program, the Proposed Action would require construction of new facilities and infrastructure, renovation of existing facilities, and additional personnel. The DAF would conduct F-35A DT operations at Eglin AFB and Tyndall AFB in Florida. This Environmental Assessment (EA) analyzes the potential environmental consequences of implementing the Proposed Action or alternatives to beddown four F-35A DT aircraft and associated personnel at Eglin AFB.

1.2 Background

The mission of the DAF is defense of the U.S. and fulfillment of the directives of the President and Secretary of Defense. To meet these mission requirements, DAF must develop and operate combat and support aircraft as well as train personnel necessary for deployment of these aircraft. In 1994, the U.S. Congress and the Department of Defense (DoD) determined that the F-35A Joint Strike Fighter would be developed to replace and supplement DAF legacy fighter and attack aircraft. The F-35A fighter aircraft, also referred to as the Lightning II, is an all-weather, stealth, multirole fifth generation fighter and is the conventional takeoff variant used by the DAF. The aircraft is designed to provide the pilot with unsurpassed situational awareness, positive target identification and precision strike in all weather conditions (DAF 2014a). The F-35A aircraft is intended to replace the DAF's aging fleet of F-16 and A-10 aircraft, bringing enhanced capabilities into advanced threat environments.

Per the 1994 mandate, the F-35A aircraft must be operationally based to support the combat-ready mission. Since that time, the beddown and planning for F-35A operational aircraft has been ongoing and is underway at several locations.

These beddowns are supported by F-35A DT aircraft that are tested and evaluated for various aircraft functions to inform and optimize the DT, initial operation, and force development programs. The DAF DT programs are implemented in a predetermined sequence suited to maximize aircraft and weapon systems capabilities within the most effective and efficient timeline (DAF 2014b). The first F-35A aircraft at Eglin AFB arrived in 2011. Following rigorous developmental and operational testing and training, the aircraft was declared "combat ready" and entered the DAF inventory in August 2016. The DAF's current proposal is to develop and test weapon systems for integration with the F-35A aircraft via the beddown of four additional F-35A DT aircraft with a Weapons DT mission at Eglin AFB.

Before a weapon can be certified for use on an aircraft, it must undergo a developmental test and evaluation process that analyzes every aspect of its employment specific to that aircraft. DT programs for aircraft and weapon systems require a complex set of resources for each test. Weapons DT operations must be conducted at a location that can support the loading, carriage,

employment, and other required testing specifications of inert and live weapons as well as aircraft and munitions tracking capabilities to guide safe performance or termination of flight activities. This includes the range and airspace capacity to safely support munitions firing at an intended target or impact area, personnel with weapons testing expertise, organizational and physical infrastructure to support the personnel, aircraft, and equipment, and properly sized, configured, and instrumented airspace and ranges for tracking aircraft and weapons for the duration of each test. Within the construct of the DoD Major Range and Test Facility Base, DAF fighter aircraft test, evaluation, and training programs operate at Edwards AFB in California, Nellis AFB in Nevada, and Eglin AFB in Florida.

Eglin AFB is the DAF's headquarters for the 96th Test Wing (96 TW), which provides expert evaluation and validation of the performance of systems through the research, design, development, acquisition, and sustainment process to ensure DAF has technologically superior, reliable, maintainable, sustainable, and safe aircraft and associated weapon systems. Under the current proposal, the F-35A DT program would be assigned to the 40th Flight Test Squadron, under the 96 TW, while weapons testing and/or aircraft and weapons modifications are underway.

1.3 Location

1.3.1 Eglin AFB

Eglin AFB, located in northwest Florida, controls the Eglin Main Base, land range areas, and the Eglin Test and Training Complex (ETTC) along the Florida Panhandle as well as the Eglin Gulf Test and Training Range (EGTTR) in the Gulf of Mexico (see **Figure 1-1**). Eglin Main Base is along the south-central boundary within the Eglin Reservation and occupies approximately 10,500 acres (16.5 square miles). The Eglin Main Base includes all command and control elements, base operating and support activities, the installation housing area, and the airfield. The ETTC spans approximately 724 square miles of land across the Northwest Florida Panhandle east of Pensacola. This area encompasses land, airspace, and water areas used to support testing and training operations, including designated test areas (TAs), interstitial areas (areas between TAs), and the riverine and estuarine areas of Choctawhatchee Bay and the Santa Rosa Sound. The ETTC is one of nineteen component installations that make up the DoD Major Range and Test Facility Base, a set of test installations, facilities, and ranges that are maintained primarily for DoD research, development, test, and evaluation purposes. The primary function of the ETTC is to support research, development, test, and evaluation of conventional weapons and electronic systems. Land ranges in the ETTC include more than 50 specific TAs that provide instrumented airspace and ranges with the capacity and physical infrastructure to track the function, operation, and performance of aircraft and integrated weapon systems against specified safety and efficiency standards and ability to support operating requirements. These areas underlie special use airspace (SUA) that separates military flight activities from civilian air traffic to support relatively unconstrained operations. Eglin AFB controls approximately 127,868 square miles of SUA, of which 2.5 percent (3,226 square miles) is over land in the ETTC and the remaining 97.5 percent (124,642 square miles) is over water in the EGTTR. SUA at Eglin AFB includes restricted areas (designated "R-"), warning area (designated "W-"), military operating areas (MOAs), and military training routes. ETTC airspace encompasses Rose Hill MOA and Air Traffic Control Assigned Airspace

(ATCAA), Eglin A East MOA, Eglin A West MOA, Eglin B MOA, Eglin C MOA, Eglin D MOA, Eglin E MOA, R-2914A, R-2914B, R-2915A, R-2915B, R-2915C, R-2917, R-2918, R-2919A, and R-2929B (shown in **Figure 1-1**). The EGTTR is the airspace controlled by Eglin AFB over the Gulf of Mexico beginning 3 nautical miles (NM) from shore, and the underlying Gulf waters. The EGTTR extends southward and westward off the coast of Florida and is subdivided into blocks of airspace that consist of warning areas W-155, W-151, W-470, W-168, and W-174 and Eglin Water Test Areas 1 through 6 (shown in **Figure 1-2**). The EGTTR warning areas are further subdivided into smaller airspace units for scheduling purposes (for example, W-151A, B, C, and D). The surface waters underlying the EGTTR airspace consists of greater than 102,000 square NM in the Gulf of Mexico. **Figures 1-1** and **1-2** also show the Gulf Regional Airspace Strategic Initiative (GRASI) airspace.

1.3.2 Tyndall AFB

Tyndall AFB is in the Florida Panhandle in Bay County on a peninsula between the St. Andrew Bay System and the Gulf of Mexico, approximately 60 miles southeast of Eglin AFB. The installation is home to the 325th Fighter Wing, a subordinate of Air Combat Command, which supports operation of various advanced aircraft. Tyndall AFB and the surrounding military airspace provide a critical venue for aircraft development, testing, and training operations. Military airspace managed and controlled by Tyndall AFB includes the Tyndall B, C/H, and E MOAs and the Compass Lake ATCAA and Carrabelle ATCAA within the same operating altitude lateral confines as the Tyndall MOAs.

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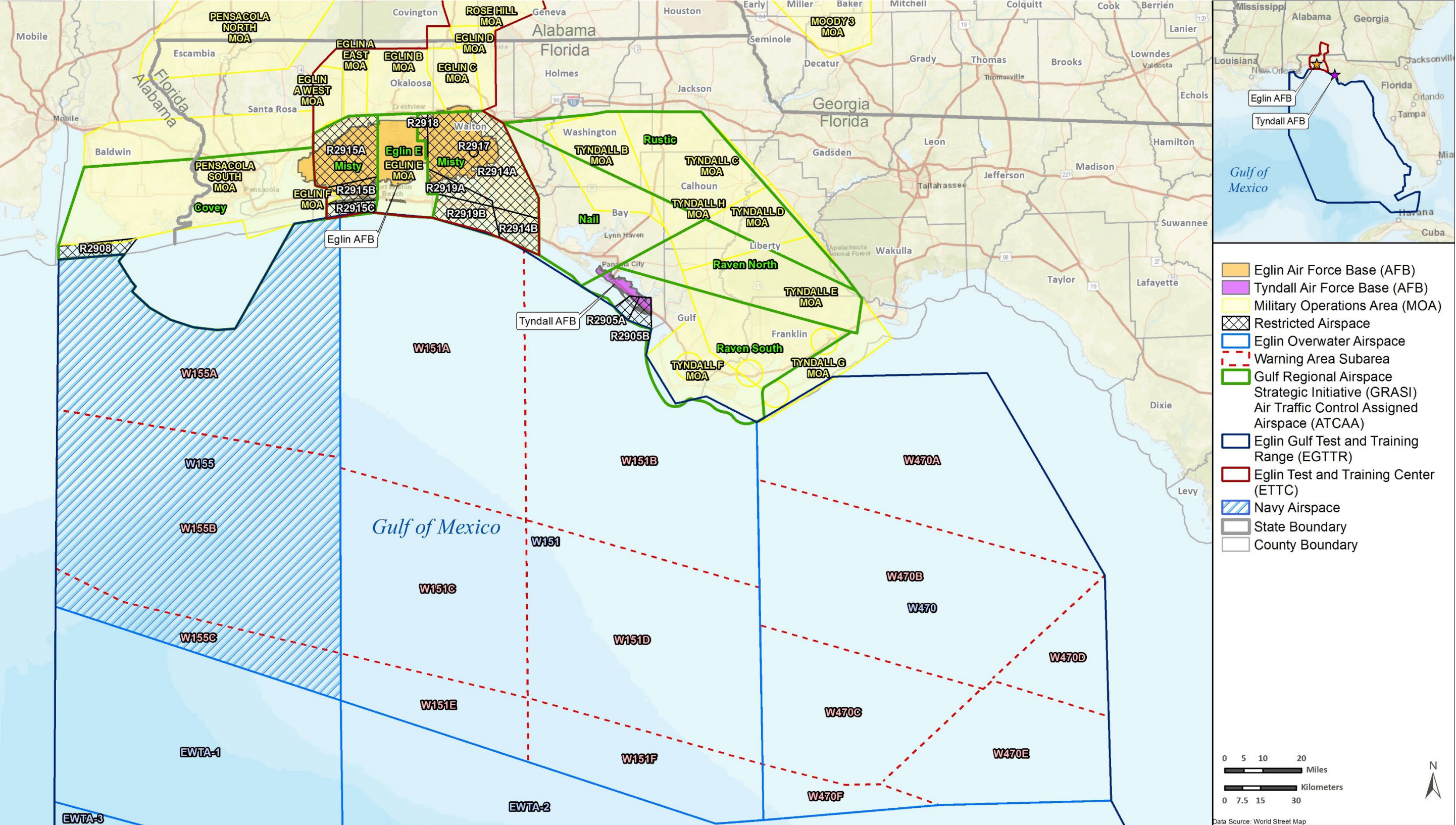


Figure 1-1. Project Area

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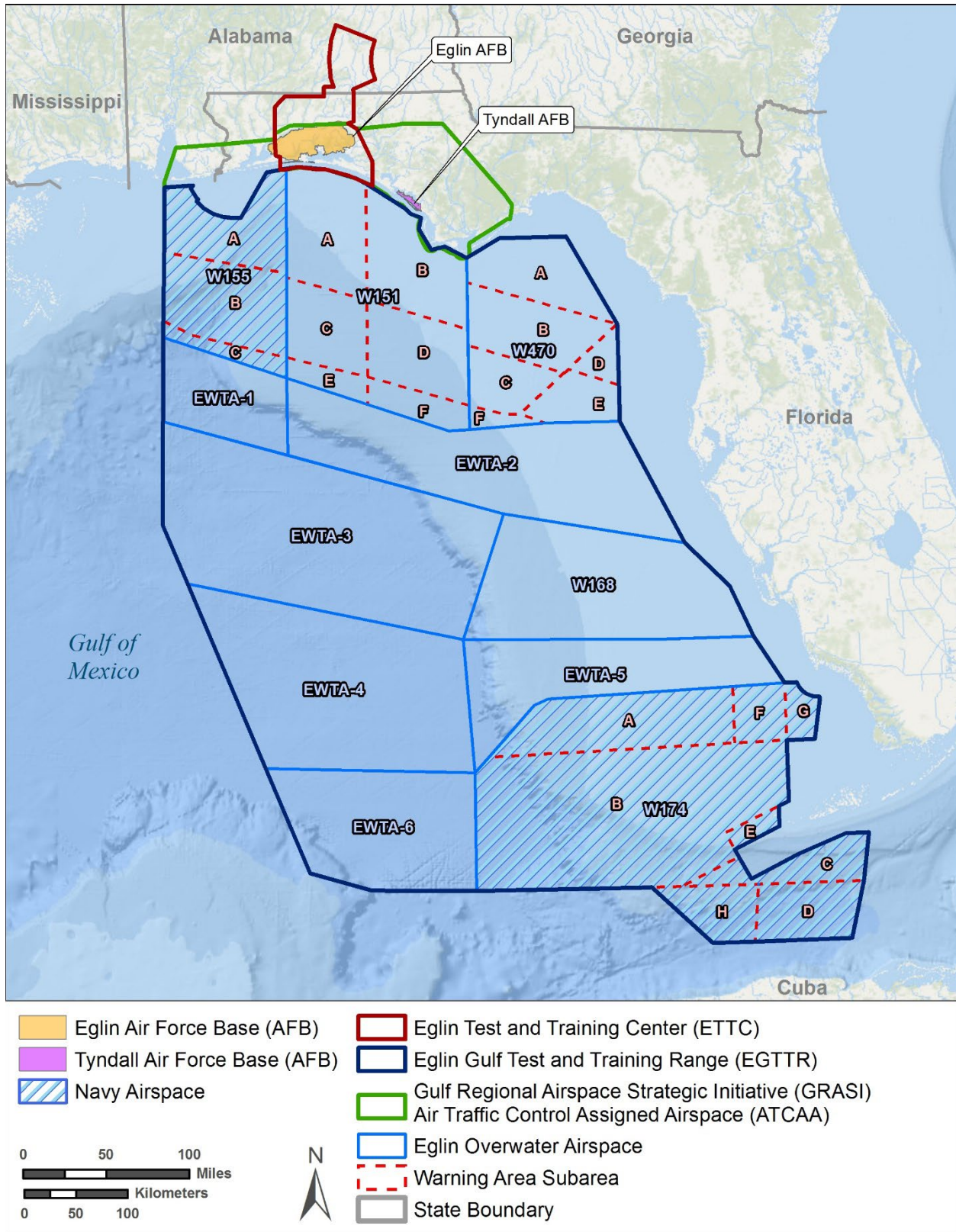


Figure 1-2. SUA and Eglin Water Test Areas in the EGTTT

1.4 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to facilitate integration of air-to-air and air-to-ground weapons on the F-35A aircraft. This is done through a Weapons DT program, which is a routine procedure for fielding any combat aircraft weapon system.

The Proposed Action is needed to conduct developmental testing of weapon systems to be integrated onto the F-35A aircraft to evaluate whether the new systems fulfil design specifications, verify the design and manufacturer process per the design specifications, and to validate how the systems integrate into the aircraft, fulfill design requirements, and meet performance standards for safety, function, and effectiveness. Weapons DT would involve the loading, carriage, employment (targeting and firing), and other test functions using both inert and live weapons. This testing must be conducted at an installation that has the operational and airspace capacity to support the required flight and munitions expenditure activities, Weapons DT expertise, and properly sized, configured, and instrumented ranges that can track and control weapon system tests.

1.5 NEPA and Other Compliance Requirements

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code [U.S.C.] Sections [§§] 4321-4347) is a federal law requiring the analysis of potential environmental impacts associated with proposed federal actions before the actions are taken. The intent of NEPA is to make informed decisions based on the identification of potential environmental consequences and take appropriate actions to protect, restore, or enhance the environment. The Council on Environmental Quality (CEQ), established in accordance with NEPA, is responsible for ensuring federal agency compliance with NEPA.

The process for implementing NEPA is codified in 40 Code of Federal Regulations (CFR) 1500–1508, *Regulations for Implementing the Procedural Provisions of NEPA*. This EA was prepared in accordance with the September 14, 2020 version of CEQ NEPA rules [at 85 FR 43304–43376], as modified by the CEQ NEPA Implementing Regulations Revisions Final Rule that became effective May 20, 2022 and the DAF's *Environmental Impact Analysis Process (EIAP)* (32 CFR 989, as amended) that provides the DAF framework for implementing NEPA. This allows DAF to thoroughly examine the Proposed Action and alternatives to determine potential environmental impacts and inform the decision-making process. Air Force Policy Directive 3270, *Environmental Quality*, states DAF will comply with applicable federal, state, and local environmental laws and regulations, including NEPA.

CEQ regulations for implementing NEPA mandate all federal agencies to use a prescribed approach to environmental impact analysis to determine whether a proposed action could have significant impacts on the environment. The approach includes an evaluation of the potential environmental consequences associated with a proposed action and considers alternative courses of action.

To comply with NEPA, the planning and decision-making process for actions proposed by federal agencies involves a study of other relevant environmental laws and regulations. The

NEPA process, however, does not replace procedural or substantive requirements of other environmental laws and regulations. This EA examines several resource areas that have the potential to be affected by the Proposed Action and alternatives and includes applicable elements of the human and natural environments required by specific laws, regulations, Executive Orders (EOs), and policies. Discussions on regulatory compliance with principal federal and state laws and regulations are provided in later chapters of this EA.

This EA will be used to guide DAF in implementing the Proposed Action in a manner consistent with DAF standards for environmental stewardship should the Proposed Action be approved for implementation.

1.6 Documents Incorporated by Reference

In accordance with the 2020 CEQ revised guidelines for implementing NEPA (40 CFR 1500 – 1508), specifically 40 CFR 1501.12, *Incorporation by Reference*, and with the intent of reducing the size of this document, paperwork, and project delays, this EA incorporates by reference relevant plans, studies, and material from existing NEPA and other planning documents that address the existing environmental conditions, ongoing operations, and plans for installation development at Eglin AFB and Tyndall AFB. **Table 1-1** provides a list of all documents incorporated by reference for the locations proposed to support beddown of the F-35A DT program. In accordance with 40 CFR 1501.12, Eglin AFB provides these documents online at: **www.eglin.af.mil/About-Us/Eglin-Documents/** to ensure these documents are readily accessible to the public.

1.7 Scope and Organization of the EA

The scope of analysis in this EA includes evaluation of the Proposed Action and alternatives. The NEPA process ensures that environmental information, including the anticipated environmental consequences of a proposed action, is available to the public, federal and state agencies, and the decision-maker before decisions are made and before actions are taken. If the analyses presented in this EA indicate that the Proposed Action would not result in significant environmental impacts, then a Finding of No Significant Impact (FONSI) would be prepared. A FONSI summarizes why a proposed action would not have a significant effect on the human environment and why an Environmental Impact Statement (EIS) would not be necessary. If the analyses presented in this EA indicate that significant environmental effects would result from the Proposed Action that cannot be mitigated to insignificant levels, a Notice of Intent to prepare an EIS would be required, or no action would be taken.

The Proposed Action consists of facility construction and modification actions followed by training activities (air and ground training operations, including munitions expenditures) at Eglin AFB and Tyndall AFB. The documents incorporated by reference (listed in **Section 1.6**) provide information and impact analyses for activities that are similar in type, conduct, and operational tempo to the Proposed Action.

Table 1-1. Documents Incorporated by Reference ¹

Agency	Date	Document Title (Reference Citation) ²
Eglin AFB		
DAF	2008	Final EIS for Proposed Implementation of the Base Realignment and Closure 2005 Decisions and Other Related Actions at Eglin AFB, Florida (DAF 2008)
DAF	2014	Final Supplemental EIS for F-35 Beddown at Eglin AFB, Florida (DAF 2014b)
DAF	2015	Final EIS for the Gulf Regional Airspace Strategic Initiative GRASI, Landscape Initiative (DAF 2015)
DAF	2021	Report on the Value and Effectiveness of Emergency Alternative Arrangements for the Department of the Air Force's Interim Beddown of the F-22 Formal Training Unit at Eglin AFB, Florida (DAF 2021)
Eglin AFB	2014	Final Eglin AFB Cantonment Areas EA (Eglin AFB 2014)
Eglin AFB	2023	Eglin Gulf Test and Training Range Final Range EA (Eglin AFB 2023a)
Eglin AFB	2018	Air Installation Compatible Use Zones Study, Eglin AFB and Duke Field, Okaloosa County, Florida (Eglin AFB 2018a)
Eglin AFB	2019	Public Notification for Draft Special EA for Emergency Aircraft Beddown that Comprise the F-22 Formal Training Unit from Tyndall AFB to Eglin AFB, Florida (Eglin AFB 2019a)
Eglin AFB	2020	Final Cantonment Areas EA, Eglin AFB, Florida (Eglin AFB 2020a)
Eglin AFB	2022	Final Range EA for Eglin Overland Air Operations, Eglin AFB, Florida (Eglin AFB 2022a)
Eglin AFB	2022	Final EA Combat Air Forces Adversary Air (ADAIR), Eglin AFB, Florida (Eglin AFB 2022b)
Eglin AFB	2023	Final Supplemental Environmental Assessment for Combat Air Forces Adversary Air (ADAIR) Plus Up with F-22 Formal Training Unit Eglin Air Force Base, Florida (Eglin AFB 2023b)
JBLE & Eglin AFB	2021	Final EIS for Fifth Generation Formal Training Unit Optimization (JBLE & Eglin AFB 2021)
Tyndall AFB		
Tyndall AFB	2016	Final Tyndall AFB Air Installations Compatible Use Zones Study (Tyndall AFB 2016)
Tyndall AFB	2020	Final EA Combat Air Forces Contracted Adversary Air Temporary Operations from Tyndall AFB, Florida (Tyndall AFB 2020a)

Key: AFB – Air Force Base; DAF – Department of the Air Force; EA – Environmental Assessment; EIS – Environmental Impact Statement; JBLE – Joint Base Langley-Eustis

¹ Documents and associated analyses are incorporated by reference in accordance with 40 CFR 1501.12.

² Documents listed in this table are available online at: <https://www.eglin.af.mil/About-Us/Eglin-Documents/>

The proposed facility construction and modification actions would be consistent with installation development actions previously analyzed in the 2014 and 2020 *Cantonment Areas* EAs at Eglin AFB (Eglin AFB 2014, Eglin AFB 2020a). Additionally, the proposed F-35A DT operations would be conducted in a manner consistent with the existing fighter missions at the installation and

would use existing airfields and over land and over water ranges that were designed for and are specifically operated for military testing and training. Existing NEPA analyses for airfield and airspace operations ongoing at Eglin AFB and Tyndall AFB are referenced in **Table 1-1**.

Because details for the construction projects and F-35A DT operations included in the Proposed Action were not specifically evaluated in previous NEPA analyses, this EA evaluates the following:

- Construction of a 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar, demolition and relocation of a boat storage facility away from the airfield, addition to Building 64, and renovations of four existing support facilities;
- Installation of temporary (i.e., prefabricated) facilities on existing pavements to accommodate aircraft and personnel during the construction period;
- Beddown of four F-35A DT aircraft and associated personnel at Eglin AFB;
- Airfield and Weapons DT activities required for the F-35A DT mission.

F-35A DT aircraft would operate with advanced electronic systems and would be used to test both fielded and, eventually, developmental (new) defensive countermeasures (flares and chaff), weapon systems, and associated munitions. Analysis in this EA considers testing of fielded weapons. Any new defensive countermeasures or weapons that would be developed and tested in the future would be accompanied by test plans which would include programmatic NEPA or supplemental environmental analyses along with timelines of completion. Analyses would be done as part of a separate weapons development program and cannot be covered in this document since those weapons are unknown at this time.

Resource areas to be analyzed include land use, air quality, noise, cultural resources, geological resources, health and safety, hazardous materials and wastes, water resources, biological resources, safety, infrastructure and transportation, environmental justice, and socioeconomics. This EA considers environmental effects of other actions on the human environment that are reasonably foreseeable and have a reasonably close causal relationship to the Proposed Action (i.e., cumulative impacts).

Section 2 of this EA presents the scope and locations of the Proposed Action and the range of alternatives to be considered. In accordance with CEQ NEPA regulations, the No Action Alternative provides the baseline against which the environmental impacts of implementing the range of alternatives addressed can be compared. Analyses of the affected environment and environmental consequences from implementing the Proposed Action, including the cumulative impacts analysis and other environmental considerations, is provided in **Section 3**.

Appendix A provides materials on interagency coordination and public involvement. **Appendix B** provides documentation for Tribal government-to-government consultation. **Appendix C** provides supporting documentation for the Coastal Zone Management Act (CZMA) analysis and the Coastal Consistency Determination. **Appendix D** includes support information for the resource analyses. **Appendix E** provides the avoidance and minimization measures and management practices that would be implemented to reduce impacts on resources from the

Proposed Action. **Appendix F** includes supporting documentation for the air quality analysis. **Appendix G** includes supporting details for the biological resources analysis.

1.8 Government-to-Government Coordination, Intergovernmental and Stakeholder Coordination, and Public Involvement

1.8.1 Government-to-Government Coordination and Consultation

Consistent with National Historic Preservation Act of 1966 implementing regulations (36 CFR 800); DoD Instruction 4710.02, *Interactions with Federally-Recognized Tribes*; Air Force Instruction 90-2002, *Air Force Interaction with Federally-Recognized Tribes*; and Air Force Manual 32-7003, *Environmental Conservation*, the DAF is also consulting with federally recognized tribes that are historically affiliated with the geographic region being considered for the Proposed Action regarding the potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal coordination process is distinct from NEPA and the intergovernmental coordination processes, and requires separate notification to all relevant tribes. The timelines for tribal consultation are also distinct from those of intergovernmental consultations.

Eglin AFB conducts government-to-government consultation with six federally recognized tribes with a historic or cultural affiliation with Eglin AFB lands: the Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, Seminole Nation of Oklahoma, Poarch Band of Creek Indians of Alabama, Muscogee (Creek) Nation of Oklahoma, and Thlopthlocco Tribal Town (Eglin AFB 2022c). The installation has arrangements with these tribes whereby the tribes do not wish to be contacted for work in areas that have already been surveyed or where predictive modeling, based on the surrounding area, has determined that there is a low likelihood for tribal and cultural resources (see **Appendix B**). These arrangements are captured in the executed 2021 Programmatic Agreement, which supersedes all earlier government-to-government agreements (Eglin AFB 2021a). No additional government-to-government consultation will be conducted for this undertaking.

1.8.2 Intergovernmental and Stakeholder Coordination

The Intergovernmental Cooperation Act and EO 12372, *Intergovernmental Review of Federal Programs* (as amended by EO 12416), require federal agencies to provide opportunities for consultation with officials of state and local governments that could be affected by a federal project. Through the interagency and intergovernmental coordination process, the project proponent notifies relevant federal, state, and local agencies of a proposed action and alternatives and provides them with sufficient time to make known their environmental concerns specific to the action. The process also provides the project proponent with the opportunity to cooperate with and consider state and local views in implementing the federal proposal.

The following describes the intergovernmental coordination anticipated for the Proposed Action:

NHPA. Per the requirements of Section 106 of the NHPA and its implementing regulations, findings of effect and requests for concurrence, where appropriate, are transmitted to the Florida State Historic Preservation Officer.

Endangered Species Act (ESA; 16 U.S.C. §§ 1531 *et seq.*) and the Marine Mammal Protection Act (MMPA; 16 U.S.C. §§ 1361 *et seq.*). ESA Section 7 requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) and/or National Marine Fisheries Service (NMFS) in cases where a proposed action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The MMPA requires federal agencies to consult with NMFS in cases where a proposed action could affect marine mammals.

DAF determined the following NEPA analyses and programmatic biological opinions (BOs) address the operating locations and the types, conduct, and volume of activities required as part of the Proposed Action; therefore, additional consultation per ESA Section 7 or the MMPA would not be required:

- **Construction.** NEPA analysis, and consultation in accordance with ESA Section 7, was conducted to address construction and preparation actions in previously disturbed areas along the airfield at Eglin Main Base. These efforts were documented in the 2014 and 2020 *Cantonment Areas EAs* (Eglin AFB 2014, Eglin AFB 2020a) and the 2009 and 2013 USFWS BOs, which respectively address indigo snake, Okaloosa darter, and the red cockaded woodpecker at Eglin AFB (USFWS 2009 and USFWS 2013).
- **Operations.** NEPA analysis, and consultation for potential effects on listed species in accordance with ESA Section 7, was conducted for fighter aircraft operations including flight, defensive countermeasures, and munitions expenditures at Eglin AFB, Tyndall AFB, ETTT airspace and land ranges, and the EGTTR. These efforts are documented in the 2008 *Base Realignment and Closure and Other Decisions EIS* (DAF 2008), the 2014 *F-35 Supplemental EIS* and associated BO issued by USFWS (DAF 2014b), the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a), the 2022 *EA* and 2023 *Supplemental EA for the Combat Air Forces Adversary Air (ADAIR) Program at Eglin AFB* (Eglin AFB 2022b and Eglin AFB 2023b).
- Analysis and consultation per the MMPA regarding take for marine mammals were conducted for Eglin AFB munitions expenditures in the EGTTR in support of the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a). The 2017, 2019, and 2023 NMFS Programmatic BOs and Conference Reports (NMFS 2017, NMFS 2019, NMFS 2023a), and the 2023 NMFS Letter of Authorization (LOA) (NMFS 2023b), document the evaluation of Eglin AFB's ongoing activities within the EGTTR, and cover the non-intentional taking of marine mammals incidental to Eglin AFB's testing and training activities. The 2023 LOA, issued by NMFS pursuant to Section 101(a)(5)(A) of the MMPA, is valid for the period of seven years (April 13, 2023 to April 13, 2030) and specifies the allotted types and numbers of munitions that may be expended by operators out of Eglin AFB, the locations within the Gulf of Mexico where expenditures can be conducted, and the measures that must be employed to avoid or minimize impacts on marine mammals. All Eglin AFB programs expending munitions using capacity from the evaluated allotment must adhere to the mitigation, monitoring, and reporting requirements per the 2018 LOA.

CZMA. The Florida Coastal Management Program (FCMP) incorporates laws that protect and enhance Florida’s conservational, recreational, ecological, and aesthetic values in accordance with the federal CZMA. Eglin AFB is within the coastal zone of Florida; therefore, a coastal zone consistency review is required in accordance with the CZMA to ensure that federal actions that could affect coastal resources will comply with the enforceable policies of the FCMP. The FCMP is based on a network of agencies implementing twenty-four laws that protect and enhance public safety interests as well as Florida’s natural, cultural, and economic coastal resources. The Florida Department of Environmental Protection (FDEP) implements the FCMP through the Florida State Clearinghouse. It is the responsibility of the Florida State Clearinghouse to coordinate State review and concurrence with or objection to the CZMA consistency review. The records of the CZMA consistency review are included in **Appendix C**.

1.8.3 Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to actions being taken. The premise of NEPA is that the quality of federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process.

The Draft EA and Draft FONSI are available in electronic format on the Eglin AFB website at <https://www.eglin.af.mil/About-Us/Eglin-Documents/>. Public comments on the Draft EA and Draft FONSI will be considered prior finalization of the EA and signing of the FONSI.

The Draft EA and Draft FONSI were made available to the Florida State Clearinghouse and relevant state and local government agencies and organizations (stakeholders) for a 30-day review and comment period. A Notice of Availability of the Draft EA and Draft FONSI was published in the local newspapers. **Appendix A** provides the list of stakeholders and tribes contacted regarding the project. Following the public comment period, copies of the Notice of Availability and stakeholder and tribal letters will be included in **Appendix A**.

2 Proposed Action and Alternatives

This section describes the Proposed Action and alternatives considered, including the No Action Alternative. Guidance for complying with NEPA requires an assessment of potentially effective and reasonably feasible alternatives for implementing the Proposed Action.

2.1 Proposed Action

The Proposed Action is to beddown four F-35A aircraft and associated personnel at Eglin AFB and to conduct test flight operations as part of a Weapons DT program to facilitate the integration of air-to-air and air-to-ground weapons on the F-35A aircraft. To support the F-35A DT Program, the Proposed Action also includes construction of a 2-bay aircraft maintenance hangar and aircraft parking area, construction of a 2-bay aircraft test hangar, demolition of Building 965 and associated relocation of the maritime operations group and boat storage functions to a new site away from the airfield, an addition to Building 64, and renovation of four existing support facilities. In addition to Eglin AFB, DAF would conduct F-35A DT operations at Tyndall AFB.

2.1.1 F-35A DT Arrival Schedule

The Proposed Action would involve a phased arrival of the four new F-35A DT aircraft between January 2026 and November 2026 (see **Table 2-1**).

Table 2-1. Phased Arrival Timeline for the F-35A DT Aircraft

Calendar Year		2025				2026											
Month		Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
F-35A DT Aircraft Arrival	1																
	2																
	3																
	4																

2.1.2 Airfield Operations

The proposed F-35A DT aircraft would operate out of Eglin AFB within the ETTC, Tyndall AFB, and the EGTTR where F-35A, F-15, and F-16 flight and weapons training operations are currently conducted (see **Figure 1-1**) (Eglin AFB 2022d). Under the Proposed Action, F-35A DT aircraft would operate with advanced electronic systems and would be used to test both fielded (existing) and, eventually, unfielded (new) defensive countermeasures (flares and chaff) and weapon systems and associated munitions. Use of fielded countermeasures and munitions would be consistent with the existing F-35A operations, which were previously analyzed in the 2008 *Base Realignment and Closure and Other Decisions EIS* (DAF 2008), the 2014 *F-35 Supplemental EIS* (DAF 2014b), 2023 *EGTTR Final Range EA* (Eglin AFB 2023a), and the 2022 *Final Range EA for Eglin Overland Operations EA* (Eglin AFB 2022a) (refer to **Section 1.6**). It is expected that pilots in the F-35A DT program would be required to follow the same requirements for proficiency (flight and weapons operations) as required of the existing F-35A program. Additionally, F-35A DT operations would adhere to the same flight and range safety

protocols, Bird/Wildlife Aircraft Strike Hazard (BASH) plans, management actions, and best practices employed by the existing fighter missions operating out of Eglin AFB. Future testing of unfielded or developmental weapon systems and munitions would be subject to separate NEPA analysis.

As shown in **Table 2-2**, the four F-35A DT aircraft would be flown for approximately 2,346 airfield operations per year. This total would be comprised of 2,322 operations at Eglin AFB and 24 operations at Tyndall AFB. All flight operations would be conducted between the daytime operating hours of 7:00 am and 10:00 pm local time. The four F-35A DT aircraft and associated operations would not replace any existing aircraft or operations at Eglin AFB; therefore, the additional aircraft at Eglin AFB and all flight activity at the respective installations would be additive. **Table 2-2** presents the proposed additional F-35A DT airfield operations relative to the total number of operations as well as the number of existing F-35A operations at each of the airfields. The subsections following **Table 2-2** provide brief descriptions of the operating conditions at Eglin AFB and Tyndall AFB.

2.1.2.1 Eglin AFB

Baseline Total Operations at Eglin AFB. The Eglin AFB total baseline number of airfield operations (i.e., 181,974 operations) reflects projected operations from the 2018 AICUZ with updated mission-related totals provided by Eglin AFB (Eglin AFB 2018a; Eglin AFB 2022e), the 2021 *Fifth Generation Formal Training Unit Optimization EIS* (JBLE & Eglin AFB 2021), the 2022 *Final EA for Combat Air Forces Adversary Air* (Eglin AFB 2022b), and the 2023 *Final Supplemental EA for Combat Air Forces Adversary Air Plus Up with F-22 Formal Training Unit Eglin Air Force Base, Florida* (Eglin AFB 2023b).

As part of a separate, CEQ-facilitated, emergency NEPA action following the devastation to Tyndall AFB by Hurricane Michael in 2018, DAF temporarily relocated the 43rd Fighter Squadron F-22 Formal Training Unit (FTU) mission and supporting 2nd Fighter Training Squadron T-38s from Tyndall AFB to Eglin AFB (Eglin AFB 2019a, DAF 2021). Although the F-22 FTU mission is currently active at Eglin AFB, DAF intends to relocate the F-22 FTU mission to Joint Base Langley-Eustis (JBLE) by the end of 2023 (DAF 2021, JBLE & Eglin AFB 2021), prior to the arrival of the F-35A DT aircraft at Eglin AFB. Because relocation of the F-22 FTU mission could be delayed, analysis in this EA conservatively assumes a baseline annual number of operations that includes the 42,554 annual F-22A FTU mission operations at Eglin airfield. Additionally, in March 2023, the DAF approved permanent contract Adversary Air (ADAIR) support for Eglin AFB with the beddown of 16 contract ADAIR aircraft that would fly approximately 3,000 annual sorties from Eglin AFB (Eglin AFB 2022b, Eglin AFB 2023). ADAIR aircraft arrivals and operations at Eglin AFB began in April 2023 and are, therefore, also included in the Eglin AFB baseline total.

Under the Proposed Action, there would be a net 1 percent increase in total aircraft operations at the Eglin AFB airfield. Following relocation of the F-22 FTU, anticipated by the end of 2023, there would be a net reduction in the projected baseline total number of operations at Eglin AFB by approximately 31 percent.

Table 2-2. Proposed Additional F-35A DT Airfield Operations ^{1, 2, 3}

Location	Proposed F-35A DT Takeoffs	Proposed F-35A DT Landings	Proposed F-35A DT Closed Patterns	Total Proposed F-35A DT Operations	Projected Total F-35A Operations (+/- Percent Change in F-35A Operations)	Projected Total Installation Operations (+/- Percent Change in Total Installation Operations)
Baseline Total Eglin AFB Airfield Operations: 181,974 ⁴						
Baseline F-35A Airfield Operations at Eglin AFB: 41,000 ⁴						
Proposed F-35A DT Operations at Eglin AFB	780	780	750	2,322	43,322 (+6)	184,296 (+1)
Baseline Total Tyndall AFB Airfield Operations: 22,000 ⁵						
Baseline F-35A Airfield Operations at Tyndall AFB: 6,900 ⁵						
Proposed F-35A DT Operations at Tyndall AFB	8	8	8	24	6,924 (+0.3)	22,024 (+0.1)
Total Proposed Operations ⁶	792	792	762	2,346	NA	NA

Key: AFB – Air Force Base; DT – Developmental Test; NA – not applicable

¹ An airfield operation is a single event defined as either (1) a single takeoff; (2) a single landing; (3) the approach phase of a closed pattern, or (4) the takeoff phase of a closed pattern. A closed pattern consists of two airfield operations (or one approach phase and one takeoff phase). The total closed pattern operations (i.e., 772) is comprised of 386 approach phases and 386 takeoff phases.

² All proposed airfield operations would be conducted between the hours of 7:00 am and 10:00 pm local time. No nighttime operations are anticipated.

³ Numbers of F-35A airfield operations reflect a chase flight with each DT operation. Analysis in this EA conservatively assumes F-35A aircraft as chase. Chase aircraft could also include T-38, F-15, F-16, and Sunshine Aero (propeller -type aircraft such as the Piper, Cessna, and Aero liner).

⁴ Total baseline annual airfield operations for Eglin AFB reflect the 2021 *Fifth Generation Formal Training Unit Optimization EIS* (JBLE & Eglin AFB 2021), the 2022 *Final EA for Combat Air Forces Adversary Air* (Eglin AFB 2022b), the 2023 *Final Supplemental EA for Combat Air Forces Adversary Air Plus Up with F-22 Formal Training Unit Eglin Air Force Base, Florida* (Eglin AFB 2023b), and the 2018 *AICUZ for Eglin AFB and Duke Field* (Eglin AFB 2018a).

⁵ Per Tyndall AFB data provided as baseline for the *Final EA Combat Air Forces Contracted Adversary Air Temporary Operations from Tyndall AFB, Florida* (Tyndall AFB 2020a).

⁶ Numbers of operations reflect the sum of proposed takeoffs, landings, and closed patterns for all airfields.

Baseline F-35A Operations at Eglin AFB. Baseline F-35A operations at Eglin AFB total 33,000 (JBLE & Eglin AFB 2021; Eglin AFB 2022e). The incoming F-35A DT airfield operations would result in net 6 percent increase in total F-35A aircraft operations

2.1.2.2 Tyndall AFB

Baseline Total Operations at Tyndall AFB. The 2016 *Tyndall AFB AICUZ* projected approximately 66,000 airfield operations as the operational condition in 2018. Because the F-22 FTU mission and associated assets were relocated from Tyndall AFB in 2018 (Eglin AFB 2019a), and DAF intends to relocate the mission to JBLE, this EA assumes an ongoing baseline number of airfield operations at Tyndall AFB that excludes the approximately 44,000 F-22 FTU program operations. Using 2021 operational data provided by Tyndall AFB for the 2020 *Final Combat Air Forces Contracted Adversary Air Temporary Operations EA* (Tyndall AFB 2020a),

the total airfield operations at the installation were approximated at 22,000 per year, including based and transient aircraft flights. Adding the proposed 24 F-35A DT airfield operations at Tyndall AFB would result in a net 0.1 percent increase in total aircraft operations.

Following the beddown of the F-35A DT program at Eglin AFB, the resulting volume of operations at Tyndall AFB would be approximately 22,024, which would be approximately one-third (33 percent) of the historical operating capacity of 66,000 (Tyndall AFB 2016).

Baseline F-35A Operations at Tyndall AFB. Of the total operations, transient F-35A aircraft were projected to be approximately 6,900 flight operations in 2021. Adding the proposed 24 F-35A DT airfield operations at Tyndall AFB would result in a net 0.3 percent increase in total F-35A transient operations.

2.1.3 Weapons DT Operations

As noted in **Section 2.1.2**, F-35A DT aircraft would operate with advanced electronic systems and would be used to test both fielded and, eventually, unfielded (new) defensive countermeasures (flares and chaff) and weapon systems and associated munitions. Because information on unfielded weapon systems is unknown at this time, F-35A DT activities using such weapon systems would be subject to separate NEPA analysis prior to operating.

2.1.3.1 Airspace and Range Utilization for Weapons DT Operations

Weapons DT operations would be conducted across multiple SUAs over land and water. Depending on the SUA, operations would include supersonic and subsonic flight. Expenditures of defensive countermeasures or munitions would be conducted during subsonic flight operations over water. **Table 2-3** lists the number of Weapons DT operations proposed for individual SUAs in the EGTTT, ETTC and the GRASI ATCAA.

Pilots would perform up to 150 F-35A DT supersonic flight and Weapons DT operations per year at Eglin AFB, representing approximately 6 percent of the overall projected number of F-35A Weapons DT operations at the installation. These operations would be similar to and consistent with those analyzed in the 2015 *EGTTT Final Range EA* and the 2022 *Final Range EA for Eglin Overland Operations* (refer to **Section 1.6**).

Supersonic flights and associated munitions expenditures over land would be conducted in R-2915A over TA B-70. A total of 60 supersonic test flights conducted over TA B-70 are authorized by Supersonic Waiver 75-1, which is renewed every 3 years (Eglin AFB 2017b). This waiver allows supersonic flights to be conducted in overland airspace over TA B-70, below flight level (FL) 300, which is 30,000 feet above mean sea level (MSL). Supersonic test flights were analyzed in the 2022 *Final Range EA for Eglin Overland Operations* (Eglin AFB 2022a). Based on input from the Eglin AFB airspace manager and other air operations personnel, supersonic test flights are not proposed or expected to occur in any other Eglin AFB overland airspace in the reasonably foreseeable future and, therefore, are not analyzed in this EA.

Table 2-3. Airspace/Range Utilization for Weapons DT Operations

Airspace	Current Altitude	Baseline Operations	Projected F-35A Weapons DT Flight Operations	Projected Total Operations	Percent Change (+/-) in Total Operations
EGTTR SUAs (Over Water)					
W-151A, W-151B, W-151C, W-151D, W-151E, W-151F	Surface to Unlimited ¹	6,896 ²	420	7,316	+6
W-470A, W-470B, W-470C, W-470D, W-470E	Surface to Unlimited ¹	1,636 ²	20	1,656	+1
ETTC SUAs (Over Land)					
R-2914A	Surface to Unlimited ⁴	3,045 ⁴	120	3,165	+4
R-2914B	8,500 feet MSL to Unlimited ⁴	2,367 ⁴	0	2,367	0
R-2915A/B	Surface to Unlimited ⁴	9,127 ⁴	120	9,247	+1
R-2915C	8,500 feet MSL to Unlimited ⁴	3,348 ⁴	0	3,348	0
GRASI (Over Land and Over Water)					
GRASI ATCAA ³	FL240 to FL600 ¹	1,724 ²	100	1,824	+6

Key: ATCAA – Air Traffic Control Assigned Airspace; DT – Developmental Test; EGTTR – Eglin Gulf Test and Training Range; ETTC – Eglin Test and Training Complex; FL – flight level; GRASI – Gulf Regional Airspace Strategic Initiative; MSL – mean sea level; SUA – special use airspace; W- – warning area; R- – restricted area

¹ No change to existing minimum flight altitude for F-35A operations is proposed.

² Baseline Weapons DT flight operations in the warning areas and GRASI ATCAA conservatively includes the F-22 FTU and contract ADAIR missions as reported in *Final EA Combat Air Forces Adversary Air, Eglin AFB* (Eglin AFB 2022b) and the *Final Supplemental Environmental Assessment Combat Air Forces Adversary Air Plus Up with F-22 Formal Training Unit Eglin Air Force Base, Florida* (Eglin AFB 2023b).

³ The GRASI ATCAA includes the Covey, Misty, Nail, Rustic, Raven North, and Raven South ATCAAs.

⁴ Numbers of baseline weapons flight operations in the restricted airspace from the *Final Range EA for Eglin Overland Operations* (Eglin AFB 2022a), *Final EA for Combat Air Forces Adversary Air* (Eglin AFB 2022b), and the *Final Supplemental EA for Combat Air Forces Adversary Air Plus Up with F-22 Formal Training Unit Eglin Air Force Base, Florida* (Eglin AFB 2023b).

2.1.3.2 Defensive Countermeasures

F-35A DT aircraft would be operated with advanced electronic systems and employ flares (e.g., M206 flares or similar) during DT operations to simulate the full range of combat tactics while testing weapons. The existing and estimated additional flares expenditures are presented in **Table 2-4**.

Chaff has not yet been fielded for the F-35A aircraft; however, DT aircraft would be expected to be among the first users as chaff is developed and tested. Chaff and flares would be employed in SUA authorized for their use. No expenditures of defensive countermeasures would occur within the GRASI ATCAA, R-2914, or R-2915 (see **Figure 1-1**).

Table 2-4. Current and Proposed Estimated Defensive Countermeasures Expenditures

Airspace	Countermeasure Type	Current Baseline Use	Projected F-35A Weapons DT Operations	Total Estimated Future Use	Net Percent Change (+/-)
W-151A, W-151B, W-151C, W-151D, W-151E, W-151F	Chaff Bundles	18,346 ¹	200	18,546	+1
	Flares	27,757 ¹	200	27,957	+<1 ³
W-470A, W-470B, W-470C, W-470D, W-470E	Chaff Bundles	1,712 ¹	10	1,722	+<1 ³
	Flares	3,523 ¹	10	3,533	+<1 ³
R-2914A/B	Chaff Bundles	47 ²	0	47	0
	Flares	53 ²	0	53	0
R-2915A/B/C	Chaff Bundles	0 ²	0	0	0
	Flares	30 ²	0	30	0

¹ Baseline chaff and flare use for the warning areas per Eglin AFB 2023b.

² Baseline chaff and flare use for the restricted areas per *Final Range EA for Eglin Overland Operations*, Eglin AFB (Eglin AFB 2022a).

³ Reflects increase of flares expenditures in the W-151 subareas by approximately by 0.7 percent. Respectively, reflects increases in chaff and flares expenditures in the W-470 subareas by 0.6 percent and 0.3 percent.

2.1.3.3 Munitions Expenditures

Munitions expended from these weapon systems may be inert (i.e., no explosive materials/warhead) or live (containing explosive materials/warhead). Any weapons expenditures of live munitions would follow applicable Eglin AFB procedures and expenditures of live munitions would occur only in approved impact areas in the ETTC and TAs where F-35 mission operations are currently conducted or the EGTTT as analyzed in the 2014 *F-35 Supplemental EIS*, 2022 *Final Range EA for Eglin Overland Operations*, and the 2023 *EGTTT Final Range EA* and in accordance with the 2017, 2019, and 2023 BOs and the 2023 LOA for Eglin AFB activities (refer to **Section 1.6**).

Specific weapons expenditure forecasts are not available due to varying test requirements but, historically, 95 percent of expenditures required for Weapons DT operations would be inert versions with no explosives. Therefore, the 100 planned annual munitions expenditures would include up to a maximum of 5 live munitions.

Table 2-5 lists the types and maximum number of live munitions that may be expended annually for the F-35A DT program. Live munitions expended for the F-35A DT program would utilize a portion of the total live expenditures allotted for Eglin AFB, as addressed during prior consultations with NMFS (NMFS 2017, NMFS 2019, NMFS 2023a). The types of inert munitions expended for the F-35A DT program may vary according to testing and evaluation needs but would not exceed a total of 95 per year.

Table 2-5. Anticipated Annual Live Munitions Expenditures

Types of Live Munitions ¹	Proposed Number of Expenditures ^{2, 3}
Guided Bomb Units (GBUs)	
GBU with a 500-pound bomb warhead	1
GBU with a 1,000-pound bomb warhead	1
GBU with a 2,000-pound bomb warhead	1
Air Intercept Missiles (AIMs)	
AIM-9, Sidewinder type/size air-to-air missile with a 25-pound warhead	1
AIM-120 Advanced Medium-Range air-to-air type/size missile with a 50-pound warhead	1

¹ The net explosive weight, or the total weight of explosive materials contained in a single munition, would be less than the total weights listed for each warhead.

² Numbers listed represent the maximum proposed per type of live munition.

³ Number reflects the maximum that may be expended per year. Live munitions expended for the F-35A DT program would use a portion of the total allotment for Eglin AFB addressed during prior consultations with NMFS (NMFS 2017, NMFS 2019, NMFS 2023a, NMFS 2023b).

Weapons DT operations would use both fielded and developmental weapons and associated munitions expenditures. Fielded weapons that may be tested as part of the F-35A DT program include:

- *Air Intercept Missile (AIM)-9* – The AIM-9 Sidewinder (25-pound warhead) is a supersonic, heat-seeking, air-to-air missile carried by fighter aircraft. It has a high-explosive warhead and an infrared heat-seeking guidance system.
- *AIM-120* – The AIM-120 advanced medium-range air-to-air missile (50-pound warhead) is a new generation missile. It has an all-weather, beyond-visual-range capability.
- *Guided Bomb Unit (GBU)-12* – The GBU-12 uses a Mark (Mk) 82, 500-pound general purpose warhead. The operator illuminates a target with a laser designator and then the munition guides to a spot of laser energy reflected from the target. The GBU-12 is a member of the Paveway II series of laser guided bombs.
- *GBU-31* – The GBU-31 is a Mk 84 or Bomb Live Unit-109 2,000-pound class general purpose warhead with a Joint Direct Attack Munition (JDAM) guidance kit attached to it.
- *GBU-32* – The GBU-32 is a Mk 83 1,000-lb general purpose warhead with a JDAM kit attached to it.
- *GBU-38* – The GBU-38 is a Mk 82 500-pound general purpose warhead with a JDAM kit attached to it.
- *GBU-39B* – The GBU-39B Small Diameter Bomb is an extended range all-weather, day or night 250-pound class, guided munition. The Small Diameter Bomb relies on the Global Positioning System to provide navigation to the target.
- *GBU-54* – The GBU-54 is the Laser JDAM variant of the GBU-38 500-pound class weapon.

The proposed F-35A DT operations would use only those live munitions that have been previously reviewed and included in the allotment for Eglin AFB activities in consultation with USFWS and NMFS, as applicable. To facilitate tracking of the approved number of expenditures, the F-35A DT program would be required to coordinate test plans for approval

and submit follow-on EIAP documentation as required by 32 CFR 989. Any testing activities or plans to expend munitions that were not included in the existing allotment would require separate EIAP analysis and associated consultation efforts.

2.1.4 Facility Requirements

To support the requirements of the F-35A DT program, the Proposed Action includes construction of a 2-bay aircraft maintenance hangar and aircraft parking area, construction of a 2-bay aircraft test hangar in a previously disturbed and regularly maintained area along the airfield, an addition to Building 64, and renovation of four existing support facilities (Buildings 32, 100, 101, and 138) at Eglin AFB (see **Figure 2-1**). Facilities and infrastructure required for the F-35A DT program would need to be located along the airfield in areas with low visibility to support ongoing operational and maintenance activities and maintain the necessary requirements for operational security. Because the area available for development within that part of the installation is limited, siting for the proposed new facilities was constrained to the locations shown in **Figure 2-1**. Temporary (i.e., prefabricated) facilities would be installed on existing pavements along the airfield to accommodate the earliest arrived F-35A DT aircraft during construction. These facilities are not shown in **Figure 2-1** because they may be placed and relocated, as needed, during the construction phase, and would be removed when construction is completed. Also, in accordance with operational security requirements for the Proposed Action, some facilities and infrastructure have been excluded from the figure. The DAF anticipates construction and preparation activities would be conducted within a timeframe of 24 months.

The new facilities would include fire suppression systems, all utilities, pavements, communications, site improvements, and associated supporting facilities to provide a complete and useable facility. All necessary auxiliary support infrastructure such as vehicle parking, access points, and pedestrian facilities would be incorporated as required. The F-35A DT program would require installation of new communications systems, including the Autonomic Logistics Information System and its replacement, the Operational Data Integrated Network. No construction activities would occur at Tyndall AFB.

2-bay Aircraft Maintenance Hangar. The proposed 2-bay aircraft maintenance hangar would be sited on the airfield apron just north of Building 64 (see **Figure 2-2**). The site is currently used for aircraft parking and maneuvering. The facility would include a 41,400 square foot (ft²) 2-bay aircraft maintenance hangar to support daily maintenance and inspection of the F-35A DT aircraft, provide storage for spare parts and tools, and accommodate workshop space needed for aircraft component repair, provide an office space for aircraft data collection and documentation, and provide lightning protection for parked aircraft. Construction would include reconfiguration of the airfield apron and flightline roadway to accommodate aircraft maneuvering and taxiing, replacement of airfield pavements, and installation of sunshades to protect the F-35A DT aircraft from adverse weather, and a parking lot to include 39 spaces for privately owned vehicles (POVs). Construction of the 2-bay aircraft maintenance hangar is anticipated to begin in fiscal year (FY) 2025 and would last approximately 2 years.



Figure Note: Some facilities and infrastructure are not shown due to operational security requirements.

Figure 2-1. Facility Requirements Overview

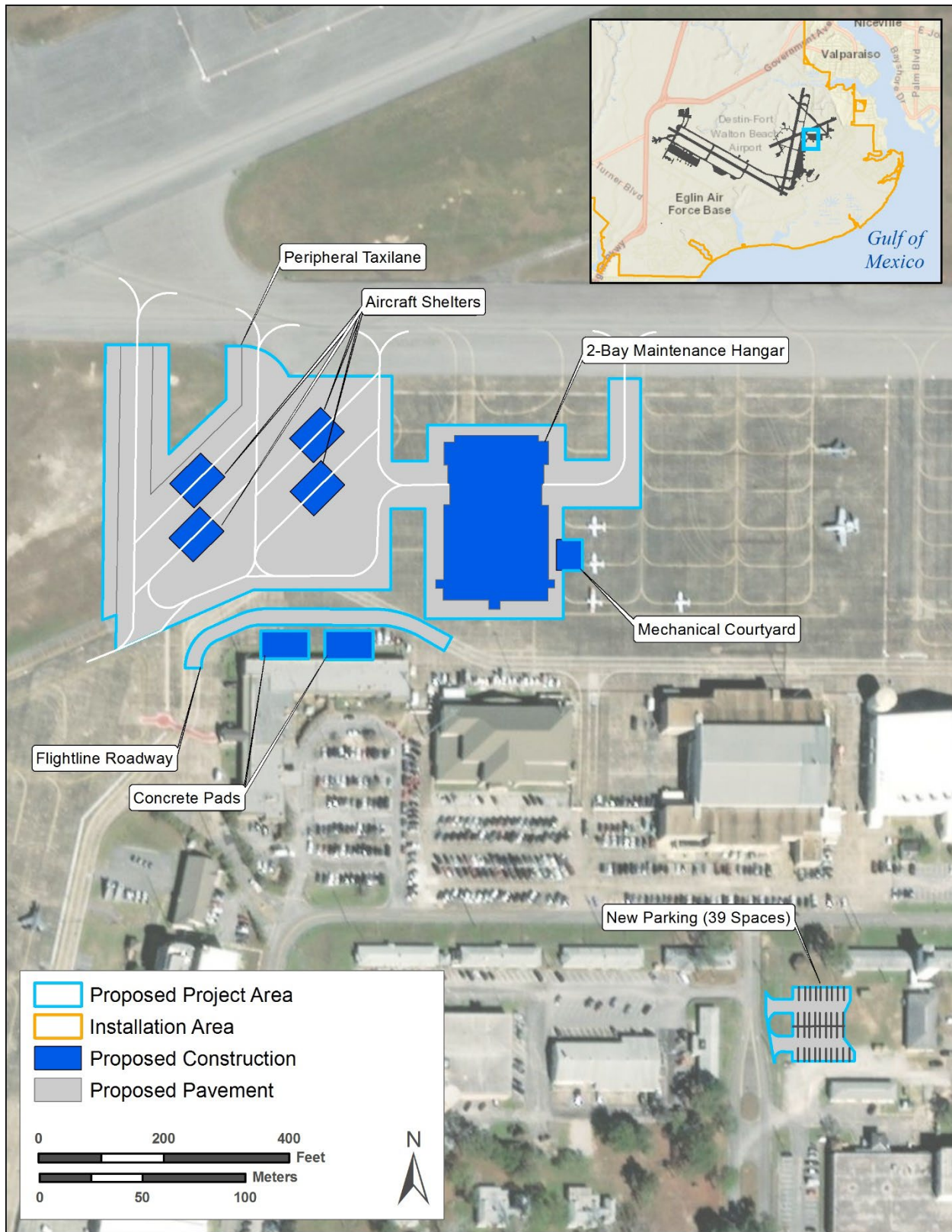


Figure 2-2. Proposed 2-Bay Aircraft Maintenance Hangar Location

2-bay Aircraft Test Hangar. The proposed 2-bay aircraft test hangar would be sited between Perimeter Road and the eastern terminus of Taxiway M. The site is an existing paved and fenced laydown yard currently used for vessel and equipment storage for the Eglin AFB maritime operations group. The proposed 38,370 ft² facility would support the proposed F-35A DT aircraft and mission. Construction would include rerouting of a nearby road, development of a new taxi lane, two aircraft parking spots adjacent to the new taxi lane, outdoor storage area adjacent to the new hangar for aerospace ground equipment (AGE), a paved and fenced equipment yard, entry control point, crash-rated fencing, driveways for site access, and a parking lot with 42 POV spaces. Construction of the 2-bay aircraft test hangar is anticipated to begin in FY 2025 and would last approximately 2 years.

Building 965 Demolition. Building 965, a 5,005-ft² storage facility at the north end of the airfield, would be demolished prior to construction of the 2-bay aircraft test hangar to provide space for that new facility. The maritime operations group and existing boat storage functions at the facility would be relocated to a new, pre-engineered boat shed and associated storage area that would be constructed approximately 1.3 miles southwest of the existing site, within the Bayou Park District of Eglin Main Base (see **Figure 2-3**). Placement of the new boat storage shed would require a gravel hardstand and installation of all required utilities.

Building 64 Addition. The proposed Building 64 addition would occur on both the south and west sides of Building 64 and would add a total of 24,232 ft² of floor space (see **Figure 2-4**). Building 64 is used for flight testing operations by the 85th Test and Evaluation Squadron. The additional building space would provide additional support capabilities for flight testing operations. Construction also would include a paved mechanical yard adjacent to the southern side of the new addition, reconfiguration of the existing POV parking lot south and west of Building 64 to accommodate 245 spaces, construction of an additional POV parking area east of Florida Avenue to accommodate 15 POV spaces, relocation of the flightline gate, and site fencing. Construction for the addition to Building 64 is anticipated to start in FY 2025 and would last approximately 1 year.

Renovations. Proposed renovations for the Proposed Action (anticipated FY 2025 through FY 2026) would involve the following buildings maintained and operated by 96 TW:

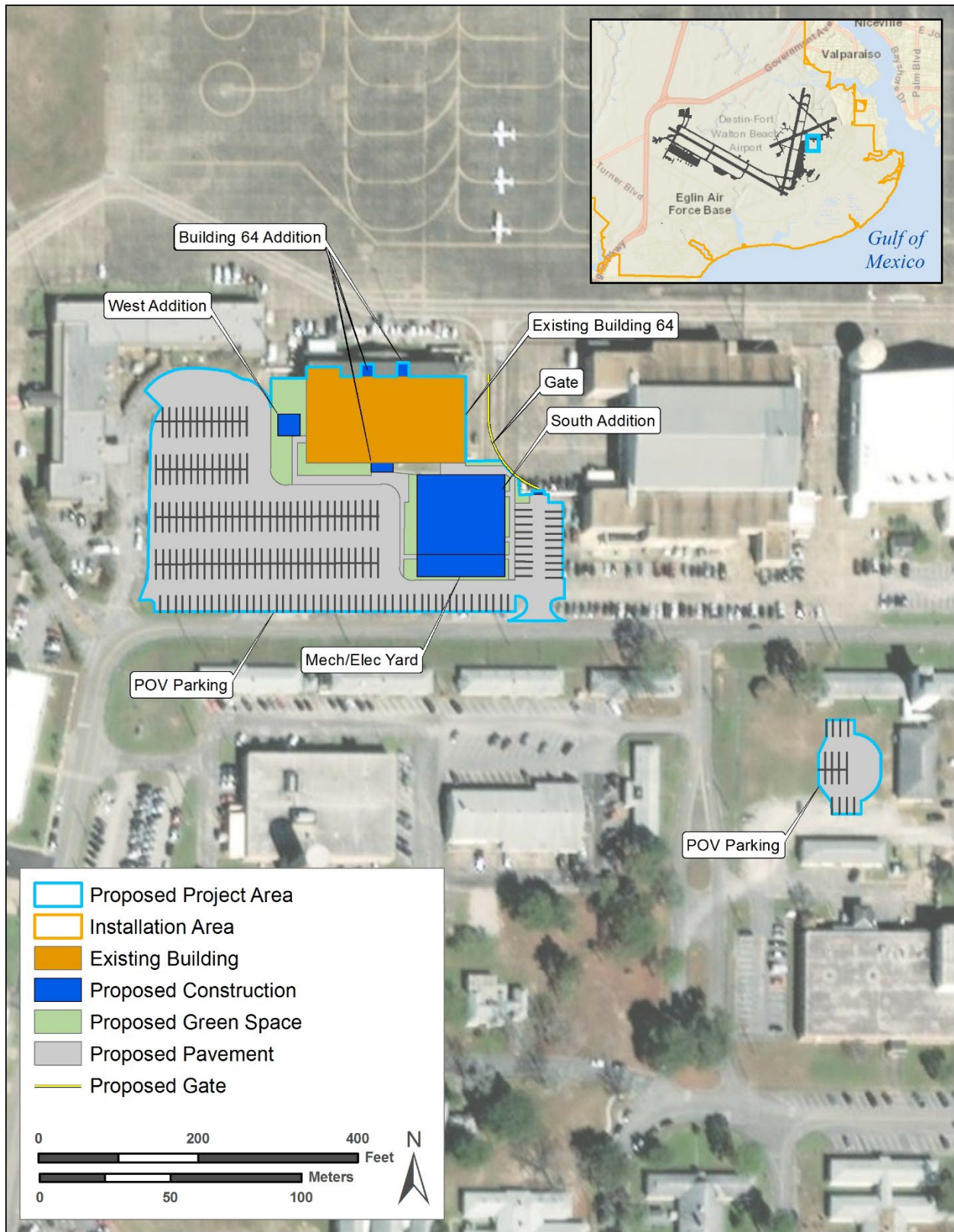
- Building 32, Egress Shop
- Building 100, Pod Shop
- Building 101, AGE facility
- Building 138, Fuels Hangar

Temporary Facilities. Construction and renovation activities, anticipated to occur from FY 2025 through FY 2026 (i.e., October 2024 through September 2026), would coincide with the phased arrival of the F-35A DT aircraft (see **Table 2-1**). As a result, three F-35A DT aircraft that would be delivered to Eglin AFB during the anticipated construction period would require temporary support facilities. Installation of temporary facilities would occur prior to the arrival of the first F-35A DT aircraft, which could occur as early as January 2026.



Data Source: World Imagery; World Street Map

Figure 2-3. Proposed Boat Shed Relocation



Data Source: World Imagery; World Street Map

Figure 2-4. Proposed Building 64 Addition

Temporary facilities required to support the F-35A DT program include:

- Two large area maintenance shelters, one shelter capable of holding two aircraft and one shelter capable of holding one aircraft
- Two sunshades
- One 3,700 ft² trailer to support administrative activities
- One 2,000 ft² trailer for storage of aircraft parts, tools, batteries, and AGE equipment
- One 3,500 ft² trailer for automatic logistics information system support for F-35A DT operations

Temporary facilities would be removed following completion of the construction and renovation activities. All temporary facilities would need to be sited on the airfield with appropriate standoff distances to allow for sufficient aircraft maneuver and taxi movements and to maintain the safety of the airfield.

2.1.5 Personnel

An addition of approximately 709 total personnel, dependents, and family members is anticipated for the F-35A DT mission at Eglin AFB. At least 259 full time military personnel would be added to Eglin AFB to support the F-35A DT program and would arrive on a phased timeline between January 2026 and November 2027. It is possible that several more full-time positions could be identified during the process of the beddown, but the grand total of additional billets would not be expected to exceed 270. The additional personnel would either be directly associated with the addition of the mission and aircraft or part of the base support agencies. Applying the DoD standard calculation, it was conservatively estimated that up to 439 family members could accompany the incoming 270 personnel. Among the dependents, approximately 263 would be school-aged children. The DoD estimates the number of dependents to be 65 percent of the total number of full-time military personnel multiplied by 2.5. The number of school-aged children among associated dependents is estimated as 65 percent of full-time personnel multiplied by 1.5.

Personnel and dependents associated with Eglin AFB missions are housed on the installation as well as within the surrounding communities and rely on both on- and off-installation childcare and health services.

2.2 Selection Standards and Identification of Reasonable Alternatives

NEPA and the CEQ regulations for implementing NEPA mandate the consideration of reasonable alternatives for the Proposed Action. “Reasonable alternatives” are defined as those that also could be utilized to meet the purpose of and need for the Proposed Action. In accordance with DAF’s EIAP (32 CFR 989), selection standards are used to identify reasonable alternatives for meeting the purpose and need for a DAF action.

The Proposed Action alternatives must meet the following selection standards:

1. Must be an AFB with an existing Weapons DT mission and test organizational structure to support the proposed F-35A Weapons DT program.

2. Must have infrastructure and facility capacities that can be used immediately or updated through renovation or addition to cost effectively enable support to the F-35A DT aircraft and mission personnel with minimal requirement for new construction.
3. Must be collocated at an installation with an existing DAF F-35 mission and with sufficient test airspace and range capacity to facilitate weapons testing.
4. Test airspace and ranges must be instrumented with required telemetry and tracking systems to ensure safety of weapons test operations.

The timing and selection of a location must align with the delivery schedule of the F-35A DT aircraft. The current schedule would deliver the first two aircraft in early 2026 with the last aircraft arriving at the end of 2026.

While DAF has several installations that are used for various types of aircraft test programs, the airspace and ranges at Eglin AFB offer the pinnacle of weapons testing and evaluation capabilities. For performance evaluation of fighter aircraft, most DT is done at Edwards AFB, California. Nellis AFB, Nevada is the home of the fighter aircraft Operational Test and Force Development Evaluation. Following graduation of an aircraft and weapon system from DT activities at Edwards AFB or Eglin AFB, Nellis AFB airspace and ranges provide robust Operational Test (OT) capabilities used to determine how aircraft and weapon systems would perform in an operational (combat) environment. Other installations where research, development, test, and evaluation activities are supported include Naval Air Station (NAS) Patuxent River in Maryland (supports DT and OT of aircraft and associated systems [electronics]), and Naval Air Weapons Station (NAWS) China Lake in California (supports DT/OT of aircraft and weapons systems).

DAF used selection standards to determine whether installation alternatives for the implementing the Proposed Action were reasonable. **Table 2-6** compares the potential installation alternatives against the following selection standards.

Table 2-6. Screening Comparison of Alternatives Against Selection Standards

Installation Alternatives	Selection Standards			
	Existing Weapons DT Mission & Organization	Existing, Cost-Effective Infrastructure and Facility Capacity	Existing Test Airspace and Range Capacity	Existing Test Airspace and Range Instrumentation
	(1)	(2)	(3)	(4)
Eglin AFB, Florida	Yes	Yes	Yes	Yes
Edwards AFB, California	No	No	No	No
Nellis AFB, Nevada	No	No	Yes	No
NAS Station Patuxent River	No	No	Partial	Partial
NAWS Station China Lake	Yes	No	Yes	Yes

Key: DT – development test; AFB – Air Force Base; NAS – Naval Air Station; NAWS – Naval Air Weapons Station

2.3 Alternatives Carried Forward for Analysis

As shown in **Table 2-6**, the Proposed Action to beddown four F-35A DT aircraft at Eglin AFB is the only alternative that met all selection standards to be able to support the project purpose and need defined in **Section 1.4**. Additional alternatives that were evaluated against the selection standards, and the corresponding analyses that determine these alternatives should be eliminated from further analysis in this EA, are described in **Section 2.5**.

Under the Proposed Action, DAF would beddown four F-35A DT aircraft and associated personnel at Eglin AFB, Florida and conduct Weapons DT (flight and weapons separation) operations at Eglin AFB and Tyndall AFB. The Proposed Action also includes construction of a 2-bay aircraft maintenance hangar and aircraft parking area, construction of a 2-bay aircraft test hangar, demolition of Building 965 and associated relocation of the maritime operations group and boat storage functions to an area away from the airfield, an addition to Building 64, and renovation of four existing support facilities.

For maximized efficiency and operational security, siting for the new facilities was based on the need for the aircraft maintenance and support functions to be in proximity to the aircraft that they would be supporting and to ensure the lowest amount of visibility and traffic volume near the hangar areas. The proposed area for new facility construction would minimize maintenance travel time to and from the aircraft and would minimize aircraft towing time. These factors are important to meeting sortie generation timelines. The maintenance hangar location was also selected to collocate it with Building 64, which would ensure efficient interaction with flight test operations and other functions.

The Proposed Action at Eglin AFB meets all the selection standards and is brought forward for further analysis. The range spaces, telemetry equipment, ramp space and uniquely qualified organizations manned by highly qualified personnel conducting weapons test tasks exist at Eglin AFB with a lengthy history of testing success. Eglin AFB provides facilities, access to weapons test supported airspace, existing basic infrastructure, and the capability to expand or accommodate new facilities and personnel.

2.4 No Action Alternative

DAF implementing regulations for NEPA, 32 CFR 989, as amended, require consideration of the No Action Alternative. In addition, CEQ guidance recommends inclusion of the No Action Alternative in an EA to assess any environmental consequences that may occur if the Proposed Action is not implemented. Therefore, this alternative is carried forward for detailed analysis in this EA. The No Action Alternative also provides a baseline against which the Proposed Action alternatives can be compared. Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft at Eglin AFB. Other non-related actions that are planned for Eglin AFB would still occur as analyzed and approved in the Record of Decision for the *Final EIS for Fifth Generation Formal Training Unit Optimization*, signed March 24, 2021. These actions would include the departure of the F-22A FTU mission from Eglin AFB (JBLE & Eglin AFB 2021) and the addition of an F-35A FTU squadron. Respectively, these planned actions would relocate the existing 28 Primary Aerospace Vehicles Authorized (PAA) F-22A aircraft and 16 PAA T-38 aircraft from Eglin AFB, and beddown 24 PAA F-35A aircraft. In addition, the existing mission at

Eglin AFB, including ADAIR operations, would continue to occur as part of the No Action Alternative

2.5 Alternatives Considered but Dismissed from Detailed Analysis

Table 2-7 lists the installation alternatives dismissed from further consideration and analysis because they failed to meet one or more of the selection standards (see **Section 2.2**) and therefore do not meet the project purpose and need specified in **Section 1.4**.

Table 2-7. List of Installation Alternatives Dismissed from Detailed Analysis

Installation Alternative	Rationale
Edwards AFB, California	This alternative does not meet standards 1, 2, 3, or 4 to support the Proposed Action. While developmental testing is conducted at Edwards AFB, the testing for Edwards AFB currently supports developmental and operational testing of new aircraft and associated systems (electronics) to ensure the aircraft were built and perform to design standards and specifications and will reliably support mission needs in combat, the installation does not have the expertise and organizational structure required for Weapons DT. Further, the available airspace and ranges at Edwards AFB are not properly instrumented to provide telemetry, tracking and termination (if required) for weapons drops and launches and therefore could not support the Proposed Action. While Edwards AFB has airspace for aircraft testing, it lacks the types and capacity of instrumented ranges needed to test aircraft weapon systems on a regular basis. Such activities would have to be coordinated with NAWS China Lake, where the U.S. Navy (predominantly) and other tenant aircraft, systems, and Weapons DT and OT operations are regularly supported. Operations at NAWS China Lake (where U.S. Navy operations would have primacy), would require DAF operators to vie for and rent airspace and range schedule time; and fly the aircraft and transport test support teams and equipment to and from the test locations. Considered with the costs to conduct the required additional NEPA analysis and NHPA and ESA consultations for this location, and to construct new facilities and infrastructure to support the additional F-35A DT aircraft, personnel, and equipment, this installation alternative would not be a financially or operationally cost-effective option.
Nellis AFB, Nevada	This alternative does not meet standards 1, 2, or 4 to support the Proposed Action. Nellis AFB supports OT of aircraft and weapon systems. When a new aircraft or weapon is being developed for DAF, it is rigorously tested during DT, the process used to verify the system was built to specifications and performance standards. Once verified, the new system graduates into OT, which verifies the usefulness, suitability, and survivability of the system in combat scenarios and operationally representative environments. Nellis AFB does not have the expertise or organizational structure to support the Weapons DT required for the Proposed Action. Though the installation does have airspace and land ranges, capacity to support both DT and OT operations does not exist because the ranges are not properly instrumented to provide telemetry, tracking, and test termination (if required) for Weapons DT drops and launches. Cost and efficiency constraints described for Edwards AFB would also apply to Nellis AFB.

Installation Alternative	Rationale
NAS Patuxent River, Maryland	This alternative does not meet standards 1 or 2 and would only partially meet standards 3 and 4 to support the Proposed Action. While the Patuxent River Complex at NAS Patuxent River supports evaluation of the operational functionality of existing and new aircraft and their associated systems (electronics), and OT interoperability evaluation of aircraft with integrated weapons systems, it does not have the organizational structure or range capacity to support the Weapons DT required for the Proposed Action. Further, the Patuxent River Complex only supports expenditure of inert munitions, and neither the airspace nor the water range are sufficient in size to support the range of F-35A Weapons DT activities required. Additionally, the range is not properly instrumented to provide telemetry, tracking, and test termination (if required) for the required Weapons DT drops and launches.
NAWS China Lake, California	Although this alternative does meet standards 1, 3, and 4 to support the Proposed Action, the cost and operational efficiency constraints identified in the discussion regarding dismissal of Edwards AFB as an installation alternative would also apply to NAWS China Lake.

Key: DT – Development Test; OT – Operational Test; AFB – Air Force Base; NAS – Naval Air Station; NAWS – Naval Air Weapons Station

3 Affected Environment and Environmental Consequences

This section presents a description of the environmental resources and baseline conditions that could be affected by the Proposed Action and No Action Alternative. In addition, this section presents an analysis of the potential environmental consequences of the Proposed Action and No Action Alternative. The Proposed Action alternative and the No Action Alternative were evaluated for their potential environmental consequences on the environmental resources in accordance with CEQ NEPA implementing regulations at 40 CFR 1508.8.

3.1 Resource Analysis

All environmental resources required to be analyzed were initially considered in this EA. In compliance with NEPA, CEQ, and DAF Environmental Impact Analysis Process regulations and guidelines, the following discussion of the affected environment and environmental consequences focuses only on those environmental resources considered potentially subject to impacts or with potentially significant environmental issues. These environmental resources are air quality, biological resources, cultural resources, geological resources, hazardous materials and wastes, infrastructure and transportation, land use, noise, safety, socioeconomics, environmental justice, and water resources. **Appendix D** provides the definition for each environmental resource area carried forward for detailed analysis in this EA. Relevant environmental plans, regulations, permits, best management practices (BMPs), and management actions are discussed in **Appendix E**.

The Proposed Action includes facility and infrastructure construction and modification actions mainly along the Eglin AFB airfield. The areas that could be physically disturbed from construction of the 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar, the addition to Building 64, and the renovation of Buildings 32, 100, 101, and 138 are collectively referred to as the “project areas” (see **Figure 2-1**). The term, “Region of Influence” (ROI) describes the complete geographic scope of potential consequences for the resource area.

3.1.1 Resources Not Carried Forward for Analysis

The environmental resources not analyzed in detail in this EA because insignificant or no impacts would occur are visual and aesthetic resources, airspace management, and environmental justice. The following paragraphs justify why these environmental resources were dismissed from detailed analysis in this EA.

Aesthetic and Visual Resources. The Proposed Action would not adversely affect the aesthetics or visual appearance of the installation, or landscapes and landforms attributed to landscape-level visually aesthetic qualities. The proposed new facilities, and expansion and modification of existing facilities would occur in appropriate planning districts (see **Section 3.8**) and would follow appropriate design guidelines to ensure a consistent and coherent architectural character throughout the installation. Landscaping would be used, where possible, to provide an attractive and professional-looking installation using plants, shrubs, and trees to blend in with the surrounding environment. Plants used for landscaping would be native species or other species approved by the Eglin Natural Resources Office to help prevent introduction

and spread of invasive non-native species on the installation. In addition, no visually sensitive locations are within the viewshed of the project areas. Therefore, further consideration and analysis of impacts on aesthetics and visual resources are not included in this EA.

Airspace Management. The Proposed Action does not include proposals for new airspace or changes to existing airspace, including no changes to existing airspace configurations (i.e., size, shape, and location). Though the Proposed Action includes new aircraft and airfield operations, the projected number of annual flights would not appreciably add to air traffic or affect airspace management in the region, and the required flights would not change the type and conduct of flight operations normally conducted at Eglin AFB or Tyndall AFB. Therefore, further consideration and analysis of impacts on airspace management are not included in this EA. No new effects on federally listed species from the additional F-35A DT aircraft operations in the warning areas would be anticipated beyond those that are included in the 2023 MMPA take authorization and ESA Section 7 consultation (NMFS 2023a, NMFS 2023b). Further, it is anticipated that effects from the presence of aircraft operations in the EGTRR would be reduced following departure of the F22-FTU program.

Environmental Justice. EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, and EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, require that all federal agencies address potential effects on minorities, low-income populations, and children. Because of the distance of the project areas to off-installation populated areas, the Proposed Action would not result in disproportionately high and adverse human health and environmental impacts on minority, low income, or child populations. Impacts from the Proposed Action would be limited to the installation and would not affect off-installation communities. Therefore, further consideration and analysis of impacts on environmental justice are not included in this EA.

3.1.2 Reasonably Foreseeable Actions for the Cumulative Impacts Analysis

As noted in **Section 1.5**, this EA was prepared in accordance with the 2020 CEQ NEPA regulations (40 CFR 1500), as amended in 2022, and therefore analyzes environmental impacts from the Proposed Action combined with potential impacts from reasonably foreseeable actions. CEQ regulations implementing the procedural provisions of NEPA define cumulative effects as follows (40 CFR 1508.7):

“The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.”

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Past actions are those actions, and their associated impacts, which have shaped the current environmental conditions of the project area. Therefore, the impacts of past actions are now part of the existing environment and are included in the affected environment described in **Sections 3.2 through 3.12**. This EA considers present and reasonably foreseeable actions based out of Eglin AFB or Tyndall AFB that could have a causal relationship to the Proposed Action and may result in cumulative impacts. These present and reasonably foreseeable future actions are listed in **Table 3-1**. The cumulative effects on the environment that would result from the incremental impacts of the Proposed Action, when combined with the

potential impacts of the present and reasonably foreseeable actions are included in the environmental consequences discussions in **Sections 3.2** through **3.12**. These sections present a qualitative analysis of the cumulative effects.

Cumulative projects identified in **Table 3-1** include beddown of units or conducting aircraft training such as the 5th Generation FTU Optimization, B-88 and C-53A Range Improvements, Santa Rosa Island Unmanned Aerial System Landing Pad and Aviation Foreign International Defense (AvFID) and Fixed Wing Aircraft Growth at Duke Field. However, relocation of the F-22 FTU mission from Eglin AFB under the 5th Generation FTU Optimization, would constitute a net decrease in airfield operations at Eglin AFB. Similarly, these reasonably foreseeable projects would incrementally increase the number of personnel at Eglin AFB. At Tyndall AFB, the reasonably foreseeable projects would result in a net increase in airfield operations and personnel.

Table 3-1. Present and Reasonably Foreseeable Actions

Project Name	Location	Timeline	Description
5th Generation FTU Optimization	Eglin AFB	2023	DAF proposes to permanently beddown the F-22 FTU mission temporarily operating out of Eglin AFB to JBLE. The proposal also includes beddown of one additional F-35A squadron at Eglin AFB should the F-22 FTU beddown at JBLE occur. Relocation of the F-22 FTU would result in a reduction of 42,554 F-22 and T-38 airfield operations per year, and 760 personnel and 1,672 dependents at Eglin AFB. The addition of a F-35A squadron would result in an increase of 26 F-35A aircraft; 16,500 airfield operations per year; 49,233 flares deployed per year; 159 munitions expenditures per year; and 377 personnel and 830 dependents at Eglin AFB. The additional F-35A FTU at Eglin AFB would use existing facilities within the 33rd Fighter Wing campus south of Runway 12/30 (JBLE & Eglin AFB 2021). F-22 FTU operations are expected to decrease through March 2023, and the associated F-22 and T-38 aircraft are expected to be relocated from Eglin AFB by April 2023; however, F-22 and T-38 aircraft may remain at Eglin AFB after that time (DAF 2022).
350 SWW and 36 EWS Beddown	Eglin AFB	2024-2025	DAF proposes to beddown the 350 SWW and 36 EWS to Eglin AFB. The proposal includes construction of a 100,000 ft ² SWW building, 90,000 ft ² EWS, and 11 acres of parking south of Runway 12/30; and addition of approximately 350 personnel by 2025 (Eglin AFB 2022f).
B-88 and C-53A Range Improvements	Eglin AFB	By 2032	The Army, in coordination with DAF, proposes to renovate and construct facilities within the B-88 Range Complex the C-53A Light Demolition Range. The action would provide facility enhancements with approximately 1,105,400 ft ² of new facilities, range expansion, and a 25 percent mission surge of operations above the current baseline level. The action does not include additional personnel (Eglin AFB 2020b).
Santa Rosa Island UAS Landing Pad	Eglin AFB	2023	DAF proposes to construct a new UAS landing pad and support structures (to include shelters, a control pad, and electric and communication lines) near Test Site A-15 on Santa Rosa Island and conduct up to 385 UAS flight operations per year primarily within R-2915 B/C and W-151A (Eglin AFB 2021b).
AvFID and Fixed Wing Aircraft Growth at Duke Field	Duke Field, Eglin AFB	2022-Future	To support the AvFID mission at Duke Field, DAF is supporting the growth of the 6th Special Operations Squadron, which includes the addition of five single-engine aircraft (e.g., Cessna 208 Caravan aircraft); 294 personnel; construction of permanent facilities; and installation of temporary facilities. Annual flight operations would increase by 2,600 operations (total takeoffs and landings), or approximately 75 hours per week of flight training. Annual air operations would be split between Duke Field at approximately 1,280 operations, or 70 percent, and approximately 780 air operations at other locations on Eglin AFB or nearby airfield including Hurlburt Field and Bob Sikes Airport. Construction of 41,200 ft ² of new facilities would occur at Duke Field (DAF 2020).

Draft Environmental Assessment – Beddown of F-35A Developmental Test Aircraft, Eglin AFB
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Project Name	Location	Timeline	Description
Submarine Fiber Optic Cable	Cape San Blas, EGTR	2023	DAF proposes to install a 52.8-mile submarine fiber optic cable extending from Cape San Blas, approximately 30 miles south of Tyndall AFB, and terminating within the Gulf of Mexico underneath W-151B (Eglin AFB 2022g).
Okaloosa County Airport Expansion	Destin-Fort Walton Beach Airport, Eglin AFB	2023	The expansion of the Destin-Fort Walton Beach Airport, which is north of Runway 12/30, includes a new concourse on the west side of the existing terminal, five additional nonstop routes to and from the airport, an entrance roundabout, and 600 new parking spaces at the airport. The Destin-Fort Walton Beach Airport uses the airfield at Eglin AFB through a joint use agreement. Construction was completed in May 2022 (Judnich 2020, Davis 2022).
Eglin Boulevard Reroute	Eglin AFB	2025	Eglin Boulevard currently crosses an aircraft tow-way and two runway clear zones, presenting a hazard to aircraft and limiting the expansion of the taxiway. DAF proposes to reroute an approximately 2.5-mile portion of Eglin Boulevard from the Eglin Boulevard split south and west to near the intersection of Eglin Boulevard and Nomad Way to improve airfield safety and traffic flow (96 CEG 2021a).
Westside Enhanced Use Lease	Eglin AFB	2028	DAF is proposing to lease and develop 98 acres of forested land on Eglin AFB. The site is near the intersection of Poquito Road and State Route 189 (Lewis Turner Boulevard) and adjacent to University of Florida Research & Engineering Education Facility. The site may be commercially developed, which would result in personnel increases (96 CEG 2021b).
Test/Training Missions at Eglin AFB	Santa Rosa, Okaloosa, Walton, and Gulf Counties	Ongoing	Eglin AFB controls Eglin Main Base, land range areas, the ETTC, and the EGTR, and supports ongoing testing and training operations in these areas. The ETTC, which spans 724 square miles of land and 128,000 square miles of airspace across Northwest Florida, provides support for individual and joint training of operational units. The EGTR supports testing and training operations conducted by Eglin AFB and Tyndall AFB. Existing testing and training at Eglin AFB include Combat Air Forces ADAIR training (Eglin AFB 2013, Eglin AFB 2022a, Eglin AFB 2023a, Eglin AFB 2023b).
Range Maintenance Activities at Eglin AFB	Eglin AFB, Cape San Blas, and Santa Rosa Island	Ongoing	Maintenance and repair activities are routine, ongoing actions conducted to ensure the long-term viability of the ETTC and other Eglin AFB-controlled land ranges. These activities include range road, bridge, culvert, and constructed low water crossing maintenance, repair, and closure; borrow pit maintenance, repair, and expansion; and test area maintenance. Vegetation control is used for general test area maintenance, native ecosystem restoration, invasive nonnative plant species control, and wildfire risk reduction.

Draft Environmental Assessment – Beddown of F-35A Developmental Test Aircraft, Eglin AFB
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Project Name	Location	Timeline	Description
Eglin AFB Future Development Plans	Eglin AFB	2025	Construction and demolition projects are anticipated to continue at Eglin AFB and the surrounding area throughout the next five years to support the mission and growth of the installation. Projects totaling approximately 1.4M SF of development would occur across six areas: Eglin Main Base, Camp Rudder/6th Ranger Training Battalion, Duke Field, 7th Special Forces Cantonment, Site C-6 20th Space Control Squadron Area, and the Jackson Guard Compound. Proposed development at Eglin AFB consists of approximately 795,266 ft ² of construction or other improvements, 170,016 ft ² of demolitions, 125.4 acres of impervious surfaces, and 35.6 acres of roads and other infrastructure. Proposed development at Duke Field consists of approximately 422,565 ft ² of construction or other improvements, 24,937 ft ² of demolitions, 78 acres of impervious surfaces, and 23 acres of parking and other infrastructure. DAF intends to commence projected development within the cantonment areas and Jackson Guard Compound within the next 5 to 10 years. Siting for future development considers areas that are free from environmental constraints. Ongoing necessary routine maintenance activities are expected to continue (Eglin AFB 2020a).
Natural Resources Management Activities on Eglin Reservation and Nearby Conservation Lands	Eglin AFB	Ongoing	The Eglin AFB INRMP details planned natural resources management activities, including wildlife, fire, and forest management. The interstitial areas of Eglin AFB are where the majority of natural resources management activities occur. The INRMP provides an overview of the future direction of natural resources management for the installation (Eglin AFB 2022h).
Air Force Enlisted Village Expansion	Eglin AFB	2026	An 80-acre parcel is proposed for expansion of residential housing for enlisted widows of retired military servicemembers and retired military families. Historically the parcel has been undeveloped, forested land, containing no improvements or structures, and remains presently in this condition. The parcel is east of the existing Air Force Enlisted Village, just north of the intersection of Sunset Lane and Poquito Road (AFEV 2021).
New Level of Activity for Eglin AFB Overland Air Operations	Eglin AFB	2022-Future	DAF proposes to authorize a new level of activity for Eglin overland air operations to support current and projected levels of Eglin air operations. The new level of activity for overland air operations would accommodate the anticipated changes to overland air operations that would result from the addition of a second F-35A FTU squadron at Eglin AFB, relocation of the existing F-22 FTU from Eglin AFB, addition of ADAIR aircraft at Eglin AFB, and use of overland airspace by additional F-35A aircraft and MQ-9 drone aircraft at Tyndall AFB. The proposal includes an increase of 28,285 annual sorties flown in the ETTC, including 19,939 annual sorties flown in R-2914A/B and R-2915A/B/C; and increased deployment of 49,233 flares per year in the ETCC and EGTR, including 9,987 flares in R-2914A/B and R-2915A/B. Increased deployment of flares would be a result of the additional F-35A FTU at Eglin AFB only (Eglin AFB 2022a).

Draft Environmental Assessment – Beddown of F-35A Developmental Test Aircraft, Eglin AFB
AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Project Name	Location	Timeline	Description
F-35A Wing and MQ-9 Wing Beddowns	Tyndall AFB	2023-2026	DAF proposes to beddown three F-35A squadrons consisting of a total of 78 F-35A aircraft at Tyndall AFB. Beddown of the F-35A squadrons is anticipated to begin in FY 2023 and end in FY 2026. The F-35A aircraft would fly a total of 44,586 annual airfield operations at Tyndall AFB and 16,552 annual sorties within Tyndall MOAs, ATCAA within Georgia and eastern Florida, W-151, and W-470. The F-35A aircraft would deploy 268 inert munitions annually at the Avon Park Range, FL, the Grand Bay Range, GA, and the Pinecastle Range, FL. DAF may also beddown an MQ-9 Remotely Piloted Aircraft Wing consisting of 24 MQ-9 drone aircraft at Tyndall AFB. MQ-9 drone aircraft would fly 5,640 airfield operations at Tyndall AFB and up to 2,820 annual sorties within Tyndall MOAs, ATCAA within Georgia and Florida, W-151, and W-470. The MQ-9 drone aircraft would perform up to 4 hours of airfield pattern work per day. In addition, MQ-9 aircraft would deploy 400 inert munitions annually at the Avon Park Range, FL, the Grand Bay Range, GA, and the Pinecastle Range, FL (Tyndall AFB 2020b).

Key: 36 EWS – 36th Electronic Warfare Squadron; 350 SWW – 350th Spectrum Warfare Wing; ADAIR – Adversary Air; AFB – Air Force Base; ATCAA – Air Traffic Control Assigned Airspace; AvFID – Aviation Foreign International Defense; EGTTR – Eglin Gulf Test and Training Range; ETTC – Eglin Test and Training Center; ft² – square foot or square feet; GRASI – Gulf Regional Airspace Strategic Initiative; FTU – Formal Training Unit; FY – fiscal year; INRMP – Integrated Natural Resources Management Plan; JBLE – Joint Base Langley-Eustis; MOA – Military Operating Area; UAS – unmanned aerial system

3.1.3 Irreversible and Irretrievable Commitment of Resources and Other Environmental Considerations

3.1.3.1 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that the use of these resources would have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy, minerals). Irreversible and irretrievable commitments of resources usually result from implementation of actions that involve the consumption of material resources used for construction, energy resources, and human labor resources. Impacts from consumption of these resources is considered to be permanent. The irreversible and irretrievable resources commitments are discussed for each resource in **Sections 3.2 through 3.12.**

3.1.3.2 Unavoidable Adverse Impacts

Unavoidable adverse impacts would result from implementation of the Proposed Action, but none of these impacts would be considered significant. The Proposed Action would require the continued use of fossil fuels, a nonrenewable natural resource, during training activities. Energy supplies, although relatively small, would be committed to the Proposed Action. The use of nonrenewable resources is an unavoidable occurrence, although not considered significant.

3.1.3.3 Compatibility of the Proposed Action with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

The Proposed Action would occur within airspace routinely used for military testing and training activities across the southeastern region, and all operations would be in accordance with pertinent regulations and air traffic controlling authorities. The nature of activities for the Proposed Action would not differ from current uses of these areas. The Proposed Action is a continuation of similar training conducted by DAF in these areas for several decades.

3.1.3.4 Relationship between Short-Term Uses of the Human Environment and Maintenance and Enhancement of Long-term Productivity

Short-term uses of the biophysical components of the human environment include direct, project-related disturbances and direct impacts associated with an increase of personnel and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Implementation of the Proposed Action would not require short-term resource uses that would result in long-term compromises of productivity. Under the Proposed Action, short-term uses of the environment would result in noise from aircraft training operations. Noise generated by the proposed F-35A DT activities would be temporary and sporadic in nature; given the proposed operating altitudes and limited duration, they would not be expected to result in long-term, adverse impacts on noise-sensitive receptors or wildlife. The nature of activities for the Proposed Action would not differ from current uses of these areas. Therefore, implementation of

the Proposed Action would not result in significant impacts on sensitive resources. As a result, it is not anticipated that the Proposed Action would result in any environmental impacts that would permanently narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or general welfare of the public.

3.2 Air Quality

3.2.1 Affected Environment

The ROI for the air quality analysis includes Okaloosa, Santa Rosa, Walton, and Bay Counties in Florida. Eglin AFB is within Okaloosa, Santa Rosa, and Walton counties. Eglin AFB also operates range sites on Cape San Blas in Gulf County; however, the F-35A DT program would not operate at these sites and therefore, Gulf County was not considered as part of the air quality ROI. Tyndall AFB is within Bay County. In addition, R-2914 covers Okaloosa, Walton, and Bay Counties and R-2915 covers Santa Rosa and Okaloosa counties (see **Figure 1-1**). All counties containing Eglin AFB, Tyndall AFB, and the restricted areas are within the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate Air Quality Control Region (40 CFR 81.68) and are in attainment or unclassified for all criteria pollutants (USEPA 2022a). In accordance with the DAF Air Quality EIAP Guide, all counties within the ROI are “Clearly Attainment” (i.e., not within 5 percent of exceeding the National Ambient Air Quality Standards [NAAQS]) for all criteria pollutants (USEPA 2022b). As a result, a General Conformity analysis is not required for federal actions occurring in those counties. **Table 3-2** includes the most recent available annual emissions inventories (calendar year 2020) for the counties within the ROI.

Table 3-2. Annual Emissions Inventory (2020) for Okaloosa, Santa Rosa, Walton, and Bay Counties, Florida

County	NO _x (tpy)	VOC (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)	Lead (tpy)	CO _{2e} ¹ (tpy)
Okaloosa	3,844	42,198	65,698	416	6,887	4,642	0.579	2,146,126
Santa Rosa	4,906	41,002	58,066	1,223	6,222	4,141	0.266	3,118,204
Walton	2,843	37,232	44,620	281	5,689	3,241	0.057	1,366,447
Bay	6,312	22,734	37,946	1,371	4,257	2,630	0.116	5,595,627

Key: CO – carbon monoxide; CO_{2e} – Equivalent emissions of carbon dioxide; NO_x – nitrogen oxides; PM₁₀ – particulate matter measured less than or equal to 10 microns in diameter; PM_{2.5} – particulate matter measured less than or equal to 2.5 microns in diameter; SO_x – sulfur oxides; tpy – tons per year; VOC – volatile organic compound
Source: USEPA 2023a

¹ All greenhouse gases (GHGs) are expressed relative to a reference gas, carbon dioxide (CO₂). To calculate the total equivalent emissions of CO₂ (CO_{2e}), all GHGs are multiplied by their global warming potential and the results are added together. The global warming potentials used to calculate CO_{2e} are as follows: CO₂ = 1; methane = 25; nitrous oxide = 298.

Eglin AFB operates under a Title V operating permit (# 0910031-022-AV) that expires on May 30, 2024 (FDEP 2019). The permit is administered by FDEP and includes requirements for inventory, monitoring, and record keeping of all major stationary sources of air emissions on the installation. Primary sources of air emissions at Eglin AFB include burning of fossil fuels (for example, diesel and natural gas), aircraft engine testing and operation, munitions use, open

burning/open detonation, fire training, prescribed burning, vehicle operation, aerospace ground support equipment, marina operations, and solid waste landfills. Existing sources of air emissions within the immediate project areas include an internal combustion engine at Building 100. Sources of air emissions within 0.1 mile of the project areas include internal combustion engines, paint booths, and natural gas-fired boilers. Application of primers and topcoats to aircraft and associated aircraft parts by brush, roller, and spray pack application method occurs in outside areas/hangars. Florida does not require permitting mobile source emissions (e.g., aircraft and vehicle operations).

Climate Change and Greenhouse Gases (GHGs). Ongoing global climate change in the southeastern U.S., including Florida, has contributed to rising seas and retreating shores, increased storm intensity, increased precipitation, decreased crop productivity, disruption of natural ecosystems, and human health effects (Carter et al. 2018). Changes to regional climate patterns could result in regional changes to flooding frequency and intensity, reduced air quality, damage to transportation infrastructure, and spread of invasive species to new areas. Cities, roads, ports, and water supplies in Florida are vulnerable to the impacts of storms and sea level rise. High air temperatures can cause adverse health effects such as heat stroke and dehydration, especially in vulnerable populations, which can affect cardiovascular and nervous systems. Warmer air can also increase the formation of ground-level ozone (O₃), which can lead to a variety of health effects including aggravation of lung diseases and increased risk of death from heart or lung disease (USEPA 2016).

Historically, Eglin AFB has an average high temperature of 81.2 degrees Fahrenheit (°F) in the hottest month of July, and an average low temperature of 49°F in the coldest month of January. The region has an average annual precipitation of 66.9 inches per year. The wettest month of the year is July, with an average rainfall of 9.4 inches (Idcide 2022). In 2019, Florida produced 233.6 million metric tons of carbon dioxide (CO₂) emissions and was ranked the third highest producer of CO₂ in the U.S. (USEPA 2019). Equivalent emissions of CO₂ (CO₂e) from stationary sources on Eglin AFB exceeded 25,000 tons per year (tpy) in 2021; therefore, the installation was required to report annual CO₂e emissions to the U.S. Environmental Protection Agency (USEPA). In 2021, Eglin AFB produced 27,896 metric tons of CO₂e (USEPA 2021).

3.2.2 Environmental Consequences

The air quality analysis estimates the effects on air quality and climate change that would result from the beddown of the F-35A DT program at Eglin AFB. All counties, within which the facility construction and modification actions and F-35A DT operations would occur, are in attainment or unclassified for all criteria pollutants. Therefore, the General Conformity Rule does not apply to the Proposed Action.

Per the Air Quality EIAP Guide, DAF applies insignificance indicators to actions occurring in areas designated as attainment or unclassified for the NAAQS to provide an indication of the significance of potential impacts on air quality. The insignificance indicator used by DAF is the 250 tpy Prevention of Significant Deterioration threshold, as defined by USEPA, and is applied to the emissions for all criteria pollutants besides lead occurring in areas that are “Clearly Attainment” (i.e., not within 5 percent of exceeding any NAAQS). The insignificance indicator for

lead is 25 tpy. The insignificance indicators do not denote a significant impact; however, they do provide a threshold to identify actions that have insignificant impacts to air quality. Any action with net emissions below the insignificance indicators for all criteria pollutants is considered so insignificant that the action will not cause or contribute to an exceedance of one or more NAAQS (AFCEC 2020).

The DAF Air Conformity Applicability Model was used to estimate the annual air emissions from the proposed facility and infrastructure construction and modification actions and F-35A DT operations. Emissions from munitions and defensive countermeasures were analyzed separately. The potential for air quality impacts was assessed in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*; the EIAP (32 CFR Part 989); and the General Conformity Rule (40 CFR Part 93 Subpart B).

Consistent with EO 14008 and the 2016 CEQ Final Guidance, this EA examines GHGs as a category of air emissions. Per the 2023 CEQ Interim Guidance, the social cost of GHGs was calculated for the estimated total net emissions of CO₂e during the construction and aircraft transition period and the foreseeable annual CO₂e emissions from operational activities included in the Proposed Action. It also examines potential future climate scenarios to determine whether elements of the Proposed Action would be affected by climate change. This EA does not attempt to measure the actual incremental impacts of GHG emissions from the Proposed Action, as there is a lack of consensus on how to measure such impacts. Global and regional climate models have substantial variation in output and do not have the ability to measure the actual incremental impacts of a project on the environment.

3.2.2.1 Proposed Action

The total estimated annual air emissions for proposed construction and operation of facilities and infrastructure and aircraft operations are provided in **Table 3-3**. The total net annual emissions from construction (October 2024 through September 2026) are not expected to exceed the insignificance indicator of 250 tpy (25 tpy for lead). Therefore, short-term, adverse impacts on air quality would not be significant. Detailed emissions calculations are included in **Appendix F**.

Table 3-3. Estimated Annual Net Change in Air Emissions from the Proposed Action ¹

Year	VOC (tpy)	NO _x (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)	Lead (tpy)	CO ₂ e (tpy)
2024 (construction)	0.392	2.238	2.767	0.007	18.913	0.087	<0.001	665.1
2025 (construction)	2.167	4.829	7.131	0.015	2.686	0.169	<0.001	1,508.5
2026 (construction and operations)	1.987	6.233	7.925	0.372	0.664	0.616	<0.001	1,828.8
2027 and later (operations)	1.888	16.019	18.800	1.463	2.245	2.052	<0.001	4,955.3
Maximum	2.167	16.019	18.800	1.463	18.913	2.052	<0.001	4,955.3
Insignificance indicator ²	250	250	250	250	250	250	25	NA

Exceeds insignificance indicator?	No	No	No	No	No	No	No	NA
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Key: CO – carbon monoxide; CO_{2e} – carbon dioxide equivalent; NA – not applicable; NO_x – nitrogen oxides; PM₁₀ – particulate matter measured less than or equal to 10 microns in diameter; PM_{2.5} – particulate matter measured less than or equal to 2.5 microns in diameter; SO_x – sulfur oxides; tpy – tons per year; VOC – volatile organic compound

¹ Operational air emissions do not include emissions from defensive countermeasures or munitions; see further discussion below regarding these emissions.

² The counties within the ROI (i.e., Okaloosa, Santa Rosa, Walton, and Bay Counties) are considered “Clearly Attainment” for all NAAQS. Therefore, the Prevention of Significant Deterioration threshold of 250 tpy (25 tpy for lead) was used as an insignificance indicator.

Short-term, minor, adverse impacts on air quality would occur during the proposed construction and modification actions on Eglin AFB. Short-term impacts on air quality would be similar to those described in the 2014 and 2020 *Cantonment Areas* EAs (Eglin AFB 2014, Eglin AFB 2020a). Emissions of criteria pollutants and GHGs would be directly produced from activities such as operation of heavy equipment, heavy duty diesel vehicles hauling supplies and debris to and from the project areas, workers commuting daily to and from the project areas in their personal vehicles, and ground disturbance. All such emissions would be temporary in nature and produced only when construction activities are occurring, during FY 2025 through FY 2026 (October 2024 through September 2026).

The air pollutant of greatest concern during the construction period is particulate matter, such as fugitive dust, which would be generated from earth moving activities and vehicles/equipment traveling over unpaved roads. Fugitive dust air emissions would be greatest during the initial site grading and excavation and would vary daily depending on the work phase, level of activity, and prevailing weather conditions. The BMPs and management actions listed in **Appendix E** would be incorporated during the construction period to minimize fugitive dust emissions and reduce emissions of criteria pollutants. These BMPs and environmental control measures could reduce uncontrolled particulate matter emissions from a construction site by approximately 50 percent depending upon the number of BMPs and environmental control measures required and the potential for particulate matter air emissions.

Long-term, minor, adverse impacts on air quality would occur from F-35A DT operations. Air emissions would be directly produced from operation and heating of new facilities; F-35A DT aircraft operations at Eglin AFB, Tyndall AFB, and within the ETTC and GRASI ATCAA; and from additional personnel at Eglin AFB. Long-term, operational air emissions would begin in 2026 and continue indefinitely. The estimated annual operational air emissions from F-35A DT operations are summarized in **Table 3-3** and include emissions estimated for 2,346 F-35A airfield operations, which include supersonic flight operations. The annual net change of criteria pollutant emissions starting in 2026 would not exceed the insignificance indicator of 250 tpy (25 tpy for lead). Therefore, long-term, adverse impacts on air quality would not be significant. Air emissions from stationary sources (i.e., heating systems) at new facilities would not increase the installation’s potential to reach additional major source permitting thresholds.

Air emissions from munitions expenditures and deployment of defensive countermeasures (i.e., chaff and flares) were analyzed in the 2022 *Overland Air Operations EA* (Eglin AFB 2022a),

2015 *GRASI EIS* (DAF 2015), 2014 *F-35 Supplemental EIS* (DAF 2014a), and the 2023 *EGTTR Range EA* (Eglin AFB 2023a). Chaff and flares would be employed in SUA authorized for their use. Chaff is not considered to have air quality impacts as chaff fibers maintain their integrity after ejection. Fibers remain suspended in the air for relatively short periods of time, are dispersed by wind, and are eventually deposited onto the ground surface. The use of explosive charge in chaff impulse cartridges results in minimal PM₁₀ emissions (DAF 1997). When flares are expended, the magnesium pellets and their casings burn out completely and the resulting flare ash is dispersed by wind, eventually falling onto the ground surface along with the in-tact plastic end caps and pistons. Criteria pollutant emissions associated with flare use at Eglin AFB were previously analyzed and determined to be in compliance with the NAAQS. A total of 210 chaff bundles and 210 flares are estimated to be expended annually as part of the Proposed Action (see **Table 2-4**). The temporary presence of burning flare magnesium pellets, suspended flare ash, and suspended chaff in the atmosphere would have no appreciable effect on air quality.

The use of impulse cartridges associated with flare expenditures results in the release of chromium and lead to the atmosphere. Human health risk assessments have estimated that more than one million flares could be used annually in a large airspace before a health risk threshold is reached (Eglin AFB 2022a). The F-35A DT defensive countermeasures is estimated to include 210 flare expenditures annually, resulting in a total of 18,547 flares expended in SUA within the ETTC. This future projected flare use is well below the estimated health risk threshold.

Several types of live and inert munitions would be used during F-35A DT testing operations. Munitions expended as part of the F-35A DT program would not exceed the allotment analyzed in the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a); therefore, a net increase of total air emissions produced by the installation beyond what was previously analyzed and authorized would not occur. Air emissions from munitions are based on net explosive weight. Inert munitions have a net explosive weight of zero; therefore, only live ordnance munitions would produce air emissions. Emissions produced from F-35A DT live munitions expenditures are shown in **Table 3-4**. Because these expenditures would not exceed the allotment analyzed previously, estimated air emissions are provided for informative purposes only. Munitions expenditures for the F-35A DT program would not result in a net increase in air emissions from existing conditions; however, such emissions would be minimal.

Table 3-4. Estimated Munitions Emissions from the Proposed Action¹

Munitions Type	Proposed Expenditures	VOC (tpy)	NO _x (tpy)	CO (tpy)	SO _x (tpy)	PM ₁₀ (tpy)	PM _{2.5} (tpy)
GBU with a 500-pound bomb warhead	1	0.004	0.092	0.277	0.001	0.001	<0.001
GBU with a 1,000-pound bomb warhead	1	0.004	0.197	0.277	0.002	<0.001	<0.001

GBU with a 2,000-pound bomb warhead	1	0.006	0.433	0.398	0.004	<0.001	<0.001
AIM-9	1	0.002	0.021	0.215	<0.001	<0.001	<0.001
AIM-120	1	0.001	0.005	0.059	<0.001	<0.001	<0.001
Inert	95	0.00	0.00	0.00	0.00	0.00	0.00
Total	100	0.016	0.748	1.226	0.007	0.001	<0.001

Key: AIM – Air Intercept Missile; CO – carbon monoxide; GBU – Guided Bomb Unit; NO_x – nitrogen oxides; PM₁₀ – particulate matter measured less than or equal to 10 microns in diameter; PM_{2.5} – particulate matter measured less than or equal to 2.5 microns in diameter; SO_x – sulfur oxides; tpy – tons per year; VOC – volatile organic compound

¹ Estimated emissions are provided for informative purposes. Munitions expenditures would not exceed the allotment analyzed in the 2023 *EGTTR Final Range EA*; therefore, no net increase in emissions from munitions expenditures would occur.

Climate Change and GHGs. Construction would produce an annual maximum of approximately 1,509 tons of direct CO₂e in 2025, representing less than 0.1 percent of annual CO₂e emissions in Okaloosa County. By comparison, 1,509 tons of CO₂e is approximately the GHG footprint of 305 passenger vehicles driven for 1 year or 173 homes' energy use for one year (USEPA 2023b). As such, air emissions produced during construction would not meaningfully contribute to the potential effects of global climate change and would not considerably increase the total CO₂e emissions produced by Okaloosa County. Therefore, construction would result in short-term, minor, adverse impacts from GHGs. Over the construction and F-35A DT aircraft delivery period between 2024 and 2026, the Proposed Action would generate an estimated net total of 4,002 tons (3,631 metric tons) of CO₂e in the ROI, with a social cost of GHGs equal to \$217,471. Social cost of GHG calculations are included in **Appendix F**.

Long-term operational CO₂e emissions from F-35A DT operations would start in 2027 and continue indefinitely, with 4,955 tons of CO₂e produced in the ROI per year. By comparison, 4,955 tons (4,495 metric tons) of CO₂e is approximately the GHG footprint of 1,000 passenger vehicles driven for one year or 567 homes' energy use for 1 year (USEPA 2023b). The annual social cost of GHGs from operations would be \$269,242 per year. Emissions from facility operations (i.e., heating) would occur within Okaloosa County. Emissions from F-35A aircraft operations would occur across the ROI. Total annual operational CO₂e emissions would represent less than 0.005 percent of the total CO₂e emissions in Florida. As such, air emissions produced during operations would not meaningfully contribute to the potential effects of global climate change and would not considerably increase the total CO₂e emissions produced by the state. Annual CO₂e emissions from new stationary sources (i.e., heating systems) combined with CO₂e from existing stationary sources, would be reported to USEPA's if emissions exceed 25,000 metric tpy.

Ongoing changes to climate patterns in northwest Florida are described in **Section 3.2.1**. These climate changes are unlikely to affect the DAF's ability to implement the Proposed Action. All elements of the Proposed Action, in-and-of-themselves are only indirectly dependent on any of the elements associated with future climate scenarios (e.g., meteorological changes). At the time of this analysis, no future climate scenario or potential climate stressor (e.g., rising seas and retreating shores, increased storm intensity, increased precipitation) would have

appreciable effects on any element of the Proposed Action. The climate stressor with the greatest potential to affect the Proposed Action is increased temperature, wind velocity, and drought potential, which can cause aircraft to operate less efficiently leading to slightly greater fuel burn requirements.

3.2.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and range operations, and construction and modification actions to support the F-35A DT program would not occur. Therefore, air quality within and in the vicinity of Eglin AFB and Tyndall AFB would remain as described in **Section 3.2.1**, and no adverse impacts would occur.

3.2.2.3 Cumulative Impacts

Short- and long-term, minor, adverse cumulative impacts on air quality would occur from the construction and modification actions, and operations for the Proposed Action when combined with construction and operation for the reasonably foreseeable actions (listed in **Section 3.1.2, Table 3-1**). Reasonably foreseeable construction actions that coincide with the construction period for the Proposed Action may contribute additional air emissions; however, such occurrences would be temporary in nature and would cease upon completion of construction activities. The Prevention of Significant Deterioration insignificance indicators are applied to each individual project; therefore, the additive emissions of criteria pollutants from construction for the reasonably foreseeable actions at Eglin AFB, such as the 350th Spectrum Warfare Wing (350 SWW) and 36th Electronic Warfare Squadron (36 EWS) Beddown, B-88 and C-53A Range Improvements, Santa Rosa Island Unmanned Aerial System Landing Pad, AvFID and Fixed Wing Aircraft Growth at Duke Field, Okaloosa County Airport expansion, Eglin Boulevard Reroute, Air Force Enlisted Village Expansion, and future development would not be combined with the emissions from the Proposed Action and would not exceed the insignificance indicators.

Long-term, minor, adverse cumulative impacts on air quality could occur from foreseeable incremental increases in aircraft operations out of Eglin AFB and Tyndall AFB; however, long-term, minor, beneficial cumulative impacts would occur from the net decrease in air emissions associated with aircraft operations and personnel commutes following implementation of the 5th Generation FTU Optimization. Increases in range operations (i.e., munitions expenditures) from the Proposed Action would not exceed the allotment analyzed in the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a); however, if additional munitions expenditures from reasonably foreseeable actions exceed the allotment, follow-on analysis and consultation would be conducted. Air emissions beyond what was previously analyzed and authorized likely would be negligible. Emissions from the Proposed Action would not be considered significant for the region; therefore, cumulative impacts on air quality from the Proposed Action, when combined with other reasonably foreseeable actions, would not be significant.

3.2.2.4 Irreversible and Irretrievable Commitment of Resources

Air pollutant emissions from the Proposed Action would not result in an irreversible or irretrievable reduction of air quality.

3.3 Biological Resources

3.3.1 Affected Environment

The ROI for biological resources includes the project areas; the Eglin AFB airspace, land, and water ranges where the proposed F-35A DT flight and munitions expenditures operations would be conducted; and the Tyndall AFB airfield where a portion of the proposed F-35A DT aircraft flight operations would be conducted. Because the proposed airfield operations at Tyndall AFB would be limited to the runway and proximal military airspaces, the analysis of biological resources at that operating location is limited to flying species with potential to occur in those defined areas.

Eglin AFB

Vegetation. Eglin AFB has 34 community types that fall into four major ecosystems: sandhills, flatwoods, wetlands/riparian, and barrier island; with the sandhills and flatwoods system being the most extensive ecosystem comprising more than 80 percent of the installation. The installation has approximately 14,000 acres of improved and 46,000 acres of semi-improved areas. The majority of the areas in and around the Eglin Main Base airfield are considered disturbed and landscaped areas. Common grasses include St. Augustine (*Stenotaphrum secundatum*), bahia grass (*Paspalum notatum*), and centipede (*Eremochloa ophiuroides*) grass. Whenever possible native plants are used in landscaping (Eglin AFB 2022h).

Wildlife. Due to the variety of habitats, there is a rich diversity of game and non-game wildlife on Eglin AFB. Some representative wildlife species include white-tailed deer (*Odocoileus virginianus*), Florida cottontail (*Sylvilagus floridanus*), raccoon (*Procyon lotor*), eastern mole (*Scalopus aquaticus*), red-winged blackbird (*Agelaius phoeniceus*), great blue heron (*Ardea herodias*), and belted kingfisher (*Megaceryle alcyon*). Freshwater aquatic species that may be observed in or around streams, creeks, wetlands, and rivers include American alligator (*Alligator mississippiensis*), largemouth bass (*Micropterus salmoides*), and sailfin shiner (*Pteronotrops hypselopterus*) (Eglin AFB 2022h).

Protected Species. Potential exists for 19 federally listed species protected by the ESA or MMPA, candidate species under the ESA, and Bald and Golden Eagle Protection Act (BGEPA) species to occur on or near the installation, and for 7 federally protected species to be present under ETTC airspace. Additionally, there are 74 plant and wildlife state-protected species with the potential to occur on the installation, including the Florida black bear (*Ursus americanus floridanus*) protected by the Florida Black Bear Conservation Rule 68A-4.009. The list of protected species was developed based on data provided in the Eglin AFB Integrated Natural Resources Management Plan (INRMP), the USFWS Information for Planning and Consultation, the Florida Fish and Wildlife Conservation Commission, Florida Department of Agriculture and Consumer Services, and previous NEPA completed for the installation (see **Appendix G**) (Eglin AFB 2022h, USFWS 2022a, FDACS 2020, FWC 2022, DAF 2014b).

Prior to delisting on October 12, 2022, the gopher tortoise eastern distinct population was a candidate for federal listing and protection. The species is still state listed as threatened and

Eglin AFB continues to comply with the *Gopher Tortoise Programmatic Conference Opinion* (FWS Log #: 04EF3000-2018-F-0139). There is a Programmatic BO for the eastern indigo snake, a species that is closely associated with the gopher tortoise, in place at Eglin AFB. While this species has not been documented since 1999, most sightings were on or near roads so consultation for this species was undertaken in 2009 (USFWS 2009). The red-cockaded woodpecker (*Leuconotopicus borealis*) is actively managed in compliance with the *Red-Cockaded Woodpecker Programmatic Biological Opinion* (USFWS 2013). Additionally, the natural resources office actively manages the Okaloosa darter (*Etheostoma okaloosae*), reticulated flatwoods salamander (*Ambystoma bishopi*), Gulf sturgeon (*Acipenser oxyrinchus desotoi*), and bald eagle (*Haliaeetus leucocephalus*).

Only the bald eagle, protected under BGEPA and MBTA, has been documented around the project areas with two historical bald eagle nests at the southern edge of Eglin Main Base. During nesting season active nests are monitored weekly and Eglin AFB natural resources staff follows all USFWS guidelines for protection of bald eagles and their nest sites including a 330-foot buffer around active nests (Eglin AFB 2022h). Okaloosa darter stream habitat and three active red-cockaded woodpecker nests are located near the proposed construction and operations areas.

The project areas do not provide quality habitat for migratory bird species; however, there is the potential for 13 birds protected under MBTA to be in the vicinity (USFWS 2022a, USFWS 2022b). Eglin AFB developed and continues to implement MBTA protective measures in accordance with NEPA, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and the DAF's EIAP review process using the DAF Form 813. The Eglin AFB BASH plan uses habitat modification with BASH dispersal techniques to minimize the presence of wildlife species, including migratory birds on the airfield (Eglin AFB 2022h, Eglin AFB 2022i).

Wetlands. The Eglin Reservation has a total of 63,901.5 acres of wetlands as defined within Section 404 of the Clean Water Act (33 U.S.C. §1344) and the Environmental Resources Permit program per Part IV, Florida Statutes, Section 373. This includes 657.6 acres of estuarine wetlands, 265.4 acres of riverine wetlands, 180.4 acres of lacustrine wetlands, and 62,798.1 acres of palustrine wetlands. There are no wetlands on, or in close proximity to the proposed construction areas or TAs where operations would be conducted on Eglin AFB (Eglin AFB 2022h).

Critical Habitat. There is no USFWS designated critical habitat within or near the project areas at Eglin AFB airfield (USFWS 2022a).

Airspaces and Land and Water Ranges. Species within and underlying the ETTC airspace would be expected to be the same as those found throughout the installation. The state-threatened Florida burrowing owl (*Athene cunicularia floridana*) has been documented on TA B-70, however, even with ongoing flight and munitions expenditures operations conducted at the site, the species has been shown to continue to nest successfully (DAF 2014b).

The EGTTTR includes the coastal and continental shelf, as well as deeper oceanic water. In the EGTTTR, there have been 25 federally protected species documented, including marine

mammals (all of which are protected under MMPA), fish, reptiles, and corals. Of the species documented in the EGTTR, three are listed as threatened under ESA, and six are listed as endangered under MMPA (see full listing in **Appendix G**). The Gulf of Mexico also supports Essential Fish Habitat for Gulf of Mexico species and highly migratory species, as well as habitat areas of particular concern (Eglin AFB 2022h, NOAA 2022).

The 2017, 2019, and 2023 NMFS BOs for ongoing training activities in the EGTTR addressed the following species:

Whales: Bryde's whale (*Balaenoptera edeni*), Rice's whale (*Balaenopteraa physalis*), sperm whale (*Physeter macrocephalus*).

Fishes: Gulf sturgeon (*Acipenser oxyrinchus desotoi*), giant manta ray (*Mobula birostris*), oceanic whitetip shark (*Carcharhinus longimanus*), Nassau grouper (*Epinephelus striatus*), scalloped hammerhead shark (*Sphyrna lewini*), smalltooth sawfish (*Pristis pectinate*).

Turtles: Hawksbill sea turtle (*Eretmochelys imbricata*), loggerhead sea turtle (*Caretta caretta*), green sea turtle (*Chelonia mydas*; both North and South Atlantic), Kemp's Ridley sea turtle (*Lepidochelys kempii*), and leatherback sea turtle (*Dermochelys coriacea*).

Corals: Boulder star coral (*Orbicella franksi*), elkhorn coral (*Acropora palmata*), lobed star coral (*Orbicella annularis*), mountainous star coral (*Orbicella faveolata*), rough cactus coral (*Mycetophyllia ferox*), pillar coral (*Dendrogryra cylindrus*), staghorn coral (*Acropora cervicornis*), and the queen conch (*Alger gigas*).

Of the species addressed in the existing BOs, only the Rice's whale, loggerhead sea turtle, green sea turtle, Kemp's Ridley sea turtle, and leatherback sea turtle were identified as likely to be adversely affected by the ongoing munitions expenditures in W-470, where the F-35A DT munitions expenditures are proposed to be conducted.

The 2023 NMFS LOA authorizes the incidental take of marine mammals due to testing and training activities conducted in the EGTTR through April 13, 2030. Building from the 2017 and 2019 BOs, the 2023 BO and LOA documents include conditions for avoidance and minimization measures, monitoring and reporting requirements, and general notifications of injured or dead marine mammals (NMFS 2017, NMFS 2019, NMFS 2023a, NMFS 2023b).

Existing NEPA analyses for on-land and offshore operations ongoing at Eglin AFB include those listed in **Table 1-1**.

Tyndall AFB

Wildlife. Due to the variety of habitats, there is a rich diversity of game and non-game wildlife on Tyndall AFB. Some representative wildlife species include white-tail deer, gray fox (*Urocyon cinereoargenteus*), green anole (*Anolis carolinensis*), cottonmouth (*Agkistrodon piscivorus*), salt marsh rabbit (*Sylvilagus aquaticus*) and great blue heron (*Ardea Herodias*). The installation's geographic location supports a warm water fisheries program, including largemouth bass (*Micropterus salmoides*), sunfish (*Lepomis* spp.), and channel catfish (*Ictalurus punctatus*). The

mixed seagrass beds, muddy bottom habitat, and sand flats, provide habitat for neonate sharks like the Atlantic sharpnose (*Rhizoprionodon terraenovae*) and bonnethead (*Sphyrna tiburo*) (Tyndall AFB 2015).

Protected Species. Tyndall AFB has the potential for 36 federally listed species protected under the ESA or MMPA, candidate species by the ESA, and BGEPA species to occur on or near the installation. Additionally, there are 37 plant and wildlife state-protected species with the potential to occur on the installation, including the Florida black bear protected by the Florida Black Bear Conservation Rule 68A-4.009. The list of protected species was developed based on data provided in the Tyndall AFB INRMP, the USFWS Information for Planning and Consultation, the Florida Fish and Wildlife Conservation Commission and Florida Department of Agriculture and Consumer Services (see **Appendix G**) (Tyndall AFB 2020c, USFWS 2022b, FDACS 2020, FWC 2022).

Bald eagles are observed regularly on Tyndall AFB with active nests in eight known locations and there have been five occurrences of Godfrey's butterwort (*Pinguicula ionantha*) across the installation. Additionally, 43 birds protected by the MBTA have the potential to occur at Tyndall AFB. BASH protections, similar to those employed at Eglin AFB, are implemented on the airfield, for birds and wildlife, in accordance with the Tyndall BASH plan (USFWS 2022b, Tyndall AFB 2015).

Airspace and Ranges. The airspace over Tyndall AFB is located above both land and water over the Coastal Plains Middle, Coastal Lowlands-Gulf, and the Coastal Plains and Flatwoods area of the Coastal Plain Mixed Forest Province. There are approximately 31 federally protected and 45 state-protected species that have the potential to occur below the airspace (see **Appendix G**). Where the airspace extends over the Gulf of Mexico there are 28 species protected by the MMPA (Tyndall AFB 2020b).

Existing NEPA and operational analyses for airfield and airspace operations ongoing Tyndall AFB include those listed in **Table 1-1** and the *Final EIS for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB* (Tyndall AFB 2020b).

3.3.2 Environmental Consequences

3.3.2.1 Proposed Action

Eglin Main Base

Vegetation. Short- and long-term, minor, adverse impacts on vegetation would occur from temporary disturbance of vegetation and soil compaction during construction and modification actions and from permanent vegetation removal for new facilities and infrastructure. Impacts would be expected from the use of heavy equipment may include trampling and soil compaction. Permanent removal of vegetation and trees at new construction sites would create long-term, minor impacts from permanent reduction in cover on the installation. Measures that would be implemented to reduce impacts on vegetation, habitat, and species are included in **Appendix E**.

Wildlife. Short-term, minor, adverse impacts on wildlife would occur from noise associated with heavy equipment use and increased human presence during facility construction and renovation which could temporarily displace wildlife. Wildlife currently inhabiting the Proposed Action construction area is expected to be habituated to noise disturbances because of the urbanized environment. Long-term, negligible, adverse impacts on wildlife would occur from the permanent loss of potential habitat for wildlife.

Protected Species. There have been no documented occurrences of protected species within the project areas at Eglin Main Base so there are no anticipated impacts to protected species. The eastern indigo snake has not been documented on the installation since 1999, but since almost all sightings were near roads, it is possible there could be an impact to this species. An Indigo Snake Programmatic BO in place since 2009 would cover this unlikely occurrence. In accordance with the MBTA and EO 13186, construction activities would be completed in a manner that would avoid or minimize adverse effects on migratory birds as much as possible.

NEPA analysis and consultation under ESA Section 7 was conducted to address construction and modification actions in previously disturbed areas along the airfield at Eglin Main Base. These efforts were documented in the 2014 and 2020 *Cantonment Areas EAs* (Eglin AFB 2014, Eglin AFB 2020a) and the 2009 and 2013 USFWS BOs, which respectively address indigo snake, Okaloosa darter, and the red-cockaded woodpecker at Eglin AFB (USFWS 2009 and USFWS 2013). None of these species have been documented on or near the Proposed Action construction area.

Wildlife and protected species in the vicinity of the airfield and ETTC TAs, including MBTA-protected birds, would experience long-term, minor, adverse impacts from noise disturbances associated with takeoffs, landings, and flight operations. It is expected most of these species are habituated to regular aircraft overflights and noises (e.g., vehicles and aircraft maintenance activities) from the regular operations at the airfield. There is also the potential for long-term, minor, adverse impacts to vegetation, wildlife, and protected species from increased wildland fire risks associated with munitions use. Because the proposed F-35A flight and Weapons DT operations, which represent a 1 percent increase over annual installation operations, would not be concentrated over any one area, the anticipated aircraft noise from the added flights and munitions expenditures on land would be considered intermittent and minor. Flight operations at Eglin Main Base would be consistent with the type and conduct of ongoing F-35 operations as analyzed in previous NEPA (see **Table 1-1**) including, but not limited to, the 2014 *F-35 Supplemental EIS* (DAF 2014b), 2022 *Final Range EA for Eglin Overland Operations* (Eglin AFB 2022a), and the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a).

As described in the 2015 and 2023 EGTTR EAs, exposure to overflight noise in the gulf warning areas results in intermittent, short-term, minor to moderate, adverse noise impacts on marine species, including mammals, fishes, and sea turtles, in the EGTTR from aircraft overflight exposure. It is expected these species would vacate or avoid areas of persistent noise. Additionally, only species at or near the surface with an overflight noise would be impacted. The assessed long-term impacts from the F-35A DT program would be less than significant, as operators would adhere to the mitigation and conservation measures specified in the 2023

EGTTR EA, Programmatic BO and LOA (Eglin AFB 2023a, NMFS 2023a, NMFS 2023b). The incoming F-35A DT program would use the capacity from the allotment of live munitions expenditures evaluated through the 2023 NMFS BO and LOA; therefore, potential impacts on marine mammals and other marine life are fully addressed by the prior completed NEPA analyses including the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a).

F-35A DT program operators would conduct all flight and Weapons DT operations in accordance with the avoidance and minimization measures set forth in those agreements. Eglin AFB will continue USFWS and NMFS coordination, as appropriate, to establish and implement appropriate mitigation measures to minimize effects on terrestrial and marine resources from EGTTR operations.

Tyndall AFB

No construction activities are proposed for Tyndall AFB, therefore there would be no impacts to vegetation, wildlife, or protected species from construction activities.

Wildlife and protected species, including MBTA-protected birds, in the vicinity of the airfield would experience long-term, negligible, adverse impacts from noise disturbances associated with takeoffs and landings on the airfield. It is expected most of these species are habituated to regular to aircraft overflights and noises (e.g., vehicles and aircraft maintenance activities) from the regular operations at the airfield. There would be long-term, negligible, adverse impacts to wildlife and protected species below the airspace when in use. Operational impacts (e.g., the potential for bird and wildlife strikes) from the proposed take-off, landing, and closed pattern flight activities at Tyndall AFB would be similar to those described for Eglin Main Base. Flight operations at Tyndall AFB would be consistent with the type and conduct of ongoing F-35 operations as analyzed in previous NEPA documentation (see **Table 1-1**) including, but not limited to, the *Final EIS for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB* (Tyndall AFB 2020b) and *Final EA Combat Air Forces Contracted Adversary Air Temporary Operations from Tyndall AFB, Florida* (Tyndall AFB 2020a).

3.3.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and renovation activities to support the F-35A DT program would not occur. Therefore, biological resources within and in the vicinity of Eglin AFB and Tyndall AFB would remain as described in **Section 3.2.1**, and no adverse impacts would occur.

3.3.2.3 Cumulative Impacts

Short and long-term, minor, adverse cumulative impacts on biological resources would occur from the construction and modification actions and F-35A DT operations under the Proposed Action and the reasonably foreseeable actions listed in **Section 3.1.2, Table 3-1**. Most of the Proposed Action project areas and reasonably foreseeable project areas are within previously disturbed areas or would take place within airspace currently used for DAF operations. Short-

term, minor, adverse cumulative impacts on vegetation and wildlife would occur from ground disturbance and the use of heavy equipment during facility construction and modification actions under the Proposed Action when combined with other construction actions, such as those for the 350 SWW and 36 EWS Beddown, B-88 and C-53A Range Improvements, and implementation of future development plans at Eglin AFB. Localized loss of habitat, degradation of habitat, noise impacts, or direct physical impacts on species can have a cumulative impact when viewed on a regional scale if that loss or impact is compounded by other events with the same end results.

Long-term, minor, adverse cumulative impacts on wildlife could occur from foreseeable incremental increases in aircraft operations out of Eglin AFB; however, long-term, minor, beneficial cumulative impacts would occur from the net decrease in total Eglin AFB airfield operations following optimization of the 5th Generation FTU. When combined with the AvFID and Fixed Wing Aircraft Growth at Duke Field, F-35A Wing and MQ-9 Wing Beddowns at Tyndall AFB, and Combat ADAIR operations at Tyndall AFB, the Proposed Action would result in long-term, minor, adverse cumulative impacts on biological resources on Eglin AFB and Tyndall AFB, respectively. These impacts would result from the net increase in airfield operations and associated noise disturbances at these airfields. Similarly, long-term, minor, adverse cumulative impacts would result from any net increase in expenditures of defensive countermeasures and munitions. Species would be expected to migrate to and use adjacent suitable habitat during disruptive noise events. Most of the wildlife inhabiting these areas are habituated to aircraft overflights and noises from regular aircraft and range operations. DAF would continue to follow all minimization and mitigation measures outlined in standard operating procedures and/or agreed upon during ESA Section 7 consultations. Therefore, the Proposed Action, when combined with other reasonably foreseeable actions, would not result in significant cumulative impacts on biological resources.

3.3.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would result in a minor loss of vegetation and wildlife habitat. Temporarily disturbed sites would be revegetated with native species to support the native plant community in the long term.

3.4 Cultural Resources

3.4.1 Affected Environment

The Area of Potential Effects (APE) is defined within Section 106 of the NHPA as the geographic area or areas within which an undertaking (defined at 42 CFR 137.289) may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. Potential impacts on cultural resources anticipated from the Proposed Action consist of temporary atmospheric impacts, including visual, auditory, and vibration impacts during construction, as well as more long-term visual impacts due to the proposed construction of two new buildings (the 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar), the relocation of the existing boat shed and storage area, and additions to Building 64. The APE for the Proposed Action is discontinuous and consists of the outer boundaries of the project areas.

As of 2021, approximately 98.3 percent of Eglin AFB that had been identified as having a high probability of containing cultural resources had been surveyed for archaeological resources (Eglin AFB 2022c). The project areas comprising the APE have either been surveyed for archaeological resources or are in areas, such as the flightline and Eglin Field Historic District, that have been disturbed by more than 70 years of construction and development, significantly diminishing the likelihood of intact archaeological deposits in those areas. The boundary of one previously recorded archaeological site (8OK00426) overlaps the APE at the proposed boat shed relocation site. Site 8OK00426 has been determined ineligible for listing in the National Register of Historic Places (NRHP), meaning no NRHP-eligible or -listed archaeological sites are located in the APE. No additional archaeological sites or cemeteries overlap the APE. Tribal consultations have not identified any sacred sites or traditional cultural properties at Eglin AFB.

Buildings 32, 100, 101, and 138 have been determined ineligible for listing in the NRHP. Building 64, built in 2002, has not yet been evaluated for eligibility (Eglin AFB 2022j). Six project areas are in or adjacent to two of the seven NRHP-listed or -eligible historic districts located on Eglin AFB. The remaining four project areas (including the sites for the 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar) would not be within the viewshed of the NRHP-listed or -eligible historic districts.

Building 32 and the parking area associated with the proposed 2-bay aircraft maintenance hangar are located within the NRHP-listed Eglin Field Historic District. Buildings 100 and 101 are adjacent to the Eglin Field Historic District, on the west side of Barrancas Avenue, which serves as the western boundary of the historic district. Building 64 is adjacent to (immediately north of) the historic district. The Eglin Field Historic District is listed in the NRHP, under Criterion A for significance in the area of Military, and under Criterion C for significance in the areas of Architecture and Engineering. The district's period of significance is 1941–1945 (Eglin AFB 1995).

The proposed boat shed relocation site is adjacent to the Marine Operations Historic District, which comprises a World War II-era dock in Weekley Bayou and one contemporary boathouse adjacent to the dock. The district was determined NRHP-eligible under Criterion A for its association with World War II-era and early Cold War water rescue activities, with a period of significance dating to 1943 through 1958 (Hardlines 2007). The proposed boat shed relocation site is approximately 0.05-mile (270 feet) southeast of the district's southeastern corner.

3.4.2 Environmental Consequences

Per Section 106 of the NHPA and its implementing regulations, an adverse effect is found when an undertaking (or action) may alter, directly or indirectly, any of the characteristics of a historic property that qualify it for NRHP eligibility in a manner that would diminish the property's historic integrity of location, setting, feeling, association, design, materials, or workmanship. Examples of adverse effects on cultural resources as defined by Section 106 can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or auditory elements that are out of character with the property or that alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the

property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance.

Per the Eglin AFB Comprehensive Section 106 Programmatic Agreement signed by Eglin AFB, the Florida State Historic Preservation Officer (SHPO), and the Advisory Council on Historic Preservation in 2021, Eglin AFB is not required to consult with the SHPO and Tribes on undertakings with a finding of “no historic properties affected” (where survey has already been conducted and SHPO has commented on eligibility) or “no adverse effect” (unless there is a reasonable doubt regarding the effect finding). However, if an undertaking is found to pose an adverse effect to historic properties, the Programmatic Agreement requires that Eglin AFB open consultation with SHPO. Eglin AFB is also required to open consultation with Tribes if an undertaking will have an adverse effect to a precontact or historic Native American archaeological site (Eglin AFB 2020c). Adverse effects determined per Section 106 may or may not be considered significant impacts per NEPA, and considerations include the type, duration, and severity of the impacts as well as potential mitigation measures developed through Section 106 consultation.

3.4.2.1 Proposed Action

Under the Proposed Action, potential impacts are limited to one NRHP-listed historic district and one NRHP-eligible historic district that either encompass or are adjacent to the project areas. Historic districts are considered an environmental constraint under the 2020 *Cantonment Areas EA* (Eglin AFB 2020a).

Within the NRHP-listed Eglin Field Historic District, renovation of Building 32 and construction of a parking area associated with the proposed 2-bay aircraft maintenance hangar would not introduce elements to the district that would diminish character-defining features of the district or impact its integrity or ability to convey its historic significance under Criteria A and C. Building 32 is not a contributing resource to the historic district and the proposed renovation would not alter the building's footprint. The proposed parking area in the district would be constructed in a cleared area at the north end of the district, adjacent to existing roadways and parking areas around neighboring buildings. These elements of the Proposed Action within the district would not alter any contributing elements nor would it add a new element out of character with the historic and current function of the district. Similarly, the proposed renovation of Buildings 100 and 101 (which are outside of and immediately west of the historic district) or additions to Building 64 (outside of and immediately north of the historic district), would not be significant enough to impact the character-defining features of the Eglin Field Historic District.

The proposed boat shed relocation site is adjacent to the NRHP-eligible Marine Operations Historic District. The relocation of the boat shed to land southeast of the historic district would not change the character of the surrounding area or impact the ability of the district to convey historic significance under Criterion A. The function and character of the boat shed would be similar and complementary to the historic use within the district. Additionally, mature vegetation south and east of the dock would screen the view of the proposed boat shed relocation site. The Proposed Action would not alter the characteristics that make either historic districts eligible for

the NRHP by diminishing character-defining features and/or relevant aspects of integrity, and would, therefore, have no effect on historic properties.

3.4.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and modification actions to support the F-35A DT program would not occur. Therefore, conditions as described in **Section 3.4.1** would remain unchanged, and no new impacts would occur on cultural resources.

3.4.2.3 Cumulative Impacts

Long-term, minor, adverse cumulative impacts on cultural resources could occur from the construction and modification actions under the Proposed Action when combined with reasonably foreseeable construction projects. The reasonably foreseeable actions identified in **Table 3-1** that have the potential to interact with the Proposed Action and cause adverse cumulative effects on cultural resources include: the beddown of the 350 SWW and 36 EWS, B-88 and C-53A Range Improvements, the Okaloosa County Airport expansion, reroute of Eglin Boulevard, and implementation of Eglin AFB Future Development Plans. Those reasonably foreseeable actions would include ground disturbance and/or would introduce new buildings and/or structures to the installation that could result in visual impacts to historic properties or historic districts or introduce changes to elements or characteristics of a historic property that make the property eligible for listing in the NRHP. The alteration or demolition of historic structures and likewise the disturbance or removal of archaeological artifacts may incrementally impact the cultural and historic setting of Eglin AFB. The potential for adverse impacts under Section 106 would be analyzed for each individual project.

No long-term, adverse cumulative impacts on cultural resources would be expected from increased F-35A operations at Eglin AFB or Tyndall AFB, or the changes in the levels of aircraft operations from the reasonably foreseeable actions, as air operations do not have the potential to impact historic or cultural properties. Therefore, the Proposed Action, when combined with other reasonably foreseeable actions, would not result in significant cumulative impacts on cultural resources.

3.4.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would not result in irreversible or irretrievable commitments of cultural resources.

3.5 Geological Resources

3.5.1 Affected Environment

The ROI for the geological resources analysis includes the proposed construction areas along the airfield and the ETTC TAs where munitions would be expended on land during DT operations.

Regional Geology. Eglin AFB falls within both the Southern Coastal Plains (Gulf Coast Flatwoods sub-region) and the Southeastern Plains (Southern Pine Plains and Hills sub-region) ecoregions of Florida (USEPA 2022c). The Southern Coastal Plain ecoregion consists primarily of flat plains with many swamps, marshes, and lakes. This ecoregion is warmer and has a longer growing season and coarser textured soils than the Middle Atlantic Coastal Plains. Once covered by a forest of beech, sweetgum, southern magnolia, slash pine, loblolly pine, white oak, and laurel oak, land cover in the region is now mostly longleaf-slash pine forest, oak-gum-cypress forest in some low-lying areas, pasture for beef cattle, and urban development (USEPA 2000). The Southern Pine Plains and Hills ecoregion consists of southward sloping and irregular plains. There are low, rolling hills, broad, gently-sloping ridgetops, a few steeper side-slopes cut by streams, and broad, flat bottomlands along low-to-moderate gradient streams with sand and clay bottoms. Sediments with varying textures, ranging from clay, fine to coarse sands, and some gravely sands, characterize this ecoregion. The climate leans towards the warmer end of a humid subtropical climate (USEPA 2022d).

Topography. The general landscape at Eglin AFB is characterized by developed flat landscapes with only mild rises (less than 5 percent slope) in elevation. Generally, these features are indistinguishable to the naked eye under natural vegetated conditions.

Soils. The predominant soil type within the proposed construction area is urban (developed) land comprising 90,870 square feet or approximately 68 percent of the total surface area. Urban land is in nearly level or gently sloping areas that are covered with airports, shopping centers, parking lots, streets, and sidewalks. Slopes are low, typically 0 to 5 percent. These soils have either been cut to a depth of 12 inches or more or covered with 12 inches of fill on average (NRCS 1995).

Soils in the ETTC TAs that support ongoing F-35A and other aircraft weapons firing operations including live and inert munitions expenditures are predominantly composed of heavily disturbed, well drained Lakeland sand (NRCS 2022). The soil profile of Lakeland sands includes primarily excessively drained, brownish-yellow sands that have developed along the tops of broad ridges and slopes. The unique combination of almost pure sand texture and very high soil infiltration, permeability, and hydrologic conductivity has created excessively drained soils with a high capacity to move water through the soil but limited capacity to hold water and nutrients in the soil (NRCS 1995). The Lakeland sand in the affected area has moderate susceptibility to erosion, due to the high sand content, and is capable of absorbing high volumes of rainfall.

Effects on soils in the range areas from the various mission training activities depend on where and how the munitions components come into contact with the ground. Inert munitions strike the ground generating soil disturbance, compaction, and exposure to metals. Effects from live munitions depend upon whether the detonation is complete or incomplete. If complete, nearly all (approximately 99 percent) of the explosive materials and biproducts are consumed during the detonation. Incomplete detonations consume a lower amount of explosive materials and release explosive materials and metals into the environment. Munitions that fail to explode may degrade over time, slowly releasing the materials contained within where the shell casings are left in place (Eglin AFB 2019b). As a fire preventive measure, Eglin AFB maintains the target areas in

the ETTC TAs clear of vegetation. This practice results in ongoing soil erosion around the targets that contributes to storm runoff and sedimentation of nearby streams (DAF 2014b). In accordance with Eglin AFB Instruction 13-212, *Range Planning and Operations*, spent shells and munitions debris are regularly recovered or removed from the ranges for the purpose of storage, reclamation, treatment, and disposal as solid waste. Adherence to these munitions recovery practices minimizes the potential for munitions constituents to leach into soils and groundwater or runoff into nearby streams.

Geological Hazards. Local terrain is geologically and seismically stable, lacking structural geologic elements such as faults, folding, and crustal deformation. No geological hazards are of concern in the proposed construction or on-land operations areas. Therefore, geological hazards are not discussed further.

3.5.2 Environmental Consequences

Protection of unique geological features, minimization of soil erosion, and siting of facilities in relation to potential geologic hazards are considered when evaluating potential effects of a proposed action on geological resources. Generally, adverse effects can be avoided or minimized if proper techniques, erosion-control measures, and structural engineering design are incorporated into project development.

Effects on geology and soils would be major and adverse if they would alter the lithology (i.e., the character of a rock formation), stratigraphy (i.e., the layering of sedimentary rocks), and geological structures that control groundwater quality, distribution of aquifers and confining beds, and groundwater availability; or change the soil composition, structure, or function within the environment.

3.5.2.1 Proposed Action

Regional Geology. The Proposed Action would not expose people or structures to substantial adverse effects, nor would it entirely remove a geologic resource. The Proposed Action would not alter rock formations or layering of sedimentary rock. Therefore, negligible impacts on regional geology would be anticipated from the Proposed Action.

Topography and Soils. The anticipated short- and long-term, adverse impacts from the proposed facility construction and modification actions along the airfield would be consistent with those already analyzed and addressed under the 2014 and 2020 *Cantonment Areas EAs* (Eglin AFB 2014, Eglin AFB 2020a). The proposed construction and modification actions along the airfield would occur predominantly on previously disturbed and developed land. Specifically, the Proposed Action would include soil excavation to prepare the sites for building construction, ground disturbance to provide access to nearby or adjacent utilities, construction of new utility lines, grading of areas to address surface water runoff during storm events, installation of grade control structures, and installation of pavement for access roads and parking lots.

Construction would add 4.6 acres of new pavement (i.e., concrete construction for the access road, airfield, and parking areas) and 5.7 acres of building footprint to Eglin Main Base, resulting in an increase of 10.3 acres of new impervious surfaces, which would be addressed through

appropriate stormwater infrastructure. Construction actions also would disturb and expose soils, which would increase their susceptibility to water and wind erosion. Because changes in stormwater infrastructure and increase in impervious surfaces would result, slight changes in the direction, rate, and volume of surface water flows may occur, and there may be gradual alterations in downstream topography. The use of heavy equipment or vehicles during construction could result in localized soil compaction, altering their normal function relative to water storage, infiltration, or filtration. To minimize impacts on geological resources during construction, the BMPs and management actions listed in **Appendix E, Section E.3.4** would be incorporated, as applicable.

As needed, Eglin AFB would obtain coverage under the 2017 National Pollutant Discharge Elimination System (NPDES) Construction General Permit for projects that individually or cumulatively disturb one acre or more of land, which requires a site-specific Erosion and Sediment Control Plan and a project-specific Stormwater Pollution Prevention Plan (SWPPP) prior to construction (USEPA 2017).

Long-term, intermittent, moderate, adverse impacts on soils (compaction, disturbance, and exposure to metals, explosives and their biproducts, and other chemical materials) from the proposed overland and over water munitions expenditures would be the same as described in the 2014 *F-35 Supplemental EIS* (DAF 2014b), the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a) and the 2022 *Final Range EA for Eglin Overland Air Operations* (Eglin AFB 2022a). Using explosives would disturb sediment, potentially increasing sedimentation and turbidity in nearby water. In such cases, the turbidity impacts would not be considered substantial because, depending on specific site conditions of wind and tidal currents, the turbidity plume would be expected to dissipate as particles return to the bottom or are dispersed (Eglin AFB 2023a). Nevertheless, erosion and sedimentation from the ranges would continue to occur whether or not the proposed F-35A DT munitions expenditures were conducted. Ongoing implementation of range protocols to recover munitions debris and spent shells would ensure minimized potential for deposition of metals and munitions constituents in the soil that may erode in winds or rainwater and be transported to affect nearby water resources. Information on effects of the Proposed Action on on-land and offshore water resources and submerged sediments are provided in **Section 3.11**. The Proposed Action would not result in significant impacts on regional and local geological resources.

3.5.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft at Eglin AFB and conditions would remain the same as described in **Section 3.5.1**. No new or additional impacts on geological resources would occur as a result of the No Action Alternative.

3.5.2.3 Cumulative Impacts

If construction for any of the reasonably foreseeable actions listed in **Table 3-1** were to occur simultaneously with the Proposed Action, ground disturbance, soil compaction, and erosion associated with the construction efforts would result in short-term, minor, cumulative adverse impacts on soils and geology. The proposed construction and modification actions for the Proposed Action and the construction actions for the reasonably foreseeable actions would

occur predominantly on previously disturbed or developed land. Cumulative impacts from construction would be temporary and would not permanently alter the topography, soils, or geology on Eglin AFB. Implementation of BMPs and environmental protection measures, including erosion control measures, would be used to minimize the potential for erosion to adversely impact adjacent wetland areas and water quality.

Long-term, minor to moderate, cumulative impacts would occur as a result of increased erosion and sedimentation associated with the increase in impervious surfaces from the Proposed Action and other construction or dredging projects identified in **Table 3-1** at Eglin AFB and Tyndall AFB, including: the beddown of the 350 SWW and 36 EWS, B-88 and C-53A Range Improvements, the Okaloosa County Airport expansion, reroute of Eglin Boulevard, implementation of Eglin AFB Future Development Plans, expansion of the Air Force Enlisted Village, and installation of the Submarine Fiber Optic Cable. Therefore, the Proposed Action, when combined with other reasonably foreseeable actions, would not result in significant cumulative impacts on geological resources.

3.5.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would not result in irreversible or irretrievable commitments of geological resources.

3.6 Hazardous Materials and Wastes

3.6.1 Affected Environment

The ROI for the hazardous materials and wastes analysis includes the project areas and areas adjacent to the project areas. The 96th Civil Engineer Group, Environmental Management Branch, is responsible for the implementation of hazardous material and waste plans at Eglin AFB. In conformance with the policies established by DAF Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*, the Environmental Management Branch has developed procedures and plans to manage hazardous materials, hazardous wastes, and Installation Restoration Program (IRP) sites on Eglin AFB.

Hazardous Materials, Petroleum Products, and Hazardous Waste Management. Hazardous materials are used throughout the installation for various functions, including aircraft refueling, maintenance, and washing; vehicle maintenance and washing; petroleum, oil, and lubricant (POL) distribution and management; facility maintenance and repair; maintenance of ground support equipment; and aircraft support operations. Hazardous materials used in these functions include fuels and lubricating oils, solvents, paints and thinners, antifreeze, deicing compounds, and acids. At Eglin AFB, hazardous materials are managed through a centralized base hazardous materials pharmacy using a system that tracks the inventory and acquisition of hazardous materials along with hazardous waste disposal and health and safety information. POLs consistent with aircraft maintenance are stored in the AGE facility (Building 101), which is proposed for renovation as part of the Proposed Action (Eglin AFB 2019c). The installation's Hazardous Material Emergency Planning and Response Plan lists Building 138, the Fuels Hangar proposed for renovation, as a hydrazine storage building or hydrazine storage and servicing facility where 55-gallon containers of hydrazine are transferred from 96th Logistics

Readiness Squadron. The plan states that facility can hold up to 950 pounds of hydrazine (Eglin AFB 2021c).

Storage tanks at Eglin AFB contain jet fuel, diesel fuel, fuel oil, used cooking oil, mineral oil for transformers, used oil, and unleaded gasoline. The primary POL management activity at Eglin AFB is the receipt, storage, and transfer of jet fuel for use in military aircraft. The total POL storage capacity at Eglin AFB is approximately 7 million gallons. Procedures and responsibilities for responding to a POL spill or other incident are addressed in the installation's Spill Prevention, Control, and Countermeasures (SPCC) Plan. The SPCC Plan addresses all oil-filled containers greater than 55 gallons at Eglin AFB. The SPCC Plan provides guidance for the prevention and management of spills from aboveground storage tanks (ASTs) and underground storage tanks (Eglin AFB 2019c). Additional details regarding liquid fuels at Eglin AFB are discussed in **Section 3.6**.

Storage tanks are located within the vicinity of Buildings 100, 101, and 138 (Eglin AFB 2017a). An emergency generator and associated 366-gallon AST containing diesel fuel is present at Building 100, which is proposed for renovation as part of the Proposed Action. A 480-gallon, double-walled tank used for waste oil/used oil and 19 portable Jet A generators are present at Building 101, which is proposed for renovation as part of the Proposed Action. A 220-gallon waste fuel storage bowser and a 220-gallon Jet A bowser are stored inside of Building 138, which is proposed for renovation as part of the Proposed Action (Eglin AFB 2019c).

Eglin AFB is regulated by USEPA as a large-quantity generator of hazardous waste (USEPA ID No. FL8570024366). Initial accumulation points (IAPs) are used throughout the installation for the accumulation of up to 55 gallons of hazardous waste or 1 quart of acutely hazardous waste, with each IAP authorized to collect a single waste stream (Eglin AFB 2019d). There are two universal waste IAPs in Building 32; four universal waste IAPs in Building 64; one universal waste IAP in Building 100; 10 hazardous waste IAPs, four POL IAPs, 2 special waste IAPs, and one universal waste IAP in Building 101; two hazardous waste and one special waste IAPs in Building 138; and one POL IAP and one special waste IAP in Building 965 (Eglin AFB 2023c).

Toxic Substances. Past surveys have determined that Buildings 100 and 101, constructed in 1956 and 1960, respectively, have asbestos-containing material (ACM) present in some floor tile and mastic throughout the facilities. Wrapped pipe above suspended ceilings and in the mechanical rooms in Buildings 100 and 101 may also contain asbestos (Eglin AFB 2022j, Eglin AFB 2022k). Additionally, based on the year of construction, these buildings may also contain lead-based paint (LBP) and polychlorinated biphenyls (PCBs). ACM was abated in January 2021 in the floor tile and mastic in the parachute tower of Building 32 (constructed in 1979); however, asbestos-wrapped pipe may also be present in the mechanical rooms (Eglin AFB 2022j, Eglin AFB 2022k). Buildings 138 and 965, constructed in 1988 and 1989, respectively, have not been surveyed for ACM and based on the years of construction are not anticipated to contain LBP or PCBs (Eglin AFB 2022l). Building 64, constructed in 2002, is not anticipated to contain ACM, LBP, or PCBs (Eglin AFB 2022j). Additionally, prior to any building renovation or demolition, surveys are conducted of ACM, LBP, and PCBs in strict compliance with all applicable federal, state, and local laws, rules, regulations, and standards.

Installation Restoration Program. Eglin AFB has 68 active IRP sites that include known and suspected soil and groundwater contamination associated with landfills, POL storage areas, oil/water separators, drainage areas, septic systems, fire training areas, and spill areas (Eglin AFB 2022m). Building 138, which is proposed for renovation as part of the Proposed Action, is within IRP Spill Site (SS-) 292P and immediately south of Point of Interest (POI-) 725. Additionally, relocation of the boat shed would occur within IRP Site SS-086. The remainder of the project areas would not occur within or adjacent to an active IRP site. Monitoring Well 88 is approximately 200 feet west of Building 64, which is proposed for an addition to both the south and west sides of the building and Monitoring Well 89 is approximately 20 feet southwest of Building 32, which is proposed for renovation. SS-291P is approximately 0.1 mile southeast of the proposed 2-bay maintenance hangar site, and contaminated groundwater potentially underlies that site. Active IRP sites within or adjacent to the project areas are shown on **Figure 3-1**. There are no active Military Munitions Response Program sites within or adjacent to the project areas; therefore, the Military Munitions Response Program will not be discussed further.

Table 3-5 presents the active IRP sites within or adjacent to the proposed construction, demolition, and renovation areas, and their land use control (LUC) status. IRP sites that are within the proposed project areas are discussed in more detail in the following paragraphs.

POI-725, North-South Flightline Drainage Ditch, was identified in a Preliminary Assessment of the Fire Training Area sites and other POIs at Eglin AFB conducted in 2015 to identify locations where poly- and perfluoroalkyl substances (PFAS) may have been used and released into the environment. POI-725 was identified as a potential perfluorooctane sulfonate (PFOS) site and has been noted as requiring Site Inspection of aqueous film forming foam (AFFF) release areas as of March 2019. POI-725 is undergoing a Remedial Investigation of the soil and groundwater to determine the full nature and extent of PFAS and PFOS contamination (Eglin AFB 2022m).



Figure Note: Some facilities and infrastructure are not shown due to operational security requirements.

Figure 3-1. Active IRP Sites Within or Adjacent to the Proposed Construction, Demolition, and Renovation Areas

Table 3-5. Active IRP Sites Within or Adjacent to the Project Areas

Site ID	Site Name	Site Status	Approximate Distance and Direction to Project Area
POI-725	North-South Flightline Drainage Ditch	Potential PFOS Site	0.02 mile north of Building 138
POI-727	LF-08 Receiver Landfill	Potential PFOS Site	0.3 mile northwest of Building 965 and the 2-bay aircraft test hangar
LF-003	Eglin Main Landfill, DRMO (formerly SS-23), CE Storage Yard (formerly SS-24), Waste Oil Receiver Yard (formerly ST-63), three petroleum pipeline valve pits (formerly SS-107, SS-108, and SS-109)	Active – LUC	0.35 mile southwest of the boat shed relocation site
LF-005	Eglin Main Landfill	Active – LUC	0.6 mile south of Building 138
LF-008	Receiver Area Landfill	Active – LUC	0.13 mile west of Building 965 and the 2-bay aircraft test hangar
SS-036	POL Tank Farm	Active – None	0.3 mile northwest of boat shed relocation site
SS-086	Exterior Electric Shop/Entomology Shop	Active – LUC	Within – boat shed relocation site
SS-283	JP-8 LNAPL Site	Active – None	0.15 mile southeast of Building 138
SS-286P-SUB	McKinley Lab Fire Site	Active – None	0.15 mile east of Building 138
SS-287	Tank 92 Spill Site	Active – None	0.35 mile northeast of 2-bay aircraft maintenance hangar and 0.35 mile south of Building 965 demolition site/2-bay aircraft test hangar site
SS-291P	Building 71 and Building 72	Active – None	0.1 mile southeast of 2-bay aircraft maintenance hangar and 0.1 mile east of Building 64. Contaminated groundwater potentially underlies the area where Building 965 is located.
SS-292P	Building 138	Active – None	Within – Building 138
SS-304P	Building 500, 96 LRS Maintenance Building	Active – None	0.65 mile west of boat shed relocation site
SS-305P	2011 Eglin Aero Beech C24R Site	Active – None	0.2 mile northwest of Building 100
SS-306P	AFFF Holding Pond	Active – None	0.35 mile east of Building 138
SS-310P	Eglin Skeet Range and Fire Training Area – to be combined with LF-003	Potential PFOS Site	0.42 mile south of boat shed relocation site

Key: AFFF – aqueous film forming foam; LF – landfill; LUC – land use control; PFOS – perfluorooctane sulfonate; POI – Point of Interest; SS – Spill Site

Source: Eglin AFB 2022m

SS-086, Exterior Electric Shop/Entomology Shop, encompasses an area of over 100 acres and includes the locations where pesticides, such as dichlorodiphenyldichloroethane, dichlorodiphenyltrichloroethane, and chlordane, were stored on the installation from the early 1980s until 1995. In 1998 approximately 3,247 tons of pesticide-impacted soils were removed from the SS-086. In 2003, groundwater LUCs to restrict residential development without proper engineering controls and use of the shallow aquifer as a source of potable drinking water were

placed on the site. The groundwater LUC underlies the boat shed relocation site. In addition, soil LUCs have been applied to two locations within the site; however, the two locations with soil LUCs are not within the project areas. The groundwater and soil LUCs have been approved by the USEPA, FDEP, and the public as the selected remedy and annual groundwater monitoring is performed for volatile organic compounds, natural attenuation parameters, and dieldrin to support remedy effectiveness reviews (Eglin AFB 2022m).

SS-292P, Building 138, is a hangar containing an AFFF fire suppression system that had an inadvertent activation in the mid-1990s where AFFF was released outside the hangar doors. Based on the 2015 Preliminary Assessment a Site Investigation was conducted. During the Site Investigation three soil borings and surface, subsurface, and composite soil samples were collected, and two monitoring wells were installed in two of the boring locations. Groundwater was encountered ranging from 20 to 23 feet below the surface during boring advancement. Soil and groundwater samples were analyzed for PFOS, perfluorooctanoic acid (PFOA), and perfluorobutanesulfonic acid. No exceedances in the soil were detected; however, PFOS and PFOA were detected in the groundwater above the USEPA Lifetime Health Advisory value¹. SS-292P is currently undergoing Remedial Investigation of the soil and groundwater with contaminants of concern listed as PFAS constituents. The full nature and extent of the PFAS contamination will be determined based on the findings of the Remedial Investigation (Eglin AFB 2022m).

SS-291P, Building 71 and Building 72, consists of two buildings that previously contained AFFF fire suppression systems. The Building 71 fire suppression system had one inadvertent activation that released AFFF into a storm drain inlet on the south side of the building. The Building 72 fire suppression system had inadvertent activations in 2001 and 2014, where AFFF was released outside the hangar doors to the north, and outside the back door of the hangar to the south, respectively. Sampling as part of a Site Investigation conducted in 2018 showed that levels of PFOS and PFOS/PFOA in the groundwater at Buildings 71 and 72 were above USEPA Lifetime Health Advisory values. At Building 72, sampling showed that PFOS in the soil was above the USEPA Regional Screening Level at one location, and the PFOA in the groundwater was above the USEPA Lifetime Health Advisory value at one location. The full nature and extent of the contamination will be determined based on the findings of the Remedial Investigation (Eglin AFB 2022m).

3.6.2 Environmental Consequences

Impacts on or from hazardous materials and wastes would be considered significant if a proposed action would result in noncompliance with applicable federal or state regulations or increase the amounts of hazardous materials or waste procured or generated beyond current management procedures, permits, and capacities. Impacts on contaminated sites would be

¹ USEPA's lifetime health advisories identify levels to protect all people, including sensitive populations and life stages, from adverse health effects resulting from a lifetime of exposure to these PFAS in drinking water. USEPA's health advisories are non-enforceable and non-regulatory and provide regulatory information to drinking water system operators as well as federal, state, tribal, and local officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination.

considered significant if a proposed action would disturb or create contaminated sites, resulting in negative impacts on human health or the environment, or if a proposed action would make it substantially more difficult or costly to remediate existing contaminated sites.

3.6.2.1 Proposed Action

Hazardous Materials, Petroleum Products, and Hazardous Waste Management. Facility construction and modification actions would result in short-term, negligible to minor, adverse impacts on hazardous materials and waste management. Construction contractors would ensure the handling, storage, and disposal of any hazardous materials, petroleum products, and any hazardous and petroleum wastes generated are carried out in accordance with the Eglin AFB's *Hazardous Waste Management Plan* (HWMP) and federal, state, and local laws and regulations. Construction equipment would use small quantities of hazardous materials and petroleum products such as solvents, hydraulic fluid, oil, antifreeze, and other hazardous materials. Hazardous materials could be used for minor equipment servicing and repair activities. Should any hazardous materials or petroleum products be released into the environment, applicable management plans such as the installation's SPCC Plan would be adhered to. The severity of a potential impact from an accidental release would vary based on the extent of a release and the substance(s) involved. Implementation of BMPs and environmental protection measures, as identified in **Appendix E, Section E.3.5**, would reduce the potential for an accidental release of these materials. Construction activities may require the temporary use of ASTs onsite for power generation or equipment fuel, and their use and maintenance would comply with applicable federal, state, and local laws and regulations to include secondary containment. ASTs would be used temporarily and removed from the area at project completion.

To reduce the potential for impacts, storage containers such as tanks associated with generators, waste oil/used oil tanks, IAPs, and bowzers within or adjacent to Buildings 100, 101, and 138, would be relocated or clearly marked and avoided to ensure no damage would occur during facility construction and modification actions. Additionally, to ensure safety and reduce the potential for an accidental release, during modification actions no containers of hydrazine would be present within Building 138 or near any modification actions associated with the building.

Operation and maintenance of the new hangars and the beddown of four F-35A aircraft and associated operations would result in long-term, negligible, adverse impacts on hazardous materials and waste management. Negligible amounts of hazardous materials such as paints, adhesives, solvents, and cleansers would be used during operation and maintenance of the new hangars. Hazardous materials and petroleum products used for facility and aircraft operations and maintenance already exist on Eglin AFB and would continue to be managed through the installation's centralized hazardous materials pharmacy. Aircraft operations and maintenance personnel would implement standard BMPs (see **Appendix E**); comply with standard operating procedures established for the F-35 aircraft on the installation; and adhere to all federal, state, and local rules and regulations governing the procurement, use, storage, transportation, and disposal of hazardous materials and petroleum products and associated hazardous and petroleum wastes generated during aircraft operations and maintenance.

activities. To manage the waste streams in the newly constructed hangars, IAPs would be established, as necessary, and maintained in accordance with the HWMP. Additionally, waste minimization measures would be implemented to reduce potential impacts. The POL IAP and special waste IAP in Building 965 would be removed or relocated prior to the building's demolition in accordance with the HWMP.

Toxic Substances. Short-term, negligible to minor, adverse impacts would result from the potential for exposure to ACM, LBP, and PCBs. Because of their age, surveys for toxic substances would be conducted by a certified contractor for Buildings 32, 100, 101, 138, and 965 prior to any building renovation or demolition. As stated in **Section 3.5.1**, Buildings 32, 100, and 101 were previously surveyed and have been identified as containing ACM. Additionally, based on the years of construction for Buildings 100 and 101, these buildings may also contain LBP and PCBs. Because Building 965 was constructed in 1989 and as discussed in **Section 3.5.1**, USEPA implemented bans on various ACMs between 1973 and 1990, there is a potential for spray-on products used during construction that could contain more than 1 percent asbestos. Toxic substances would be handled by a certified contractor in accordance with the HWMP and disposed of at a USEPA-approved landfill (Eglin AFB 2019d).

Demolition and modification of facilities containing toxic substances would result in long-term, negligible, beneficial impacts from the reduced potential for future human exposure to and reduced amounts of ACMs, LBP, and PCBs to maintain at Eglin AFB. No short- or long-term, adverse impacts on toxic substances are expected from operation and maintenance of the new hangars.

Environmental Restoration Program. Short-term, negligible to minor, adverse impacts on or from IRP Sites SS-292P, POI-725, SS-086, and SS-291P could result from renovation of Building 138, relocation of the boat shed, and construction of the 2-bay aircraft maintenance hangar. Because IRP Sites SS-292P, POI-725, and SS-291P are in the investigatory stage, contractors performing renovations to Building 138 and constructing the 2-bay aircraft maintenance hangar would adhere to all guidelines established by the installation. Appropriate personal protective equipment would be used while performing construction activities at IRP sites. Should potentially hazardous wastes be discovered or unearthed during renovation, the contractor would immediately cease work, contact appropriate installation personnel, and await sampling and analysis results before taking any further action. Any waste determined to be hazardous would be managed or disposed in accordance with applicable laws and regulations. The boat shed would be relocated within the SS-086 groundwater LUC area and the LUCs prohibit the removal of soil from the site and restrict dewatering without regulatory approval. To avoid potential impacts, the construction area would be built up rather than excavated to reduce displacement of soils and avoid the need for dewatering. Construction would include placement of a pre-engineered building on top of a gravel hardstand. Because construction would avoid displacement of soil or other ground-disturbing activities, the boat shed relocation would not be expected to result in impacts on or from the groundwater plume associated with the site nor violate the LUCs placed on the site in 2003. Monitoring Well 88, which is west of Building 64, and Monitoring Well 89, which is southwest of Building 32, would be clearly marked and avoided to ensure no damage to these wells occurs during renovation activities.

No short- or long-term impacts on or from IRP sites would be expected from F-35A DT aircraft operations. All operations and maintenance would be conducted in accordance with Eglin AFB's plans and standard operating procedures as well as local, state, and federal rules and regulations.

3.6.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction, demolition, and renovation activities to support the F-35A DT program would not occur. Therefore, existing conditions described in **Section 3.6.1** would remain unchanged and no impacts on hazardous materials and waste management would occur.

3.6.2.3 Cumulative Impacts

Construction and modification actions associated with the Proposed Action, when combined with the construction actions of the reasonably foreseeable actions, would result in short-term, negligible to minor, adverse impacts on hazardous materials and wastes management. These impacts would result from the use of hazardous materials and petroleum products; generation of hazardous wastes during construction and modification actions, potential disturbance of toxic substances during facility demolition or modification; and the potential for overlap with IRP sites. The use and generation of hazardous materials and wastes during construction and demolition would be unavoidable; however, the hazardous materials and wastes would be handled in accordance with federal, state, and local policies. Therefore, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative impacts on hazardous materials and wastes.

The Proposed Action, as well as reasonably foreseeable actions at Eglin AFB and Tyndall AFB, would incorporate standard measures to limit or control hazardous materials and waste into their design and operation plans. Incremental increases in air operations would occur at established locations in existing military operating areas. The net decrease in air operations from the 5th Generation FTU Optimization would result in long-term, minor, beneficial cumulative impacts from the decreased use of hazardous wastes and petroleum products.

3.6.2.4 Irreversible and Irretrievable Commitment of Resources

The material resources, including hazardous materials, used for the Proposed Action would potentially include concrete, steel, and various construction materials and supplies. The materials that would be consumed are not in short supply, would not limit other unrelated construction activities, and would not be considered significant.

3.7 Infrastructure and Transportation

3.7.1 Affected Environment

The ROI for the infrastructure and transportation analysis includes utility services and supplies at Eglin Main Base and in the surrounding communities, the project areas, installation

roadways, access gates, installation parking areas for POV and government-owned vehicles, and the regional roads/highways immediately adjacent to the installation.

Infrastructure

Electricity. Electricity at Eglin Main Base is provided by Gulf Power through overhead and underground transmission lines. Electrical infrastructure on Eglin Main Base is owned and operated by DAF. Primary overhead lines are along Choctawhatchee Boulevard and Barrancas Avenue, while secondary underground lines are throughout the airfield. The electrical distribution capacity at Eglin Main Base is acceptable at a peak capacity of 14 megawatts and capable of taking on additional missions, as required (Eglin AFB 2017a).

Natural Gas. Natural gas at Eglin Main Base is provided by the Okaloosa Gas District, which is the primary natural gas provider in Okaloosa County. Gas distribution lines are along Choctawhatchee Boulevard and Barrancas Avenue, with connections to buildings along the flightline. Natural gas pipes and valves are checked and repaired annually. Past projects have increased the number of access points, boosting the gas pressure on the east side of the Eglin Main Base to accommodate future growth. The natural gas distribution at Eglin AFB is classified as adequate, meaning the space, facilities, acreage, or system capacity meets existing mission requirements and offers opportunities for development or mission expansion (Eglin AFB 2017a). Natural gas at Eglin AFB is used for heating and facility operations.

Liquid Fuel Supply. On Eglin AFB, the Eglin Main Base liquid fuels system has a capacity of approximately 6 million gallons. Total fuel consumption on the installation currently ranges from an average of 58,080 gallons per day (gpd) to a peak of 224,616 gpd.

Eglin Main Base receives jet fuel by barge at the main fuel supply point within the bulk fuel storage facility at the eastern boundary of the installation. Fuel deliveries range from 400,000 gallons to 1 million gallons per delivery. Fuel at the bulk fuel storage facility is stored in five large storage tanks. The fuel is then delivered via pipeline to smaller storage tanks and hydrants within the eastern and western portions of the airfield. There are three fuel storage tanks just south of the Building 965 demolition project area. Aircraft are fueled via trucks, which transport fuel from storage tanks to aircraft refueling areas (Eglin AFB 2017a).

Although the fuels distribution system at Eglin AFB is degraded, with regularly scheduled maintenance, the current overall liquid fuels distribution systems at Eglin AFB are adequate. Eglin AFB's fuel stations and associated fueling infrastructure at the west side of the airfield have corroded in the gulf environment, are currently degraded to the point that they require significant upgrades and are quickly approaching their typical lifespan. The fuel transfer line to the East Ramp, however, is fully operational and in adequate condition (Eglin AFB 2017a). Eglin AFB maintains an adequate fuel supply to support ongoing mission training operations through its use of tanker trucks, which deliver fuel to the installation two to three times per week.

Potable Water. Potable water systems in Florida are regulated by FDEP, which implements the Florida Safe Water Drinking Act, ensuring compliance with the federal Safe Water Drinking Act (42 U.S.C. §§ 300f *et seq.*) of 1974 and the National Primary Drinking Water Regulations (40

CFR 141 *et seq.*). Potable water at Eglin Main Base is provided by the American State Utility Service, Inc. Potable water is sourced from eight groundwater wells that draw from the Floridian Aquifer and is treated with chlorine and fluoride. Three potable water source points are east of the flightline between Choctawhatchee Boulevard and Georgia Avenue. As of 2021, potable water meets or exceeds all federal and state requirements (Eglin AFB 2017a, Eglin AFB 2022n). The potable water infrastructure at Eglin Main Base is considered degraded (Eglin AFB 2017a). The existing capacity of the potable water system is 30 million gallons per day (mgd) and the existing demand is 1.01 mgd. Based on USGS data, current domestic consumption of potable water at Eglin AFB is 73 gpd per person (USGS 2018). For an 8-hour shift, in an administrative or industrial facility, water consumption is estimated to be 50 gpd per person (DAF Pamphlet 14-10144).

Wastewater. Wastewater generated on Eglin Main Base is collected through the installation's sanitary sewer system and is processed by Okaloosa County at the Arbennie Pritchett Water Regional Treatment Plant in Fort Walton Beach. Wastewater is generated from aircraft maintenance, production operations, and domestic uses. Sewer pumps and sewer lines are near the project areas. The current wastewater distribution/collection system on Eglin Main Base is considered adequate. The peak capacity of the wastewater discharge system at Eglin AFB is 5 mgd and the peak demand is 600,000 gpd, meaning the system has a headroom of 4.4 mgd (88 percent) (Eglin AFB 2017a). Wastewater demand for an 8-hour shift in an administrative or industrial facility is estimated to be 35 to 45 gpd. Domestic wastewater demand is estimated to be 51.1 to 65.7 gpd (USGS 2018, AFPAM 14-10144).

Stormwater Management. Stormwater on Eglin Main Base is collected through a combination of stormwater gravity lines, open drainage areas, and retention ponds. Eglin Main Base consists of primarily man-made stormwater collection systems, while each of the cantonment areas are graded to direct stormwater runoff to low elevation areas. Stormwater runoff drains predominantly to the south and east. Stormwater that falls on and east of the airfield is collected through gravity lines and discharged to drainage basins to the south/southeast or to outfalls along the Weekley Bayou to the east. All stormwater on Eglin Main Base eventually reaches Choctawhatchee Bay. Stormwater infrastructure on Eglin Main Base is in adequate condition has adequate capacity to handle storm surges from storm events in Northwest Florida (Eglin AFB 2017a).

Eglin AFB maintains two NPDES permits issued by FDEP: a Multi-Sector General Permit for stormwater discharge associated with industrial activity (Permit No. FLR05C197-004) and a Phase II municipal separate storm sewer system general stormwater permit (Permit No. FLR04E007). As a component of the Multi-Sector General Permit, Eglin AFB maintains and complies with a Stormwater Pollution Prevent Plan that documents existing stormwater management practices and guides personnel who are responsible for ensuring that potential stormwater pollution is minimized (Eglin AFB 2020d). Eglin AFB also maintains and follows a Stormwater Management Plan, under Eglin AFB's Stormwater Management Program, which is required by the FDEP Phase II municipal separate storm sewer system permit (Eglin AFB 2018b). NPDES regulations require the installation to obtain authorization from FDEP for discharges of stormwater to any surface water and water of the U.S. Projects that disturb more

than one acre must apply for an NPDES General Permit for Stormwater Discharge from Large and Small Construction Activities.

Communications. Communications systems at Eglin Main Base are extensive and include telephone, fiber optic, and secure internet lines, and broadcasting connectivity. Underground communication lines are present throughout the airfield and near the project areas. Wireless communications comprise multiple networks of terrestrial cellular towers. Radio is the primary means of transporting cellular wireless voice communications at Eglin AFB. Communication systems include ground-to-air and point-to-point systems, support on the ranges, and communications backbones such as microwave and fiber optic systems (Eglin AFB 2017a). System upgrades and planning improvements support long-term sustainment of mission activities (Eglin AFB 2017a).

Solid Waste Management. Eglin AFB maintains and follows a *Solid Waste Management Plan* (Eglin AFB 2020e). Collection of solid waste is privatized to contractors that collect, divert, and dispose of waste generated on the installation. Non-hazardous solid waste that cannot be diverted is taken to the Okaloosa County Transfer Station and then hauled to Springhill Regional Landfill in Jackson County, Florida, Santa Rosa Central Landfill in Santa Rosa County, Florida, or Colonial Landfill in Ascension County, Louisiana. Construction and demolition debris is managed by construction contractors and is required to be removed to a secure, permitted disposal site or collected and transported for approved recycling reuse. Construction debris may be disposed of at Crestview Landfill or Arena Landfill in Okaloosa County, Florida, Santa Rosa Central Landfill in Santa Rosa County, Florida, and the Crestview Construction and Demolition Disposal Facility in Okaloosa County, Florida. Eglin AFB operates a recycling center that processes scrap metal, aluminum, plastics, cardboard, paper, and small caliber expended small arms cartridge casings (Eglin AFB 2020e).

Transportation Infrastructure

Roadways & Airfield. Interstate (I-) 10 is the main east-west corridor connecting Eglin AFB to the rest of the Florida Panhandle. State Road (SR) 85 connects I-10 with SR 123 and South John Simms Parkway, which provide access to the Northwest Gate and East Gate, respectively. The commercial vehicle processing gate (i.e., North Gate) can be accessed from SR 85. Several four-lane state and U.S. highways provide coastal access and move traffic north-south between the coast and I-10 or U.S. Highway 90. On the installation, Perimeter Road travels around the airfield to the north and connects the North Gate Road to the rest of the installation. The primary roads near the project areas are Choctawhatchee Boulevard and Barrancas Avenue, which connect with Perimeter Road and Eglin Boulevard at the intersection of Daytona Road and Eighth Street. Eglin Boulevard travels around the airfield to the south, connecting the East Gate to the western portion of Eglin Main Base and the West Gate (Eglin AFB 2017a).

Roadway maintenance at Eglin Main Base is concentrated on primary and secondary roads typically two-lane roads designed to support high levels of traffic and a diversity of vehicle types. All essential roadways forming the central transportation hub of the installation require proper maintenance to provide efficient long-term circulation. The overall age and condition of many of

the primary roadways at Eglin Main Base are degraded and beyond the typical pavement design life yet continue to remain operable for a large volume of daily traffic (Eglin AFB 2017a).

Airfield pavements at Eglin Main Base include two runways, paved overruns, parking and maintenance aprons, aircraft taxiways, and an arm/disarm pad. Runway 12/30 runs in a northwest to southeast directions parallel to Taxiways B and H. Runway 01/19 runs in a northeast to southwest direction, intersecting Taxiways U, N, and M. The eastern terminus of Taxiway M is just south of the proposed 2-bay aircraft test hangar and the Building 965 demolition site (Eglin AFB 2017a). In addition to military aircraft, Eglin AFB allows the airfield to be used by commercial aircraft at a limited capacity through a partnership with Okaloosa County's Destin-Fort Walton Beach Airport (McLaughlin 2022).

Gate Access. The East Gate, along Eglin Boulevard, provides access to the eastern portion of Eglin Main Base and the project areas. The East Gate is open seven days a week, 24 hours a day for both inbound and outbound traffic. The Northwest Gate, along Nomad Way, is open five days per week from 6:00 am to 8:00 am for inbound traffic and from 4:00 pm to 6:00 pm for outbound traffic. The Northwest Gate provides access to the western portion of Eglin Main Base and the western portion of the airfield. The North Gate, along North Gate Road, is open six days per week from 6:00 am to 6:00 pm for inbound and outbound traffic and is responsible for construction traffic and delivery inspections into Eglin Main Base. Lane capacity at the access gates is limited resulting in long queues and slower traffic during the peak inbound and outbound hours (Eglin AFB 2017a).

Parking. Parking at Eglin Main Base is available in surface lots throughout the installation, primarily for POVs. Most parking areas are asphalt paved with concrete curb and gutters. Parking for facilities along the flightline is available south of Building 64 and east and west of Barrancas Avenue. Parking available to personnel working at air operations and maintenance facilities is deficient and considered to be degraded (Eglin AFB 2017a).

3.7.2 Environmental Consequences

Impacts on infrastructure would be considered significant if a proposed action would cause exceedance of a utility's capacity or place unreasonable demand on a specific utility or infrastructure component. Impacts may arise from energy needs created by either direct or indirect workforce and population changes related to installation activities. All construction contractors would be informed of utility locations prior to any ground-disturbing activities that would result in unintended utility disruptions or human safety hazards. All construction activity would be conducted in accordance with federal and state safety guidelines. Any permits required for excavation and trenching would be obtained prior to the commencement of construction activities.

Impacts on transportation systems would be considered significant if a proposed action resulted in substantial decline in the operability of a roadway, excessive delays at installation gates, reduced traffic safety leading to increased risk of vehicular accidents, significant degradation of the existing transportation infrastructure, or substantial and permanent changes to roadway accessibility.

3.7.2.1 Proposed Action

Infrastructure. Short-term, negligible, adverse impacts on infrastructure (electricity, natural gas, liquid fuels, sewer and wastewater, stormwater, solid waste, communications) at Eglin AFB would occur from temporary service disruptions during facility construction and modification actions. The construction and modification actions, to include placement and use of the temporary facilities along the airfield, would occur in a heavily developed area where utilities are readily available. Short-term, negligible, adverse impacts could occur from temporary interruptions in electrical, natural gas, sewer and wastewater, and communications networks when buildings are disconnected from or connected to the respective distribution systems during the proposed development activities. Disruptions would be temporary and coordinated with area users beforehand. Utilities near the project areas would be extended to new facilities or facility additions, as required. Use of equipment required for the facility construction and modification actions would result in additional consumption of fuels; however, would not affect the existing fuel capacity or fuel distribution system at Eglin Main Base.

Short-term, negligible to minor, adverse impacts on solid waste management would be expected from the generation of demolition and construction waste. Solid waste generated during construction and modification actions would consist mainly of building materials (e.g., concrete, metals, lumber, cement, asphalt) and yard debris (e.g., trees, shrubs). To maximize landfill diversion rates, contractors would be required to recycle construction and demolition debris in accordance with applicable federal and installation policies and would be required to comply with all DAF guidance regarding disposal of debris, as identified in the Integrated Solid Waste Management Plan (Eglin AFB 2021d). The construction and modification actions would generate approximately 6,600 tons of solid waste (USEPA 2009). All solid waste generated during construction would be recycled to the extent possible or disposed by construction personnel at an appropriate landfill. The DoD set a diversion rate goal of 60 percent of construction and demolition debris, minimizing the amount of waste disposed of at local landfills (DoD 2015). Because the remaining waste to be disposed of could be taken to multiple landfills in the area (per Eglin AFB 2020e), effects on the capacities of those landfills would be negligible to minor.

Long-term, negligible, adverse impacts on infrastructure from slightly greater demand for electricity, natural gas, water, sanitary sewer, and communications services would be expected as a result of increased consumption from the operation of the new hangar facilities, boat shed, and other modified facilities, and F-35A DT mission personnel. Because temporary facilities would be removed following construction, no long-term effects on utility or infrastructure capacity would be anticipated. Along with the projected operations, maintenance, and facility upkeep required for the mission, if all incoming 709 personnel and their dependents were to be housed on the installation, the estimated increase in consumption of utilities would be as follows: electricity demand would increase by an estimated 16 percent; potable water demand would increase for 270 personnel on an 8-hour shift basis by 13,500 gpd (1.33 percent) with an additional 51,757 gpd (5.12 percent) for non-shift domestic potable water; and peak wastewater demand would increase for 270 personnel on an 8-hour shift basis by estimated 10,800 gpd from average usage (or 1.8 percent) with an additional 41,406 gpd (6.9 percent) for non-shift

domestic wastewater demand. Wastewater demand for the new personnel and dependents would increase the installation's demand by 8.7 percent and the new peak wastewater demand would be approximately 13 percent of the peak system capacity.

Demand on communications infrastructure would increase to support the incoming personnel and operations. Because the installation is currently in the process of implementing communications upgrades and improvements, the slight increase in demand for the F-35A DT program would be minor. The demand for liquid fuels also would increase to accommodate the four new F-35A DT aircraft.

Long-term, negligible, adverse impacts on the solid waste system at Eglin AFB and the multiple off-installation recycling centers and landfills that receive generated waste and recyclable materials would occur from personnel increases and facility operations. Additional personnel and dependents associated with the F-35A DT program would generate solid waste within the communities where they are housed, conservatively estimated at 1.7 tons per day (USEPA 2022e). The multiple landfill facilities in the communities surrounding Eglin AFB would continue to adequately handle this flow. Eglin AFB would encourage recycling and reduction efforts to limit added strain to the Eglin AFB and local solid waste management systems.

Long-term, negligible to minor, adverse impacts on stormwater management at Eglin AFB would occur from an increase of approximately 10.3 acres of impervious surfaces, which would cause increases in stormwater runoff to Eglin AFB stormwater infrastructure. Stormwater systems at new facilities would be designed to comply with federal, state, and local regulations and associated permit requirements to minimize impacts on the existing stormwater system.

The long-term impacts from increased demand and consumption of utilities to support the F-35A DT program would not exceed the capacities of the existing utility systems on Eglin Main Base. No impacts on infrastructure would occur at Tyndall AFB because only airfield operations would occur at those locations.

Transportation

Roadways & Airfield. Short-term, negligible to minor, adverse impacts on roadways would occur from increased traffic during proposed construction and modification actions. The added construction traffic would consist of trucks delivering construction supplies and removing debris, daily worker commutes in their personal vehicles, and heavy equipment deliveries. Construction-related traffic would be greatest during the peak morning and evening travel times. The locations of increased traffic would be concentrated near the flightline and within the eastern portion of the installation. Construction traffic would comprise a small percentage of the total traffic on the installation. Disruptions may include added construction traffic at the access gates, presence of the construction materials and equipment along installation parking areas and roadways near the project areas that may temporarily affect increased queueing, and detours to avoid construction sites.

Construction of the 2-bay aircraft test hangar project would require rerouting a portion of existing roadway, which may alter existing traffic patterns in their respective areas during construction or

may involve temporary detours with longer commutes on the installation to avoid the area. These changes would not lead to long-term disruption of traffic patterns on the installation.

Long-term, negligible to minor, adverse impacts on the runways and roadways at Eglin AFB would occur from the additional 2,322 airfield operations and 270 F-35A DT personnel. Additional personnel would contribute to the ongoing traffic congestion, queueing in lanes, and traffic delays currently experienced on the installation. Additional airfield operations could increase the rate of pavement deterioration on the airfield. However, replacement of existing airfield pavements that may be degraded and construction of new airfield pavements and taxi lanes as part of the 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar projects (see **Figure 2-2**) would result in long-term, minor, beneficial impacts.

Gate Access. Short-term, negligible to minor, adverse impacts on gate access would occur as a result of the additional traffic from construction workers, vehicles, and equipment required for the facility construction and modification actions. The East Gate would be used to access the proposed 2-bay aircraft maintenance hangar site, Buildings 64, 32, 101, 100, and 138, and the proposed boat shed relocation site. The additional personnel and equipment would put additional stress on the Eglin Main Base gates, as existing lane capacity is limited, and long queues and slower traffic currently occur during the peak inbound and outbound hours. Additional traffic from construction crews and equipment would be temporary and would cease following completion of the facility construction and modification actions.

Parking. Long-term, negligible to minor, beneficial impacts would result from construction of an additional 81 parking spaces as part of the 2-bay aircraft maintenance hangar and 2-bay aircraft test hangar projects, and reconfiguration of existing parking areas as part of the addition to Building 64 (see **Figures 2-2** and **2-4**). The addition to Building 64 also would include an additional 15 parking spaces adjacent to the proposed 2-bay aircraft maintenance hangar parking area (see **Figure 2-4**). It is anticipated the additional parking areas would accommodate the parking requirements for the additional 270 F-35A DT mission personnel.

No impacts on ground transportation, gate access, or parking would occur at Tyndall AFB because only airfield operations would occur at those locations.

3.7.2.2 No Action Alternatives

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and modification actions to support the F-35A DT program would not occur. Therefore, conditions as described in **Section 3.7.1** would remain unchanged, and no impacts would occur on infrastructure and transportation.

3.7.2.3 Cumulative Impacts

The Proposed Action and reasonably foreseeable actions at Eglin AFB and Tyndall AFB have the potential to impact the following infrastructure: electricity, natural gas, liquid fuels supply, potable water, wastewater, stormwater management, communications, solid waste management, and transportation. Short-term, minor, adverse cumulative impacts during

construction and modification actions associated with the Proposed Action and reasonably foreseeable actions would occur from on- or off-installation service interruptions should utility lines need to be rerouted or when new facilities are connected to utility distribution systems.

Upgrade and construction of new infrastructure would increase utility efficiency for all existing and proposed facilities on Eglin Main Base, resulting in long-term, beneficial cumulative impacts. Long-term, negligible to minor, adverse, cumulative impacts from incremental increases in demand and consumption of utilities required to support the F-35A DT mission and other future tenants and personnel on Eglin AFB, such as the additional F-35A squadron of the 5th Generation FTU Optimization project, maintenance personnel for the 350 SWW and 36 EWS at Eglin AFB, and personnel for AvFID Growth at Duke Field. Construction workers and permanent personnel would contribute to the ongoing traffic congestion, queueing in lanes, and traffic delays currently experienced on the installation. However, it is not anticipated that the Proposed Action, when combined with reasonably foreseeable actions, would result in significant cumulative impacts on infrastructure and transportation.

3.7.2.4 Irreversible and Irretrievable Commitment of Resources

Energy resources, including petroleum-based products (e.g., gasoline, diesel, aviation fuel) used for the Proposed Action would be irretrievably lost. During construction, gasoline and diesel would be used for the operation of vehicles and construction equipment. Consumption of these energy resources would not place a significant demand on their availability in the region. These impacts would be less than significant.

3.8 Land Use

3.8.1 Affected Environment

The ROI for the land use analysis includes the proposed facility construction, demolition, and construction areas along the airfield in the Flightline District; as well as the location of the proposed boat shed in the Bayou Park District.

Land Use. Eglin AFB covers approximately 724 square miles (463,360 acres) and includes parts of Okaloosa, Walton, and Santa Rosa counties. The installation is divided into nine planning districts, which contain areas of similar land use. These districts include the Flightline District, Downtown District, Westside District, Fightertown District, Boomtown District, Tom's Creek District, Bayou Park District, Bayside District, and the Pinchot District (Eglin AFB 2017a). The majority of the project areas are within the Flightline District of Eglin Main Base. Permitted land uses in the district include airfield operations and maintenance, industrial, administrative, and munitions storage (Eglin AFB 2017a). Land uses within the project area consist of aircraft operations and maintenance per the 2017 Eglin AFB *Installation Development Plan* (Eglin AFB 2017a). Surrounding the project areas are industrial, accompanied housing, administrative, and airfield clearance land uses. The *Installation Development Plan* identified existing and future land uses within the areas proposed for construction and renovation activities. Typical facilities and features of aircraft operations and maintenance and industrial land uses include base engineering, maintenance shops, warehouses, and aircraft hangars.

Coastal Zone Consistency. The coastal zone in Florida consists of the entire state – all 67 counties and adjacent territorial seas, including Okaloosa County and Eglin Main Base. The FCMP consists of nine state agencies and five regional water management districts that implement 24 laws to protect and enhance the state’s natural, cultural, and economic coastal resources. FDEP is responsible for directing the implementation of the FCMP. Under the FCMP, permits are required for erosion control devices, excavations, and erection of structures waterward of the Coastal Construction Control Line. This line demarks the landward extent of the potential inland impacts of erosion because of a 100-year storm event. The project areas are landward of the Coastal Construction Control Line; however, the project areas are within the Florida coastal zone (FDEP 2022a).

3.8.2 Environmental Consequences

Potential impacts on land use are based on the level of land use sensitivity in the ROI. Impacts on land use would be significant if one of the following criteria is met: inconsistency or noncompliance with existing land use plans or policies, incompatibility with adjacent land use to the extent that public health or safety is threatened, or a conflict with planning criteria established to ensure the safety and protection of human life and property.

3.8.2.1 Proposed Action

Land Use. Long-term, negligible, adverse impacts on land use at Eglin AFB would result from the Proposed Action. Impacts on land use from construction and operation of new facilities at Eglin Main Base were previously analyzed in the 2020 *Cantonment Areas EA* (Eglin AFB 2020a). The proposed facility and infrastructure construction and modification actions would be compatible with land use planning district permitted land uses and current (or future) land use classifications (Eglin AFB 2017a). Building 32 is in a Permitted with Restrictions area within the Downtown District. Impacts on land use would not occur from renovation of Building 32, as the building’s function would not change.

Land use classification at the 2-bay test aircraft maintenance hangar, which would replace Building 965, would be changed to aircraft operations and maintenance. Building 965 is currently classified as light industrial and is used by the maritime operations group for boat storage. The proposed boat shed relocation site would be re-classified from open space to light industrial. No other changes in land use classification would be required for the Proposed Action.

For a project or program to be approved anywhere on the installation, the proponent must go through a siting process to ensure the project adheres to the requirements of the existing and future military missions (Eglin AFB 2017a). The siting process determined that the proposed building locations would adhere to mission requirements and land use classifications. Facility renovations are not required to go through the siting process (Eglin AFB 2020a). All proposed land uses would be compatible with current and future land uses.

Coastal Zone Consistency. The Proposed Action would not alter or jeopardize the coastline or coastal resources at Eglin AFB. The Proposed Action would take place within the coastal zone and the jurisdictional area of the FDEP and federal actions at Eglin AFB are required to be

consistent, to the maximum extent possible, with the laws of the FCMP. Prior to undertaking a federal action, Eglin AFB submits a CZMA consistency determination to the state of Florida for review and concurrence (refer to **Appendix C**).

3.8.2.2 No Action Alternatives

Under the No Action Alternative, construction and modification actions to support the F-35A DT program would not occur. Therefore, conditions as described in **Section 3.8.1** would remain unchanged, and no impacts would occur on land use.

3.8.2.3 Cumulative Impacts

New facilities proposed for the reasonably foreseeable actions generally would be compatible with existing land uses on Eglin AFB. Private sector land use development, such as the commercial development that could occur following the Westside Enhanced Use Lease, could result in long-term, adverse impacts without proper coordination and adherence to LUCs. Short-term, minor, adverse, cumulative impacts on land use could result from temporary increases in noise levels if any of the construction activities as part of the reasonably foreseeable actions were to occur simultaneously with the construction and modification actions planned for the Proposed Action. However, the additive noise levels would not result in additional areas of incompatible land use nor preclude the viability of the existing land uses. In addition, the noise levels would be similar enough to baseline conditions as to not be considered significant.

The Proposed Action and reasonably foreseeable actions on Eglin AFB would adhere to the *Installation Development Plan*, which could result in long-term, minor, beneficial cumulative impacts. These actions would, to the greatest extent practicable, consolidate like functions, increase efficiency, or remove outdated and underused facilities. Therefore, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative impacts on land use.

3.8.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would not result in irreversible or irretrievable commitments of land resources or capacity.

3.9 Noise

3.9.1 Affected Environment

The ROI for the noise analysis includes Eglin Main Base, project areas (see **Figure 2-1**); the airfields at Eglin AFB and Tyndall AFB, where F-35A DT aircraft operations would occur; and the ranges and impacts areas within the ETTC and EGTTT within which range activities would occur (see **Figure 1-1** and **Tables 2-3** and **2-4**). The ROI also includes off-installation areas that could be affected by noise generated from the Proposed Action.

Eglin Main Base is within Okaloosa County, which enforces a noise ordinance stating noise levels are not to exceed 60 A-weighted decibels (dBA) from 7:00 am to 10:00 pm and 55 dBA from 10:00 pm to 7:00 am in residential areas. Construction activities are exempt from the not-to-exceed level from 7:00 am to 10:00 pm, provided such activity does not exceed 86 dBA

(Okaloosa County 2021). The Okaloosa County noise ordinance is applicable only to off-installation areas.

Existing sources of noise at Eglin AFB include military and nonmilitary aircraft overflights, munitions use, airfield operations, vehicular traffic, forestry operations, grounds maintenance activities, and construction activities. Most of the project areas are in the Eglin AFB Flightline District, while Building 32 is in the Downtown District and the proposed boat shed relocation site is in the Bayou Park District. These districts primarily support aircraft, industrial, administrative, and commercial activities. Common daytime outdoor noise levels in these districts typically vary with intermittent noise peaks occurring from aircraft operations and other distinct noise-generating activities, such as periodic heavy truck traffic and construction. Noise levels generated within industrial and commercial areas are estimated to range from 50 dBA (light auto traffic at 100 feet) to 80 dBA (heavy truck traffic) (USEPA 1971).

The existing F-35A missions at Eglin AFB and Tyndall AFB include a variety of aircraft operations including 41,000 F-35A operations at Eglin AFB and 6,900 F-35A operations at Tyndall AFB (see **Table 2-2**). Existing F-35A aircraft operations at Eglin AFB were analyzed in the 2014 *F-35 Supplemental EIS* and authorized by the associated *Record of Decision* (DAF 2014b). **Table 3-6** shows the maximum sound level (L_{max}) and sound exposure level (SEL) for a person on the ground for a single F-35A overflight during takeoff and landing phases.

Table 3-6. Noise Levels for Existing F-35A Overflights

Altitude/Distance (feet AGL)	F-35A Departure/Takeoff ¹		F-35A Approach/Landing ²	
	L_{max} (dBA)	SEL (dBA)	L_{max} (dBA)	SEL (dBA)
500	119	125	100	107
1,000	111	119	93	102
2,000	103	113	85	95
5,000	91	103	73	86
10,000	81	95	62	76

Key: AGL – above ground level; dBA – A-weighted decibel; L_{max} – maximum sound level; SEL – sound exposure level

Source: DAF 2013

¹ Power setting of 100% used to calculate noise levels from departure/takeoff. Power setting for departure/takeoff operations is typical, but not constant.

² Power setting of 40% used to calculate noise levels from arrival/landing. Power setting for arrival/landing operations is typical, but not constant.

The greatest L_{max} and SEL of a single F-35A overflight occurs during the takeoff phase. Noise from F-35A overflights generate distinct acoustical events. Based on analysis in Rylander et al. 1974 and Rylander and Bjorkman (1988), aircraft noise levels that would be consistent with F-35A overflights would have the potential to annoy more than 12 percent of individuals under their flight path. During overflights, individuals may briefly pause during conversation or awaken if asleep. However, the maximum noise level is only experienced briefly at the closest point of approach, with the noise level rising and falling as the aircraft flies over. The F-35As may fly at fast-paced speeds where receptors are often not aware of the aircraft until it is nearly over them and individuals under the flight path may experience a startle effect.

Noise from airfield operations decrease with increasing distance from the airfield. The *Air Installation Compatible Use Zone Studies* for Eglin AFB and Tyndall AFB summarize noise levels from aircraft operations in the vicinity of the airfields. Aircraft at Eglin Main Base generate noise between 75 and 80 decibels (dB) day-night sound level (DNL) at the proposed 2-bay aircraft maintenance hangar site and Buildings 32, 64, 100, 101, and 138; between 70 and 75 dB DNL at the proposed Building 965 demolition site; and below 65 dB DNL at the proposed boat shed relocation site and beyond to the Gulf south of the installation (Eglin AFB 2023b). The noise levels presented for Eglin AFB reflect ongoing operations of the F-22 FTU program, which will be relocated by the end of 2023 (see **Section 2.1.2.1**) (Eglin AFB 2023b). Airfield operations primarily affect areas within the cities of Valparaiso to the north and Niceville to the northeast of Eglin Main Base. **Figure 3-2** shows the existing noise contours associated with aircraft operations at Eglin AFB. At Tyndall AFB, noise from airfield operations may reach up to 75 dBA DNL at off-installation areas; however, most off-installation areas that experience noise greater than 65 dB DNL are exposed to DNL between 65 and 70 dB (Tyndall AFB 2016).

The nearest noise sensitive receptors to the project areas are an off-installation residential area approximately 0.2 mile north of the proposed boat shed relocation site, and the Addie R. Lewis school approximately 0.5 mile east of the proposed 2-bay aircraft test hangar site and the Building 965 demolition site. Noise from airfield operations at these locations does not exceed 65 dB DNL (Eglin AFB 2018a).

Supersonic Waiver 75-1 allows supersonic flights (i.e., exceeding the speed of sound) to be conducted in overland airspace below FL 300. Existing noise within TA B-70 consists of explosive detonations and sonic booms, which can be described as impulse noise. The impulse noise environment at TA B-70 is characterized by occasional supersonic overflights and on-land munitions expenditures (detonations greater than 1,000 pounds net explosive weight). Noise measured in the nearby towns of Holley approximately 7 miles southwest of TA B-70, and Fort Walton Beach, approximately 9 miles southeast of TA B-70 have reached sound pressure levels from sonic booms and munitions expenditures that have ranged from 105 to 136 peak sound pressure level (L_{pk}). Overall, impulse noise from Eglin AFB missions approaching the 140 L_{pk} level rarely extend beyond the Eglin AFB boundary. Impulse noise may reach levels above 140 dB, which is the maximum safe noise level for preventing damage to human hearing. Noise greater than 140 L_{pk} have not been measured beyond the boundary of Eglin AFB (Eglin AFB 2004).

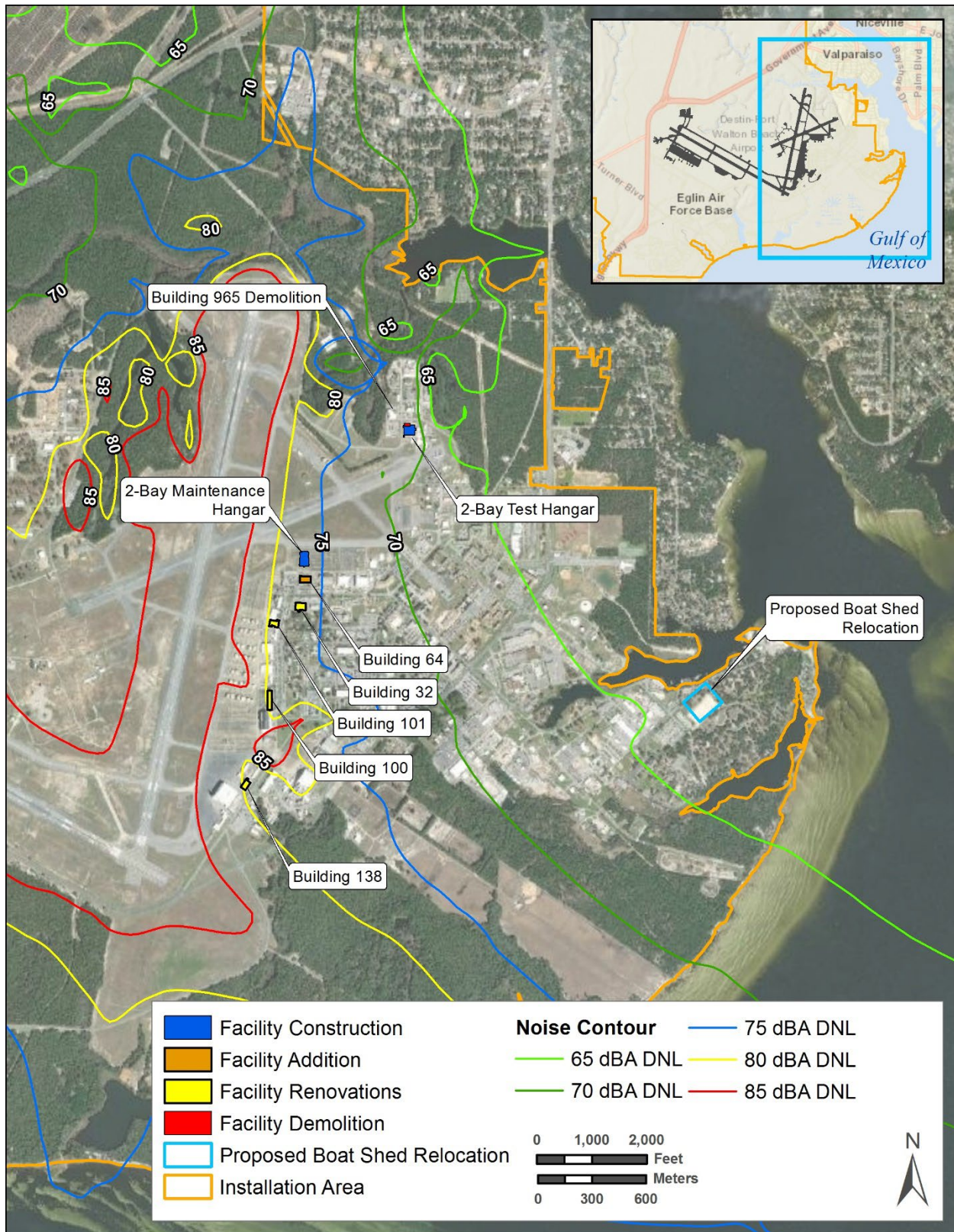


Figure Note: Some facilities and infrastructure are not shown due to operational security requirements.

Figure 3-2. Existing Noise Contours at Eglin AFB

Supersonic flight is conducted in accordance with DAF Manual 13-201, *Airspace Management*, which allows supersonic operations only within the portion of the supersonic corridor that would not project the sonic boom (noise above 140 L_{pk}) beyond the boundary of Eglin AFB and requires units to consider critical locations (e.g., populated areas, critical habitat) that should be avoided while conducting supersonic operations.

Ongoing subsonic flight operations and munitions expenditures over water within the EGTTTR generate noise that exceed ambient levels. Noise from live munition expenditures may reach sound pressure levels greater than 140 L_{pk} at the point of detonation. Ongoing over water range activities, including aircraft operations and live and inert munitions expenditures, were analyzed in, and authorized by the 2015 *EGTTTR Final Range EA* (Eglin AFB 2023a) and the associated 2017 and 2019 NMFS Programmatic BOs and Conference Reports (NMFS 2017, NMFS 2019). When there is a potential for harmful noise, DAF establishes safety distances around in-water target areas to protect the public and mission personnel. Considering the distance from the in-water target area from the shoreline, noise produced from a detonation and perceived by people onshore can be compared to a very faint or distant thunder. DAF also deploys survey teams to monitor the target area, identify sensitive marine species, and determine if all requirements of the 2017 and 2019 NMFS BOs have been met prior to conducting testing (Eglin AFB 2023a).

3.9.2 Environmental Consequences

Noise impacts would be considered significant if the Proposed Action were to result in the violation of applicable federal, state, or local noise regulations; create appreciable areas of incompatible land use; or result in noise that would negatively affect the health of the community within the ROI. Impacts of noise on wildlife are discussed in **Section 3.3.2**.

3.9.2.1 Proposed Action

Short-term, minor, adverse impacts on the ambient noise environment would occur from facility construction and modification actions. Construction noise along the airfield would be as described in the 2020 *Cantonment Areas EA* (Eglin AFB 2020a). The use of heavy construction equipment would result in intermittent, temporary increases in ambient noise levels during the construction period. A variety of sounds are emitted from construction equipment including loaders, trucks, and pavers. Noise levels associated with common types of construction and operation equipment are listed in **Table 3-7**. Noise generated by construction equipment typically exceeds ambient levels by 20 to 25 dBA in an urban environment and up to 35 dBA in a quiet suburban area. The use of exhaust mufflers and other noise dampening equipment could reduce the sound level by up to 10 dBA (USEPA 1971). Construction noise would occur during the daytime, between 7:00 am to 10:00 pm. Because of the temporary nature of construction activities, noise beyond ambient levels would cease following the construction period.

Table 3-7. Average Noise Levels for Common Construction Equipment

Category and Equipment	Predicted Noise Level (dBA)			
	50 feet	250 feet	500 feet	1,000 feet
Clearing and Grading				
Truck	83 to 94	69 to 80	63 to 74	57 to 68
Backhoe	72 to 93	58 to 79	52 to 73	46 to 67
Construction and Paving				
Concrete mixer and pumps	74 to 88	60 to 74	54 to 68	48 to 62
Paver	86 to 88	72 to 74	66 to 88	60 to 62
Dozer/Tractor/Front loader	75 to 80	61 to 66	55 to 60	49 to 54

Key: dBA – A-weighted decibel

Sources: USEPA 1971, TRS Audio 2022

Noise would vary depending on the type and characteristics of construction equipment used and if multiple pieces of equipment were used simultaneously. In general, the addition of a piece of equipment with identical noise levels would increase the overall noise environment by 3 dB (USEPA 1971). Therefore, additive noise associated with multiple pieces of equipment operating simultaneously during the construction period would increase the overall noise environment by a few dB over the noise produced by the noisiest equipment. These noise levels would decrease with distance from the project areas (see **Table 3-7**).

Construction and modification actions would be conducted within the Flightline, Downtown, and Bayou Park Districts, where noise from aircraft overflights, airfield operations, vehicular traffic, grounds maintenance activities, and construction activities is common. During construction, increases in truck traffic transiting through Eglin AFB to reach the proposed project areas would occur. Truck traffic in these areas is common; therefore, adverse impacts on the ambient noise environment from construction-related traffic would be negligible. To minimize increased noise levels, BMPs and management actions listed in **Appendix E** would be incorporated during the construction period.

The nearest noise sensitive receptors to the project areas are approximately 0.2 mile north of the proposed boat shed relocation site and approximately 0.5 mile to the northeast of the area where Building 965 would be demolished and the 2-bay aircraft test hangar would be constructed. Noise from construction at these distances would be below 65 dBA (TRS Audio 2022).

Operational activities associated with the proposed new, renovated, or relocated facilities and infrastructure would be consistent with land uses of and ongoing activities conducted within the Flightline, Downtown, and Bayou Park Districts.

Following relocation of the F-22 FTU program (anticipated in 2023), the resulting operational noise levels at Eglin AFB would be comparable with the No Action Alternative at the installation over the long term, consistent with the analysis in the *Supplemental EA for Combat Air Forces Adversary Air Plus Up with F-22 Formal Training Unit* (Eglin AFB 2023b). Operation of the four additional F-35A DT aircraft would not appreciably affect the ambient noise environment at the installation over the long term. There would be no change in the authorized types of operations conducted at Eglin AFB or Tyndall AFB. Operational activities associated with the F-35A DT

program would adhere to the BMPs and management actions listed in **Appendix E**, as applicable, to reduce operational noise levels and ensure compatibility with existing land uses.

F-35A DT aircraft noise levels associated with the Proposed Action would be consistent with the levels analyzed and authorized in the 2014 *F-35 Supplemental EIS* and *Record of Decision* (DAF 2014b). F-35A DT operations would be compatible with existing airfield operations. Noise levels produced by F-35A DT aircraft would be as shown in **Table 3-6**. F-35A DT aircraft would generally be accompanied by chase aircraft that could include T-38, F-15, F-16 and Sunshine Aero (propeller type aircraft such as the Piper, Cessna, and Aero liner) aircraft types. For the purposes of this analysis, it was assumed the F-35A aircraft would be used as a chase aircraft because noise levels generated by F-35As would be greater than other potential chase aircraft and would constitute an upper bound of effects. In general, two aircraft that produce the same level of noise and flying in tandem would produce noise levels approximately 3 dBA greater than the noise level produced by a single aircraft alone. Therefore, F-35A DT flight operations with chase aircraft may produce noise levels up to an L_{max} of 122 dBA and an SEL of 128 dBA at 500 feet. These maximum noise levels would occur during the takeoff phase of an airfield operation.

Noise from F-35A overflights would continue to generate distinct acoustical events that have the potential to periodically but briefly annoy individuals directly under their flight path. Overall noise from the additional F-35A aircraft and associated operations would not be perceptibly different from the noise produced from existing airfield operations at Eglin AFB and Tyndall AFB. Noise from F-35A DT aircraft operations would not alter the level of noise perceived within the vicinity of the airfields and would not result in incompatibility with surrounding land uses. Therefore, while there would be an increase in aircraft noise above the existing baseline noise environment, there would not be a significant impact to the community based on historical noise levels and noise levels previously analyzed in the 2014 *F-35 Supplemental EIS* (DAF 2014b). Noise sensitive receptors at and near Eglin AFB, such as the Addie R. Lewis school approximately 0.5 mile east of the proposed Building 965 demolition site and the proposed 2-bay aircraft hangar construction site, do not underlie the airspace where takeoff and landing phases would occur and therefore would be negligibly affected by the proposed additional F-35A airfield operations. It is unlikely that noise from the additional aircraft operations for noise sensitive receptors would exceed 65 dB DNL.

The nature and levels of noise from range activities (i.e., supersonic flights and munitions expenditures) would be comparable to existing conditions, and completely within the operational envelope of which they currently occur. Supersonic flights over land would be conducted in TA B-70 below FL 300, where supersonic flights are currently authorized and conducted, in accordance with Supersonic Waiver 75-1. Intermittent impulse noise impacts from supersonic flights over land in R-2915A overlying TA B-70 were previously analyzed in the 2022 *Final Range EA for Eglin Overland Operations* (Eglin AFB 2022a). Similarly, noise from supersonic flights over water was previously analyzed in the 2014 *F-35 Supplemental EIS* (DAF 2014b). All proposed F-35A DT supersonic flights would adhere to the procedures identified in DAF Manual 13-201, restricting sonic boom projections to within the boundary of Eglin AFB and limiting the exposure of unsafe noise levels to human receptors.

Noise from subsonic aircraft operations and weapons expenditures in the EGTTR was previously addressed in the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a) and the associated 2017 and 2019 NMFS Programmatic BOs and Conference Reports (NMFS 2017, NMFS 2019). Noise from overland and over water munitions expenditures was previously analyzed in the 2014 *F-35 Supplemental EIS* (DAF 2014b) and the 2022 *Final Range EA for Eglin Overland Air Operations* (Eglin AFB 2022a). Munitions expended as part of the F-35A DT program would not exceed the allotment analyzed in the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a). Peak noise levels from munitions would not exceed 130 dB at off-installation locations and would not increase from the levels reached currently. F-35A DT overland and over water range activities would adhere to the BMPs and management actions listed in **Appendix E**, as applicable, to reduce associated noise levels and prevent harmful noise from being perceived by individuals.

3.9.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and range operations, and construction and modification actions to support the F-35A DT program would not occur. The current F-35A mission would continue to operate at Eglin AFB in accordance with the 2014 *F-35 Supplemental EIS* (DAF 2014b) and development along and near the airfield would continue as described in the 2020 *Cantonment Areas EA* (Eglin AFB 2020a). In addition, the current overland and over water flight operations including live and inert munitions expenditures would continue as described in the 2014 *F-35 Supplemental EIS*, 2015 *EGTTR Final Range EA*, and the 2022 *Final Range EA for Eglin Overland Air Operations*. Therefore, the ambient noise environment at and in the vicinity of Eglin AFB and Tyndall AFB would remain as described in **Section 3.9.1**, and no additional adverse impacts would occur.

3.9.2.3 Cumulative Impacts

Construction and modification actions planned for the Proposed Action, when combined with construction required for the reasonably foreseeable actions, would result in intermittent, short-term, increases on the noise environment from the potential for additive construction noise. If conducted concurrently, the construction and modification actions associated with the Proposed Action and the reasonably foreseeable construction actions would produce additive noise levels a few dB greater than what would be produced by the Proposed Action alone. These cumulative impacts would be temporary and minor.

Long-term, minor, beneficial cumulative impacts would occur from the net decrease in aircraft operations and personnel following implementation of the 5th Generation FTU Optimization. Incremental increases in noise may occur from beddown of additional aircraft and personnel at Eglin AFB and Tyndall AFB; however, the nature and levels of noise from aircraft operations would be comparable to existing noise levels, consistent with noise levels typical for DAF installations. In addition, increases in range operations (i.e., supersonic flights and munitions expenditures) from the Proposed Action, when combined with the incremental increases in range operations from reasonably foreseeable actions, would be comparable to existing conditions. Therefore, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative impacts on noise.

3.9.2.4 Irreversible and Irretrievable Commitment of Resources

Noise generated for the Proposed Action would not result in an irreversible or irretrievable change in the ambient sound environment.

3.10 Safety

3.10.1 Affected Environment

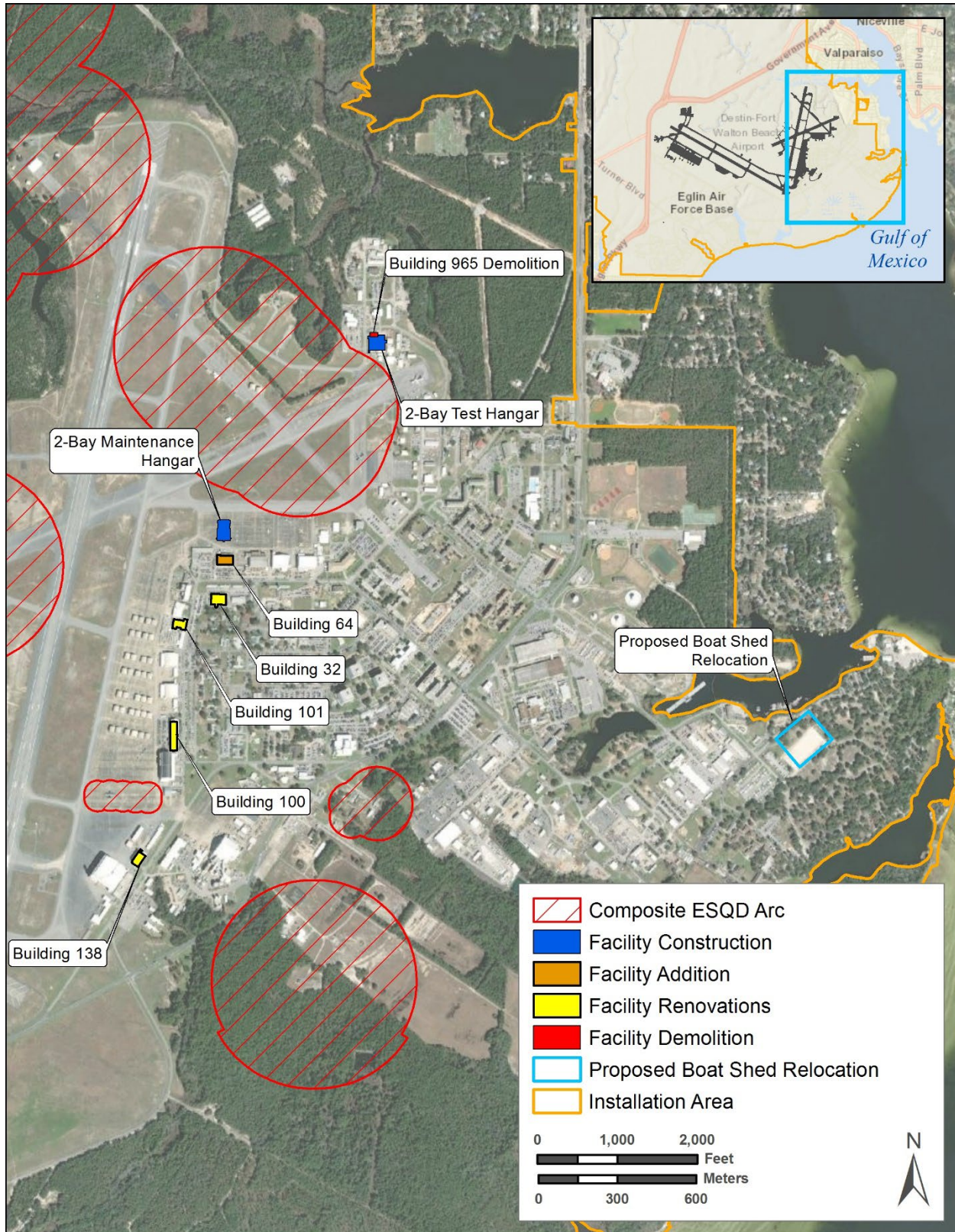
The ROI for the safety analysis includes the project areas, airfields at Eglin AFB, Tyndall AFB, and overland and over water ranges within the ETTC and EGTTT.

Explosives Safety. There are 19 Explosive Safety Quantity Distance (ESQD) arcs covering a total of 1,841 acres at Eglin Main Base. Most of the ESQD arcs at Eglin Main Base are concentrated in the munitions storage area north of the airfield and the live ordnance loading areas southwest of Runway 12/30. There is an ESQD arc approximately 0.1 mile southwest of Building 100, but it would not overlap with the proposed renovations or operations (see **Figure 3-3**). The proposed taxi lane, blast pad, equipment yard, and flight gate near the proposed Building 965 demolition site and 2-bay aircraft test hangar would overlap with several ESQD arcs associated with the armament research test areas.

Ground Safety. Day-to-day operations, maintenance, and construction activities conducted at Eglin AFB are performed in accordance with applicable DAF safety regulations, published DAF technical orders, and standards prescribed by DAF Occupational Safety and Health requirements. Specific safety requirements and responses to events that may occur on Eglin AFB are detailed in published range operating procedures. All aspects of ground safety at Eglin AFB are within DAF standards.

All contractors performing construction or renovation activities on Eglin AFB are responsible for following ground safety and Occupational Safety and Health Administration (OSHA) regulations and are required to conduct these activities in a manner that does not increase risk to workers or the public. For each construction and renovation project, a site-specific health and safety plan is required. Developers working on the installation are required to prepare appropriate job site safety plans explaining how job safety would be ensured throughout the life of the project and to follow all applicable OSHA requirements.

Offshore Safety. The Proposed Action would require aircraft operations over water within the EGTTT (see **Table 2-3**). During range operations in the EGTTT, DAF implements restrictions on recreational or commercial vessels. These restrictions are defined by the dimensions of the “safety footprint” of an impact area that may have potential harmful noise, blast, or other effects. Safety footprints vary based on several factors, including weapon type, flight profile, altitude of delivery, speed, or flight system of the specified activity. Emergency teams work with U.S. Coast Guard personnel who are trained to respond to aircraft mishaps.



Data Source: World Imagery; World Street Map

Figure Note: Some facilities and infrastructure are not shown due to operational security requirements.

Figure 3-3. ESQD arcs near the Project Areas

Flight Safety. The primary safety concern regarding military flights is the potential for aircraft mishaps. Aircraft mishaps may occur as a result of mid-air collisions, collisions with man-made structures or terrain, weather-related accidents, mechanical failure, pilot error, or bird/wildlife-aircraft collisions.

During the lifetime of the F-35 aircraft, the nationwide average of Class A mishaps per year is 0.23, which is approximately 2.22 mishaps per 100,000 flying hours (AFSEC 2022). The average number of Class B mishaps per year is 0.27, or 2.66 mishaps per 100,000 flying hours. In 2018, an F-35 experienced a ground mishap (malfunctioned nose gear) at Eglin AFB (Airforce Technology 2018). No in-flight F-35 aircraft mishaps have occurred at the project areas (ASN 2022). Eglin AFB responds to all aircraft mishaps in accordance with the *Installation Emergency Management Plan* (Eglin AFB 2022o). Foreign object debris creates safety hazards and can ultimately affect safe operations by damaging aircraft. Foreign Object Debris management plans are implemented to ensure the airfield is clear of debris and a safe operational environment for aircraft is maintained.

Bird/Wildlife Aircraft Strikes constitute a safety concern for military flights because they can result in damage to aircraft, or injury to aircrews or local human populations if an aircraft crashes. From 2016 to 2020, 185 bird-aircraft strikes were reported to have occurred around Eglin AFB (Eglin AFB 2018a). None of these bird-aircraft strikes resulted in Class A or Class B mishaps. Two strikes resulted in Class C mishaps. Approximately 37 bird-aircraft strikes occur on an annual basis from Eglin AFB air operations, including those conducted off-installation.

The Eglin AFB BASH Plan provides guidance to reduce the bird and wildlife strike hazards in the Eglin AFB airspace (Eglin AFB 2022i).

3.10.2 Environmental Consequences

Any increase in safety risks is considered an adverse impact on safety. Significant impacts on safety would be expected if the Proposed Action were to substantially increase risks associated with the safety of DAF personnel, contractors, or the general public, or introduce a new risk for which DAF is not prepared or does not have adequate management and response plans in place.

3.10.2.1 Proposed Action

Explosives Safety. Long-term, adverse impacts on explosives safety from the Proposed Action would be negligible from construction and operations occurring within established ESQD arcs for the proposed taxi lane and blast pad associated with the proposed Building 965 demolition and the 2-bay aircraft test hangar site. All applicable procedures and regulations outlined in Air Force Policy Directive 91-2, *Safety Programs*, DAF Instruction 91-202, *The U.S. Air Force Mishap Prevention Program*, and Eglin AFB Manual 91-202, *Designation of Explosive Loaded Aircraft Parking Area, Load/Unload Areas and Arm/Dearm Areas*, would be followed to avoid potential safety impacts during construction and operation. Additionally, operation of the proposed facilities and infrastructure would be compatible with the permittable land uses within the ESQD arcs and, therefore, would not require a change or reconfiguration of the arcs or impact the movement of munitions. Existing coordination procedures would continue to be

implemented during proposed operation of the taxi lane and blast pad to ensure safety of all personnel while working in areas associated with increased risk of explosives and munitions. When required, signage would be constructed to prohibit entry in restricted areas.

Ground Safety. Short and long-term, minor, adverse impacts on ground safety would occur from the temporary addition of construction workers and the permanent addition of 270 personnel at Eglin Main Base, which would increase the risk of workplace mishaps. All existing and new personnel would be required to follow applicable OSHA and DAF Occupational Safety and Health standards.

Offshore Safety. Long-term, adverse impacts on offshore safety would be negligible. It is unlikely that private and commercial aircraft or boats would be impacted directly by Weapons DT operations. For missions involving the use of bombs or missiles, the affected area would be cleared of all commercial and recreational boats. The cleared area would include a safety footprint around the target, the size of which would depend on the weapon being tested. The area would be cleared with the assistance of DAF and contracted safety boats. Missions would not proceed until the target area is confirmed to be clear of unauthorized vessels.

Flight Safety. Short-term, minor, adverse impacts on airfield and flight safety would occur from construction activities adjacent to the airfield, including the installation of the temporary facilities, and staging of construction equipment and materials. To maintain a safe operational environment for aircraft, construction contractors would be required to adhere to an installation-approved foreign object debris inspection and removal plan when conducting any service, construction, or renovation activity on or near any apron, taxiway, or runway location, including aircraft maintenance, fueling, and associated areas that aircraft are known to travel. Temporary facilities would be removed upon completion of construction actions; therefore, no long-term effects on airfield operations or flight safety would be expected.

Long-term, minor, adverse impacts on flight safety would occur from an increase of 2,356 annual airfield operations at Eglin AFB and Tyndall AFB under the Proposed Action, resulting in an increased risk of aircraft mishaps. Risk to public safety from aircraft mishaps is considered to be low based on the low rate of aircraft mishaps in Eglin AFB overland airspace associated with existing daily operations. Most mishaps would occur in the immediate vicinity of the airfield runways, posing potential safety risks to Eglin AFB personnel (Eglin AFB 2018a). Current flight safety policies and procedures at Eglin AFB ensure the potential for aircraft mishaps would be minimized to the extent possible.

Approximately 37 bird-aircraft strikes occur on an annual basis as a result of Eglin AFB air operations. The Proposed Action would increase air operations which also would increase the potential for bird-aircraft strikes. The potential increase in BASH incidents is expected to be minor due to continued implementation of BASH reduction measures outlined in the *Eglin AFB Bird/Wildlife Aircraft Strike Hazard Plan*. Based on historical data, the overall potential for BASH events to result in a severe (Class A or B) mishap would be considered low.

3.10.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and modification actions to support the F-35A DT program would not occur. Therefore, conditions as described in **Section 3.10.1** would remain unchanged, and added or new safety impacts would occur.

3.10.2.3 Cumulative Impacts

Short-term, minor, adverse cumulative impacts on occupational safety at Eglin AFB would occur from increased hazards to construction workers, installation personnel, and civilians should the construction and modification actions associated with the Proposed Action occur simultaneously with reasonably foreseeable construction actions. Adherence to established procedures, including the use of PPE, fencing project areas, posting signs, and compliance with all federal, state, and DoD OSHA standards would reduce or eliminate health and safety impacts on contractors, military personnel, and the general public. Incremental increases in flight activity from beddown of additional aircraft and tenants would increase BASH risk and the potential for aircraft mishaps. Long-term, minor, beneficial cumulative impacts would occur from the net decrease in aircraft operations and number of personnel at Eglin AFB following implementation of the 5th Generation FTU Optimization, which would decrease the potential for BASH incidents, aircraft mishaps, and workplace mishaps. Therefore, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative impacts on safety.

3.10.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would not result in an irreversible or irretrievable reduction in public health and safety.

3.11 Socioeconomics

3.11.1 Affected Environment

The ROI for the socioeconomics analysis includes the areas in which potential socioeconomic effects from construction and modification actions, increased personnel and dependents, and the proposed F-35A DT operations (flight and munitions expenditures), would occur. These effects would be concentrated within Eglin AFB, surrounding communities, Okaloosa County, and offshore areas within the EGTR. The socioeconomics analysis uses U.S. Census Bureau-reported data on the county's population, housing, employment, and income characteristics. Data for Okaloosa County or the state of Florida are provided for comparison.

The proposed over land and over water Weapons DT operations would be consistent with ongoing missions at Eglin AFB and the proposed munitions expenditures have already been addressed in prior NEPA analyses, agency coordination efforts, and consultations. This analysis will only briefly discuss where those operations would occur and the types of effects that would be ongoing from the F-35A DT mission.

Population. Okaloosa County's total population in 2020 was 207,430 (USCB 2020). In 2021, Eglin AFB reported a population of approximately 20,000 personnel (Eglin AFB 2022p).

Housing. Privatized housing occupancy rates at Eglin Main Base indicate little remaining capacity to house additional personnel. An occupancy rate of 94.7 percent is anticipated for the 747 newly constructed homes following the full build out in 2020 (Eglin AFB 2017a). According to the Eglin AFB Housing Management Chief, housing for new personnel is based on a first come first serve basis. In Okaloosa County, the homeowner vacancy rate is 1.1 percent, and the rental vacancy rate is 19.6 percent. Out of 102,272 total housing units in Okaloosa County, 17,775 units (17.4 percent) were vacant as of 2021 (USCB 2021a).

Public Services. Although many of the medical facilities at Eglin Main Base have received major renovations or interior modifications, the overall conditions of these facilities are considered degraded. The existing fitness facilities at Eglin Main Base are also in substandard condition and need significant repairs. Two Child Development Centers on Eglin Main Base provide childcare (Eglin AFB 2017a). According to the Eglin AFB Child & Youth Services Flight Chief, there were 130 infants and 32 one-year-olds on the waiting list at the Child Development Center as of January 2022. Due to these capacity concerns, incoming personnel with children would need to consider off-installation childcare centers.

Employment. The three largest industries in the county in terms of percentage of the workforce employed within the industry in 2021 were: educational services, and health care and social assistance (18.9 percent); professional, scientific, and management, and administrative and waste management services (13.1 percent); and retail trade (12 percent). The construction industry represented 8.2 and 8.1 percent of the county and state's workforce, respectively. Furthermore, the armed forces made up 7 percent of those employed in Okaloosa County, compared to 0.4 percent in Florida. In 2021, the unemployment rate in Okaloosa County was 3.6 percent, while the state of Florida's unemployment rate was 5.6 percent (USCB 2021b).

Economic Sectors. Recreational and commercial activities (e.g., fishing, diving, shipping) in the Gulf of Mexico contribute to the economies of adjacent coastal communities (Eglin AFB 2023a). Ongoing DAF testing and training activities conducted in the EGTR occasionally restrict commercial or civilian users to maintain safe separation from air maneuvers, vessel operations, and air-to-surface weapons firing of live and inert munitions. Economic sectors affected by offshore range activities include recreational fishing, commercial fishing, fishing tournaments, maritime transportation. To support ongoing range activities in the EGTR, DAF occasionally restricts public access by air or water to one or more sub-areas of W-151 and W-470 (see **Figures 1-1 and 1-2**) for discrete time periods (Eglin AFB 2023a). Access restrictions are typically in place for a duration between four and six hours per training day for a total of up to 60 training days per year. The size of the closed area varies depending on the specific mission.

To enable commercial and civilian maritime operators to avoid the area during a planned closure, Eglin AFB protocol is to provide an advance notice to mariners. During a closure, the non-participating vessels (such as recreational and commercial fishing vessels) are advised to not enter the safety footprint while it is active. Occasionally, Eglin Range Safety also hires local charter companies to support establishment of safety perimeters around active operating areas in the gulf. It is estimated that the W-151 area is closed for portions of 30 to 60 days per year to support weapons firing and munitions expenditure operations. During the hours of closure each

mission day, the affected area is inaccessible to commercial and recreational fishing vessels, recreational boaters, scuba divers, and other civilian operations (Eglin AFB 2023a).

3.11.2 Environmental Consequences

Impacts associated with socioeconomic resources are evaluated based on the changes to demographics, employment, or housing caused by a proposed action. Impacts from a proposed action would be considered significant if they resulted in any adverse, long-term or permanent change in socioeconomic conditions that could not be minimized through the use of BMPs and would adversely affect the economic stability in the region would be considered a significant impact to socioeconomic resources.

3.11.2.1 Proposed Action

Population. Under the Proposed Action, the population of Eglin Main Base and Okaloosa County would increase by approximately 4 percent and 0.4 percent, respectively.

Housing. It is anticipated the incoming 270 personnel and estimated 439 accompanying dependents would live on-installation or within the surrounding community. Based on 2021 reported housing data, limited local housing availability would support the anticipated population increase of 709 total incoming personnel and dependents.

Public Services. Long-term, minor, adverse impacts on public services would occur from addition of personnel and dependents at Eglin Main Base. The additional personnel and associated dependents would add to the existing demand on installation and local education, childcare, health, and emergency services. Among the incoming dependents, approximately 263 would be school-aged children. Because the capacity of the child development center is already exceeded, with a substantial wait list for new families, incoming personnel would need to consider off-installation childcare options.

Employment. Short-term, negligible, beneficial impacts would occur during the facility and infrastructure construction and modification actions from increased construction employment and local spending for construction materials and fuel purchases.

Economic Sectors. F-35A Weapons DT operations conducted offshore would be consistent with ongoing mission training activities as described and analyzed in the 2015 *EGTTR Final Range EA*. Overland operations would be consistent with the 2014 *F-35 Supplemental EIS* (Eglin AFB 2014b) 2022 *Final Range EA for Overland Air Operations* (Eglin AFB 2022a). Impacts on maritime transportation, recreational fishing, and scuba diving in areas with artificial reefs that may also operate in W-151 and W-470 would include intermittent, short-term closure of portions of the warning area to ensure safe operating conditions (Eglin AFB 2023a). Through adherence to safety protocols, issuances of advanced notice to enable prior planning, and limiting hours of access restrictions, effects (vessel detours, requirement to access other fishing areas, limited access to artificial reefs in the area) would be minimized to the extent practicable. DAF would continue to issue advance notice to mariners advising nonparticipating vessels to avoid the area, and to provide public awareness of planned DT activities. Weapons DT activities also would contribute to ongoing beneficial impacts on local vendors from the temporary employment of charter boats and crews to support Eglin Range Safety as part of the safety

perimeter team. Compensation received from the DAF could offset the potential loss in income associated with the loss in business activities or other recreational excursions during the intermittent closures of W-151 to support the proposed operations.

The Proposed Action would not impact socioeconomic resources at Tyndall AFB. Additionally, recreational and commercial fishermen operating in Choctawhatchee Bay would not be affected as DAF would not restrict access to these waters.

3.11.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and modification actions to support the F-35A DT program would not occur. Therefore, conditions as described in **Section 3.11.1** would remain unchanged, and no socioeconomic impacts would occur.

3.11.2.3 Cumulative Impacts

The Proposed Action, when combined with reasonably foreseeable actions, would result in short-term, minor, beneficial cumulative impacts and long-term, minor, adverse cumulative impacts on socioeconomics. Beneficial impacts would occur from added increased employment and local spending from the reasonably foreseeable construction actions when combined with the beneficial impacts from the construction and modification actions associated with the Proposed Action. Incremental increases in personnel at Eglin AFB from the additional F-35A squadron of the 5th Generation FTU Optimization, maintenance personnel for the 350 SWW and 36 EWS, and AvFID personnel would put additional strain on childcare and other public services at Eglin AFB, resulting in minor, adverse cumulative impacts. However, the net decrease of personnel and dependents following the 5th Generation Optimization could reduce the potential for these services to operate beyond their capacity. It is anticipated local housing availability would be able to support incremental increases in personnel. Therefore, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative socioeconomic impacts.

3.11.2.4 Irreversible and Irretrievable Commitment of Resources

The hiring of individuals from the local construction workforce to update facilities and infrastructure for the Proposed Action would be considered a temporary and irretrievable loss of human/labor resources because those hired for the project would not be available to support other work activities in the local area. The hiring of construction labor resources for the Proposed Action however represents employment opportunities and would be considered beneficial.

3.12 Water Resources

3.12.1 Affected Environment

The ROI for water resources includes surface, groundwater, and floodplains at Eglin AFB, and portions of the Gulf of Mexico in W-151 and W-470 where munitions would be expended.

Surface Water. The main surface waters within the ROI include Gulf of Mexico waters that extend over 100 NM offshore: Choctawhatchee Bay to the south of Eglin Main Base, Boggy Bayou to the east, and Poquito Bayou to the west (Eglin AFB 2020a). State jurisdiction for sediments and waters extends from the low tide line out to 9 NM from shore of Florida, while federal jurisdiction begins at 9 NM and extends out to 200 NM. The ROI is therefore subject to both state and federal jurisdiction. Other freshwater bodies on Eglin AFB include 32 lakes (over 300 acres of man-made ponds and natural lakes), 30 miles of rivers, and an extensive network of streams that encompass approximately 600 acres (Eglin AFB 2022h).

The Eglin Reservation encompasses portions of three hydrologic basins: Choctawhatchee Bay, Yellow River Basin, and Pensacola Bay; of these, the project areas are contained within the Choctawhatchee Bay watershed. Weekley Pond and Jack's Lake Branch are located to the south and east of the project areas. The area east of the airfield, where most of the infrastructure improvements are taking place, is an industrialized area that contains some green open spaces but no surface water features, as shown in **Figure 3-4**.

Ocean water in the vicinity of the EGTR typically has a salinity equal to or greater than 35 parts per thousand. Dissolved inorganic ions in Gulf of Mexico waters over the continental shelf include sodium, chloride, magnesium, potassium, calcium, and phosphate (Eglin AFB 2023a). Tidal action in the Gulf of Mexico is less developed than that of the Atlantic Coast and may be diurnal (one high and one low), semidiurnal (two high and two low tides daily), or mixed (Eglin AFB 2002). Water depth in the EGTR ranges from 20 to 700 meters, and the depth at the test site ranges from 30 to 145 meters. Turbidity, a measure of water clarity in the Gulf of Mexico, generally decreases from nearshore to offshore, and bottom turbidity measurements tend to be higher than turbidity levels at the surface. High turbidity measurements are caused by suspended solids or impurities in the water column (Eglin AFB 2023a).

The substrate (sediments) underlying the EGTR is comparable to that found throughout the eastern half of the Gulf and consists primarily of quartz sand high in sulfur and phosphate content. There are locations of hard-bottom substrate and artificial reefs; these are rare (less than 1 percent) and not beneath the primary target area. A number of artificial reefs could occur inside safety footprints and would be inaccessible for the duration of certain tests. The number of such structures affected would depend on the type of munition used, delivery parameters, etc. The geology of this area of the Gulf of Mexico is characterized as a shallow, broad continental shelf, with steep slopes leading to two large deepwater plains several miles from the target area and scattered regions where the bottom is somewhat higher (Eglin AFB 2023a).

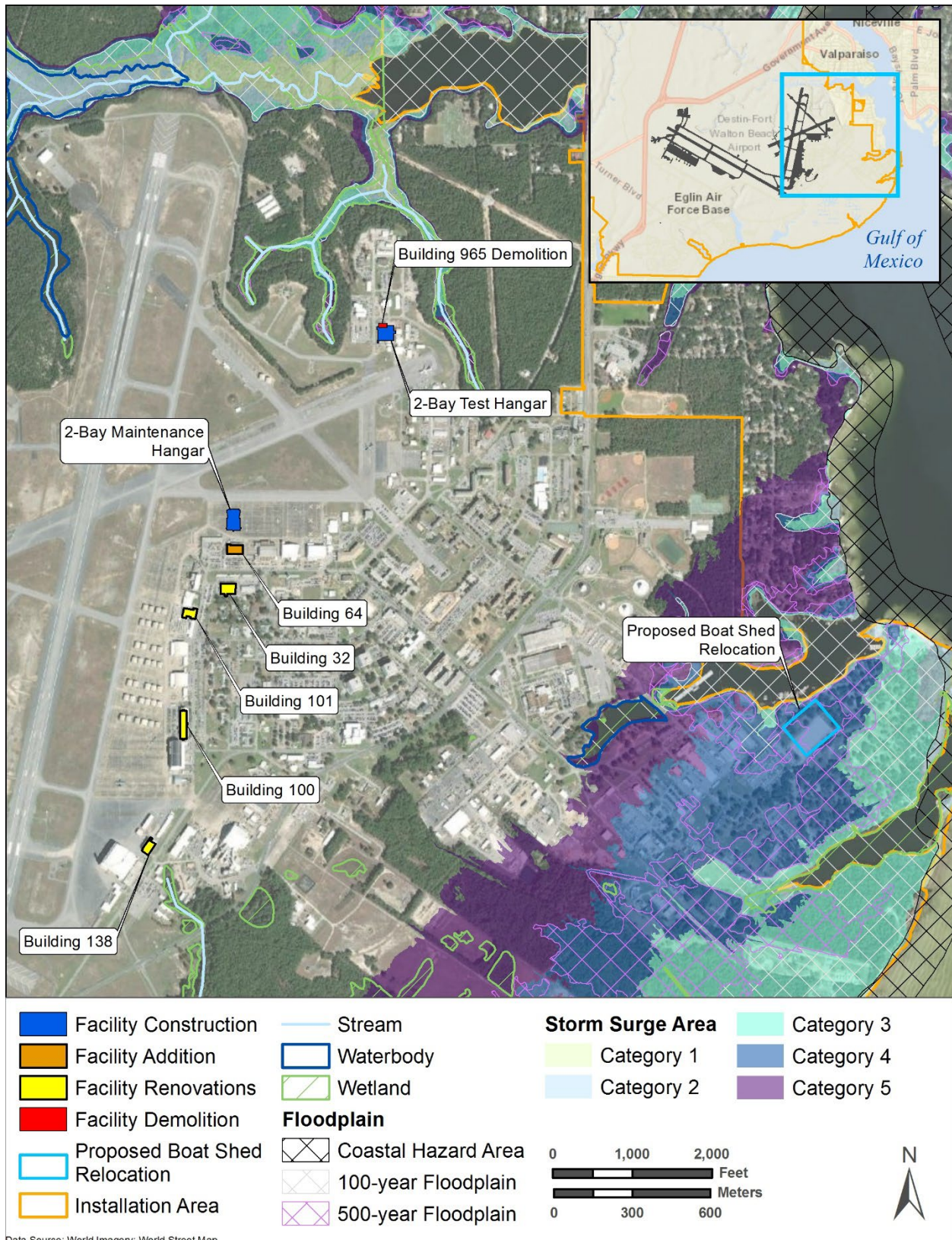


Figure Note: Some facilities and infrastructure are not shown due to operational security requirements.

Figure 3-4. Water Resources at Eglin Main Base

Surface Water Quality. Fresh surface waters on Eglin AFB are classified as Class III waters, which are designated for “recreation, propagation, and maintenance of a healthy, well-balanced population of fish and wildlife”. All waters in the Gulf of Mexico are also designated as Class III. Impaired waters near Eglin AFB include Bass Lake, Boggy Bayou, the lower segment of Choctawhatchee Bay, Gap Creek, Garniers Beach Park, Poquito Park, Rocky Bayou and Rocky Bayou State Park, East Bay, and Yellow River (FDEP 2020, FDEP 2022b). Outstanding Florida Waters in the ROI include Gulf Islands National Seashore, Henderson Beach State Recreation Area, Grayton Beach State Recreation Area, St. Andrews State Recreation Area, St. Vincent National Wildlife Refuge (Pig Island), T. H. Stone Memorial St. Joseph Peninsula State Park, and St. Joseph Bay Aquatic Preserve.

Water quality within EGTTTR is defined by a number of factors, including chemical materials, waste disposal, tides, commercial activities, artificial reefs, and military activities. Chemical pollutants from oil spills, leaks, discharges, and organotins (boat de-fouling reagents) may enter the nearshore coastal environment and flow outward to the open ocean by tidal action and effect water quality. Chemical pollutants can have an effect through ingestion and long-term accumulation in the bodies of marine species. Pollutants have a tendency to bioaccumulate based on where the animal is situated within the food chain. Waters of the Gulf of Mexico region have been rated by USEPA as being fair, with 10 percent of the area rated poor. Most of the coastal locations sampled on Florida’s Gulf of Mexico were rated good to fair. Only waters near the more metropolitan areas around Pensacola, Tampa, and Fort Meyers received poor ratings (USEPA 2012).

In the Gulf of Mexico, the sediment quality index is rated poor because 19 percent of the coastal area as rated poor for at least one of the component indicators. However, the results were variable and may have been indicators of natural circumstances at the time of sampling. Further, the sediment contaminants component indicator for the Gulf of Mexico region is rated good, with only three percent of the coastal area rated poor for this component indicator (USEPA 2012). Elements such as nitrogen, iron, zinc, aluminum, manganese, and organic compounds are found naturally in Gulf of Mexico waters, but some are also common byproducts of underwater explosives and ammunition firing (Eglin AFB 2023a).

Ongoing air-to-surface test and training activities over water resources generate explosives and byproducts, metals, and other chemical materials. Explosions may disturb sediment, increasing turbidity. Turbidity increases from munitions expenditures are not considered substantial because, depending on site-specific conditions of wind and tidal currents, the turbidity plume eventually dissipates as particles return to the bottom or are dispersed. Therefore, effects on turbidity are not discussed further. Explosions that occur above or at the surface of the water distribute nearly all explosion byproducts into the air, rather than into the water. In general, three things happen to military expended materials that come to rest on the ocean floor: (1) they lodge in sediment where there is little or no oxygen, usually below 4 inches (10 centimeters); (2) they remain on the ocean floor and begin to react with seawater; or (3) they remain on the ocean floor and become encrusted by marine organisms (Eglin AFB 2023a).

Metals, explosives, and other materials associated with existing testing and training activities are released into the marine environment at low concentrations, are readily diluted, and have negligible potential to adversely impact water or sediment quality, including biota that occur in the water column or within sediments. Studies of maritime sites where substantial amounts of munitions have been expended or disposed, in quantities much greater than the EGTTT, show no adverse impacts to water quality, sediments, or biota at such sites. Most studies of unexploded ordnance in marine environments have not detected explosives or have detected them in the range of parts per billion. Studies examining the impact of ordnance on marine organisms have produced mixed results (Eglin AFB 2023a).

Groundwater. Groundwater underlying Eglin AFB occurs in two major aquifer systems: the surficial aquifer (also known as the sand and gravel aquifer) and the Floridan Aquifer. The Floridan aquifer system, which underlies the entire state, is the major source of groundwater supply in most of Florida and is the primary water supply source at Eglin AFB (FDEP 2022c). The Floridan Aquifer consists of a thick sequence of inter-bedded limestone and dolomite. The top of the Floridan Aquifer ranges from approximately 50 ft below msl in the northeastern corner of Eglin AFB to approximately 700 ft below msl in the southwestern part of the Base (Eglin AFB 2022a). The surficial aquifer consists primarily of fine to coarse sand and gravel. Water within this unit is generally unconfined, i.e., free to rise and fall. The surficial aquifer is not a primary water supply source at Eglin AFB; however, water is drawn from it by certain on-base wells (Eglin AFB 2022h). The surficial aquifer is separated from the underlying confined Floridan Aquifer by the low-permeability Pensacola Clay confining bed.

Floodplains. Floodplain management on Eglin AFB includes floodplain protection, floodplain boundary determination, and assessment of proposed actions within floodplains. Floodplain protection and assessment of proposed actions is the responsibility of the Environmental Impact Analysis Program, 96th Civil Engineer Group, Environmental Planning Office, and Natural Resource Offices. Flooding on Eglin AFB is caused by rainfall, hurricane storm surge, or a combination of both. Annual rainfall averages 60 inches, primarily in the summer and late winter or early spring. Most of the summer rainfall is from scattered showers and thundershowers that are often heavy and last only one or two hours. Excessive rainfall may also result from hurricanes or tropical storms, with most storms occurring late summer and early fall. This area has a drought return interval of 20 to 25 years (Eglin AFB 2022h). Eglin Main Base has 100-year and 500-year floodplains along its southern border with Choctawhatchee Bay (Eglin AFB 2020a; FEMA 2021). Recent modeling data (Eglin AFB 2020a) show that the southeastern portion of the main base area would be flooded during extreme storm (hurricane) events, as shown in **Figure 3-2**.

3.12.2 Environmental Consequences

A proposed action could have significant impacts on water resources if it were to substantially affect water quality; endanger public health or safety by creating or worsening health or flood hazard conditions; threaten or damage unique hydrologic characteristics; overdraft groundwater basins; or violate applicable laws or regulations that protect water resources.

3.12.2.1 Proposed Action

Surface Water and Surface Water Quality. Short-term, minor to moderate, adverse impacts on surface water would be similar to those described in the 2020 *Cantonment Areas EA* and would be greatest at any location where construction would occur within 50 feet of a surface water body—in the case of this Proposed Action, the proposed boat shed relocation. Impacts on surface water would occur during the proposed facilities and infrastructure construction and modification actions along the Eglin AFB airfield. Impacts would occur anywhere construction is taking place; however, because the proposed facilities and infrastructure are being built on previously disturbed areas, these impacts would be minor. BMPs specified in the installation-specific SWPPP and development of site-specific construction SWPPPs (as required) would minimize potential adverse effects (Eglin AFB 2020a).

Long-term, minor, adverse impacts on surface water would occur from the increase of approximately 10.3 acres of impervious surfaces, increasing the potential for surface runoff and velocity over existing conditions. Most of the facilities would be built on previously disturbed areas. Any construction of impervious surface (e.g., pavements, buildings), stormwater management systems (retention ponds, swales, stormwater pipes/culverts), or work in wetlands would require an Environmental Resource Permit through the Northwest Florida Water Management District. Additionally, because land disturbance would be greater than 5,000 ft², compliance with Section 438 of the Energy Independence and Security Act, which requires projects to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the project area, would be required. Permit and compliance measures that would be implemented to avoid or minimize impacts on water resources are provided in **Appendix E**.

Flight and munitions expenditures operations for the 96 TW and other operating groups at Eglin AFB were analyzed in the 2023 *EGTTR Final Range EA* (Eglin AFB 2023a) and related consultations with NMFS (NMFS 2017, NMFS 2019). These activities are expected to result in long-term, negligible to minor, adverse impacts on offshore surface water in the Gulf of Mexico. Impacts on water resources from testing and training operations at Eglin AFB for the F-35A DT mission would be associated with expenditures of chaff and flares, as well as metals and chemical materials introduced through spent munitions and explosive byproducts and by direct impacts. The F-35A DT program would be using capacity from the previously analyzed munitions allotments addressed in those prior analysis effort. Therefore, impacts on offshore water resources (surface waters and submerged sediments) would be the same as described in those analyses, including long-term, negligible, adverse impacts to sediment or water quality from explosives; long-term, minor, adverse impacts from spent munitions fragments and debris deposits; long-term, minor, adverse localized impacts from unconsumed explosives; and long-term, negligible, adverse impacts from defensive countermeasures.

Munitions expenditures for the F-35A Weapons DT mission would be conducted over water within W-151 and W-470, in accordance with the operational protocols specified in the 2015 *EGTTR Final Range EA* and associated consultations. As discussed previously, chemical, physical, or biological changes to sediment or water quality would not be considered substantial. The number of munitions expenditures proposed is relatively small when compared to the total area of W-151 and W-470 in which they would be distributed. The majority of explosive

chemicals that would be deposited from munitions expenditures are found naturally in the environment and the ecosystem is equipped to handle them in the small levels. Chemicals associated with explosives would be expected to rapidly degrade and/or dissipate due to the natural currents, sunlight, and other environmental factors. As discussed in the 2019 NMFS BO, EGTR activities introduce chemicals into the marine environment that are potentially harmful in higher concentrations. However, rapid dilution would be expected and toxic concentrations are unlikely to be encountered by ESA-listed fish or their prey (NMFS 2019).

Debris deposited on the seafloor would include spent munitions fragments and possibly pieces of targets (e.g., fiberglass, plywood). Debris would not appreciably affect the sandy seafloor. Debris moved by water currents could scour the bottom, but sediments would quickly refill any affected areas, and overall effects to benthic communities would be minor. Large pieces of debris would not be as prone to movement on the seafloor and could result in beneficial effects by providing habitat for encrusting organisms, fish, and other marine fauna. There is a potential for some debris to be carried by currents and interact with the substrate, but damage to natural or artificial reefs is not expected and the impacts would not be significant.

Long-term, negligible, adverse impacts from unconsumed explosives associated with training and testing activities would be localized to the area in which the unconsumed explosive was deposited. The frequency of low-order detonations or dudded munitions would be low. The constituents of unconsumed explosives are subject to several physical, chemical, and biological processes that render the materials harmless or would otherwise dissipate them to undetectable levels (Eglin AFB 2023a).

Expenditure of defensive countermeasures under the F-35A DT mission, including chaff bundles and flares, would occur within W-151 and R-2914. As discussed in the 2023 *EGTR Final Range EA* (Eglin AFB 2023a), chaff is generally resistant to chemical weathering and likely remains in the environment for long periods. All components of the aluminum coating for chaff are however already common in seawater and ocean sediments (Nozaki 1997). Further, the non-coating components of chaff are silicates, which are benign compounds that are largely similar to their naturally occurring counterparts. Flares are generally consumed entirely during use. Small amounts of metals are used to give flares and other pyrotechnic materials bright and distinctive colors. Combustion products from flares include magnesium oxide, sodium carbonate, CO₂, and water. Combustion products of flares are mostly phosphates, which are harmless. Flares that function properly are completely consumed during use and expended in the air, and therefore would not have any impact on sediments or waters. The failure rate of flares is low (5 percent). Chemicals associated with unconsumed flares are small in quantity and subject to additional chemical reactions and subsequent dilution in the ocean (Eglin AFB 2023a).

Groundwater. No impacts on groundwater from the Proposed Action would be anticipated. The ground disturbances for the construction and modification actions would be at surface-level and, at most, a few feet below the subsurface, but would not be expected to impact groundwater. If required, DAF would implement LUCs near monitoring or water wells in the project areas to prevent potential contamination from reaching the groundwater.

Floodplains. The pre-engineered boat shed would be located in a previously developed (cleared and graded) area where it would be surrounded on the north, east, and south sides by 500-year floodplains. The west boundary and northwest corner of the new facility would overlap an approximately 1-acre portion of the 500-year floodplain where properties have a 0.2 percent chance of experiencing flooding in any given year. The installation constructs and manages facilities in this area to be consistent with the intent of the floodplain management guidelines promulgated as a function of the National Flood Insurance Program and would therefore construct the facility to be at a higher elevation than the floodplain. No other project areas would be within the Coastal High Hazard Area (or Special Flood Hazard Area) that would be subjected to storm hazards due to wind and wave action. Because the area has been previously disturbed and already encompasses existing facilities and infrastructure, no appreciable impacts that would affect the flow of water in a flood event would be expected. Measures that would be implemented to avoid or minimize impacts water resources are provided in **Appendix E**.

3.12.2.2 No Action Alternative

Under the No Action Alternative, DAF would not beddown four F-35A DT aircraft and associated personnel at Eglin AFB, and F-35A DT flight and weapons testing operations, and construction and modification actions to support the F-35A DT program, would not occur. Therefore, water resources would remain unchanged, and no new impacts would occur.

3.12.2.3 Cumulative Impacts

The Proposed Action, when combined with reasonably foreseeable actions would result in short- and long-term, minor to moderate, adverse cumulative impacts on water resources from construction activities involving ground disturbance and following increases in impervious surfaces. Soil disturbance from construction, and water disturbance from overwater munitions expenditures and installation of a submarine fiber optic cable could result in erosion, sedimentation, increased turbidity, and degraded water quality. The cumulative increase in impervious surfaces from the Proposed Action and reasonably foreseeable actions would be considered a minor contribution to additional runoff and erosion effects on the whole watershed but may also be noticeable on a local level. In accordance with federal and state stormwater regulations, the post-development hydrologic conditions of project areas must be maintained as they were during predevelopment. For the construction and modification actions associated with the Proposed Action and reasonably foreseeable construction actions, preservation of pre-development hydrologic condition would be ensured through utilization of existing stormwater management systems on the installation, adherence to appropriate plans and permits, and incorporation of BMPs and low-impact development strategies that would attenuate potentially long-term, adverse cumulative impacts on water resources. Overall, the Proposed Action, when combined with reasonably foreseeable actions, would not result in significant cumulative impacts on water resources.

3.12.2.4 Irreversible and Irretrievable Commitment of Resources

The Proposed Action would not result in irreversible or irretrievable commitments of water resources.

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A

Interagency Coordination
and Public Involvement



Appendix A: Interagency Coordination and Public Involvement

A.1 Interagency Coordination Distribution List

Christopher Stahl
Coordinator
Florida Department of Environmental Protection,
Florida State Clearinghouse
3800 Commonwealth Boulevard
Mail Station 47
Tallahassee, FL 32399

[[Preparer's Note: Placeholder – This appendix will include the signed copy of the State Clearinghouse Letter, letter response, newspaper Notice of Availability, and public comments following the public review and comment period for the Draft EA.]]

A.2 Example Letter to the Florida State Clearinghouse



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 96TH TEST WING (AFMC)
EGLIN AIR FORCE BASE FLORIDA**

Month DD, 2023

Maria D. Rodriguez
96 CEG/CEIEA
501 DeLeon Street, Building 696, Suite 101
Eglin Air Force Base Florida, 32542-5105

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Boulevard, Main Station 47
Tallahassee, Florida 32399-2400

SUBJECT: Review of the Draft *Environmental Assessment Addressing Beddown of F-35A Developmental Testing Aircraft at Eglin Air Force Base, Florida*.

Mr. Stahl

The Department of the Air Force is pleased to electronically submit the Draft *Environmental Assessment Addressing Beddown of F-35A Developmental Testing Aircraft at Eglin Air Force Base, Florida* via the Department of Defense Secure Access File Exchange located at <https://safe.apps.mil/>. This correspondence is a request for comments from your office on the subject document. The Department of the Air Force prepared this document to conform to the requirements of the *National Environmental Policy Act*.

We respectfully request your comments be sent to Ms. Maria D. Rodriguez, 96 CEG/CEVS, 501 DeLeon Street, Suite 101, Eglin AFB, FL 32542-5105, or by email to maria.d.rodriguez@us.af.mil. Please reference the F-35A DT EA in the subject line of the correspondence. The Department of the Air Force would greatly appreciate it if you would consolidate and submit your agency's comments within 60 days from receipt of this document.

[[Insert Electronic Signature]]

MARIA D. RODRIGUEZ, NH-04
Chief, Environmental Management Branch

cc: Project File (letter only)

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B

Eglin AFB Government-to-
Government Tribal
Consultation



B. Appendix B: Eglin AFB Government to Government Tribal Consultation

B.1 Government-to-Government Consultation Distribution List

Eglin AFB conducts government-to-government consultation with six federally recognized tribes with a historic or cultural affiliation with Eglin AFB lands: the Miccosukee Tribe of Indians of Florida, Seminole Tribe of Florida, Seminole Nation of Oklahoma, Poarch Band of Creek Indians of Alabama, Muscogee (Creek) Nation of Oklahoma, and Thlopthlocco Tribal Town. Contact information for each tribe is listed, below.

The installation has a Programmatic Agreement with these tribes whereby the tribes do not wish to be contacted for work in areas that have already been surveyed or where predictive modeling, based on the surrounding area, has determined that there is a low likelihood for cultural resources. These arrangements are captured in the executed 2021 Programmatic Agreement, which supersedes all earlier government-to-government agreements. Tribal consultations conducted previously have not identified any sacred sites or traditional cultural properties at Eglin AFB. No additional government-to-government consultation will be conducted for this undertaking.

David Hill
Principal Chief
The Muscogee (Creek) Nation
P.O. Box 580
Okmulgee, OK 74447

Ryan Morrow
Town King
Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Billy Cypress
Chairman
Miccosukee Tribe of Indians of Florida
Tamiami Station
P.O. Box 440021
Miami, FL 33144

Mitchell Cypress
Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Lewis Johnson
Principal Chief
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Stephanie Bryan
Tribal Chair
Poarch Band of Creek Indians
5811 Jack Springs Road
Building 500
Atmore, AL 36502

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Eglin AFB Government to Government Tribal Consultation Memorandum



**DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 96TH TEST WING (AFMC)
EGLIN AIR FORCE BASE FLORIDA**

3/7/2022

MEMORANDUM FOR RECORD

FROM: Eglin Air Force Base Installation Tribal Liaison Officer

SUBJECT: Government to Government Tribal Consultation with Regards to Traditional Cultural Properties and Sacred Sites at Eglin Air Force Base, Florida

Eglin Air Force Base (AFB) has a well-established relationship with various Federally-recognized tribes that have a historic affiliation to the area in and around Eglin AFB. While tribal consultations had been occurring for years, the formal government-to-government relationship was established between Eglin AFB and the following four tribes in 2008: the Miccosukee Tribes of Indians of Florida, the Muscogee (Creek) Nation, the Poarch Band of Creek Indians, and the Seminole Tribe of Florida. The federally recognized tribe, Thlopthlocco Tribal Town, began consulting with Eglin AFB beginning 2012, and then the Seminole Nation of Oklahoma in September of 2019.

Meetings with all of these tribes led to the development of a Memoranda of Understanding (MOU) related to Section 106 of the *National Historic Preservation Act* and *The Native American Graves Protection and Repatriation Act*. The Muscogee (Creek) Nation and Thlopthlocco Tribal Town ultimately signed MOUs with Eglin AFB. Although indicating an intent to sign, the Poarch Band of Creek Indians never actually signed an MOU. The Miccosukee Tribe of Indians of Florida and the Seminole Tribe of Florida did not wish to sign MOUs, but verbally agreed with all of the principles laid out in the documents signed by the other tribes.

In October of 2021, Eglin AFB completed a landmark comprehensive Section 106 Programmatic Agreement (PA) with the Florida State Historic Preservation Officer (FL SHPO) and the Advisory Council on Historic Preservation (ACHP). This PA superseded the previous MOUs. Three of the six tribes have signed as Invited Signatories: the Muscogee (Creek) Nation, the Seminole Nation of Oklahoma, and the Thlopthlocco Tribal Town, and three tribes verbally agreed and are listed as Concurring Parties: the Miccosukee Tribes of Indians of Florida, the Poarch Band of Creek Indians, and the Seminole Tribe of Florida.

Eglin AFB has already surveyed approximately 75 percent of the roughly 387,000 acres that can currently be evaluated (or about 288,000 acres). In addition, nearly 100 percent of all high-probability areas have been surveyed and thousands of specific archaeological sites have been evaluated. Through several decades of archaeological investigations and tribal consultations, no Traditional Cultural Properties (TCPs) or Sacred Sites have ever been identified by the tribes.

The topic of TCPs has routinely been discussed with the tribes beginning in 2008 when the formal government-to-government relationship was first established. TCPs were also discussed at our most recent face-to-face meeting with the tribes on 16 June 2021. Eglin AFB and the tribes recognized that previously unknown TCPs could be identified in the future with the accumulation of more information. However, each tribe has stated that they are unaware of any TCPs or Sacred Sites currently located on Eglin AFB lands and prefer to not be consulted regarding each specific project which impacts areas previously assessed and/or determined low-risk for TCPs or Sacred Sites.

This memorandum for record will be updated annually, to reflect the current status of communication with the tribes as well as any changes to TCPs of Sacred Sites identified on Eglin AFB.

RODRIGUEZRODRIGUE
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RODRIGUEZRODRIGUEZ.MARIA.1
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MARIA D. RODRIGUEZ, NH-04
Installation Tribal Liaison Officer
Eglin AFB, Florida



C

Coastal Zone Management
Act Compliance
Documentation



C. Appendix C: Coastal Zone Management Act Compliance Documentation

C.1 Coastal Consistency Determination Letter

[[Preparer's Note: The State Clearinghouse Response will be incorporated into this appendix, once received.]]

C.1.1 Introduction

This document provides the State of Florida with the United States Department of the Air Force's (DAF) Federal Consistency Determination under the Coastal Zone Management Act (CZMA) Section 307 and 15 Code of Federal Regulations (CFR) Section 930 Subpart C. The information in this Consistency Determination is provided pursuant to 15 CFR Part 930.39; Section 307 of the CZMA; and 16 United States Code 1456, as amended, and its implementing regulations at 15 CFR Part 930.

C.1.2 Proposed Federal Agency Action

This Federal Consistency Determination addresses the DAF's mission to beddown four F-35A Developmental Test (DT) aircraft as well as base facilities, infrastructure, and workforce to support F-35 Weapons DT at Eglin Air Force Base (AFB). Construction and preparation activities would be anticipated to start in 2024, and aircraft and personnel would arrive in phases starting in 2026.

DAF proposes to beddown four F-35A aircraft and associated personnel at Eglin Air Force Base in Okaloosa County, Florida as part of a weapons Developmental Test (DT) program to facilitate the integration of air-to-air and air-to-ground weapons on the F-35A aircraft (project purpose). This is done through a Weapons DT program, which is a routine procedure for fielding any combat aircraft weapon system. The Proposed Action is needed to conduct developmental testing of weapon systems to be integrated onto the F-35A aircraft to evaluate whether the new systems fulfill design specification, verify the design and manufacturer process per the design specifications, and validate how the system integrates into the aircraft, fulfills design requirements, and meets performance standards for safety, function, and effectiveness. Weapons DT would involve the loading, carriage, employment (targeting and firing), and other testing functions using both inert and live weapons. This testing must be conducted at an installation that has the operational and airspace capacity to support the required flight and munitions expenditure activities, weapon development testing expertise, and properly sized, configured, and instrumented ranges that can track and control weapon system tests.

Facility construction and modification activities would be required to support operations and maintenance of the F-35A DT aircraft. Construction would include a 2-bay aircraft maintenance hangar and aircraft parking area; construction of a 2-bay aircraft test hangar; and an addition to Building 64. The Proposed action would also renovate four existing support facilities, install of temporary shade facilities, and require installation of utility connections which would add 4.6 acres of new pavement (i.e., concrete construction for the access road, airfield, and parking areas) and 5.7 acres of building footprint to Eglin Main Base, resulting in an increase of 10.3

acres of new impervious surfaces, which would be addressed through appropriate stormwater infrastructure. Approximately 259 (up to a maximum of 270) DAF personnel and 439 associated dependents would be added to support the F-35A DT mission, representing an approximate 3.5 percent net increase in Eglin AFB's population. Annual airfield operations at Eglin AFB would increase by approximately 1 percent.

C.1.3 Federal Consistency Review

The Florida Statutes addressed as part of the Florida Coastal Management Program consistency review and considered in the analysis of the Proposed Action at Eglin AFB are discussed in **Table C-1**.

Table C-1. Florida Coastal Management Program Federal Consistency Review

Statute	Scope	Consistency
Chapter 161, F.S. <i>Beach and Shore Preservation</i>	Authorizes the Florida Department of Environmental Protection to regulate construction on or seaward of the state's beaches	The Proposed Action would be consistent with ongoing operations at Eglin AFB and its land ranges, and mission activities conducted offshore in the Gulf of Mexico, as addressed in prior NEPA analyses and consultations. No effects on coastal resources are anticipated because no construction or DT operations would occur on the coast or beach areas.
Chapter 163, F.S. <i>Intergovernmental Programs: Growth Policy; County and Municipal Planning; Land Development Regulation</i>	Requires local governments to prepare, adopt, and implement comprehensive plans that encourage the most appropriate use of land and natural resources in a manner that is consistent with the public interest	The Proposed Action would not impact local government comprehensive plans.
Chapter 186, F.S. <i>State and Regional Planning</i>	Details state-level planning requirements; requires the development of special statewide plans governing water use, land development, and transportation	State and regional agencies will be provided the opportunity to review the F-35A DT Environmental Assessment. The Proposed Action would not affect nor interfere with the development of state plans for water use, land development, and transportation.
Chapter 252, F.S. <i>Emergency Management</i>	Directs the state to reduce the vulnerability of its people and property to natural and human-made disasters; prepare for, respond to, and reduce the impacts of disasters; and decrease the time and resources needed when responding to disasters	The Proposed Action would not have adverse impacts on the ability of the state to manage and respond to natural and human-made disasters.
Chapter 253, F.S. <i>State Lands</i>	Provides the framework for conservation and protection of natural and cultural resources on state-owned lands	The Proposed Action would occur on federal property and use existing airspace; therefore, no impact on state-owned lands would occur.

Statute	Scope	Consistency
Chapter 258, F.S. <i>State Parks and Preserves</i>	Addresses administration and management of state parks, preserves, and recreation areas	The Proposed Action would not impact state parks, recreational areas, or preserves.
Chapter 259, F.S. <i>Land Acquisitions for Conservation or Recreation</i>	Authorizes acquisition of environmentally endangered lands and outdoor recreation lands	The Proposed Action would not affect publicly owned lands for tourism or outdoor recreation.
Chapter 260, F.S. <i>Florida Greenways and Trails Act</i>	Authorizes acquisition of land to create a recreational trails system (Florida Greenways and Trails System) and to facilitate management of the system	The Proposed Action would not include the acquisition of land and would not affect the Greenways and Trails Program.
Chapter 267, F.S. <i>Historical Resources</i>	Addresses management and preservation of the state's archaeological and historic resources	The Proposed Action would not affect cultural or historic resources at Eglin AFB.
Chapter 288, F.S. <i>Commercial Development and Capital Improvements</i>	Provides the framework for promoting and developing the general business, trade, and tourism components of the state economy	<p>The proposed would not have adverse impacts on Florida industries or economic diversification efforts.</p> <p>The proposed Weapons DT activities would involve munitions expenditures in warning areas W-151 and W-470 offshore in the Gulf of Mexico. These activities would restrict access to a portion of the water areas at those locations for brief periods during a test day. Operators would coordinate issuance of a notice to mariners to enable advanced awareness and preparation to avoid the areas where planned DT activities would be conducted. Also, Eglin AFB would coordinate safety perimeters around the anticipated W-151 test areas to keep the area clear of public, recreational, and commercial vessels. Because civilian and commercial users of the areas would be provided advanced notice of the short-term, intermittent DT activities, and those DT activities would not preclude use of other nearby ocean areas that also support fishing, transport, and recreational activities, no effects on tourism, trade, or other components of the economy would be expected.</p>
Chapter 334, F.S. <i>Transportation Administration</i>	Addresses the transportation administration policies of the state	<p>Short-term, negligible impacts are anticipated on the transportation network at Eglin AFB from construction vehicles, which would comprise a small percentage of the total existing traffic.</p> <p>Long-term, negligible to minor, adverse impacts could result from the increase in personnel and dependents, and potential increased congestion that would primarily occur at access gates during peak hours. No</p>

Statute	Scope	Consistency
		permanent impacts nor alterations to the transportation network would occur.
Chapter 339, F.S. <i>Transportation Finance and Planning</i>	Addresses the state's transportation systems finance and planning needs	The Proposed Action would not affect the finance and planning needs of the state's transportation system.
Chapter 373, F.S. <i>Water Resources</i>	Addresses conservation and preservation of water resources, water quality, and environmental quality.	Short-term, negligible to minor, adverse impacts would occur during construction and renovation projects associated with the beddown from increased sedimentation. Long-term, minor, adverse impacts would occur on surface water and floodplains from the increased rate and volume of stormwater runoff due to an increase in impervious surfaces. Impacts would be minimized through implementation of environmental protection and best management practices (BMPs) and by following the installation and project-specific Stormwater Pollution Prevention Plans (SWPPPs). All applicable permits would be prepared in accordance with Florida's laws and the National Pollutant Discharge Elimination System. Therefore, the Proposed Action would be consistent with Florida's laws and regulations regarding the water resources of the state.
Chapter 375, F.S. <i>Outdoor Recreation and Conservation Lands</i>	Addresses the development of a comprehensive multipurpose outdoor recreation plan	The Proposed Action would not affect opportunities for outdoor recreation on state lands.
Chapter 376, F.S. <i>Pollutant Discharge Prevention and Removal</i>	Regulates the transfer, storage, and transportation of pollutants, and cleanup of pollutant discharges	All petroleum, oils, and lubricants would be managed through implementation of the installation's Spill Prevention, Control, and Countermeasures Plan. Handling, storage, transportation, and disposal activities would be conducted in accordance with applicable federal, state, and local regulations; DAF Instructions; and the Eglin AFB Hazardous Waste Management Plan.
Chapter 377, F.S. <i>Energy Resources</i>	Addresses the regulation, planning, and development of oil and gas resources of the state	The Proposed Action would not affect energy resource production, including oil and gas, in Florida.
Chapter 379, F.S. <i>Fish and Wildlife Conservation</i>	Addresses the management of the wildlife resources of the state	Construction activities for the Proposed Action would occur in developed areas that provide minimal to no habitat for native wildlife species. Implementation of the Proposed Action would result in short-term, minor, adverse impacts on wildlife from construction noise and noise associated with ongoing aircraft operations. Measures to minimize potential impacts on these species are discussed in the EA.

Statute	Scope	Consistency
Chapter 380, F.S. <i>Land and Water Management</i>	Establishes state land and water management policies to guide and coordinate local decisions relating to growth and development	The Proposed Action would be consistent with state and local policies regarding growth and development. There would be no changes to coastal infrastructure, such as capacity increases of existing coastal infrastructure, nor use of state funds for infrastructure planning, designing, or construction.
Chapter 381, F.S. <i>Public Health: General Provisions</i>	Establishes public policy concerning the state's public health system	The Proposed Action would not affect the state's policy concerning the public health system.
Chapter 388, F.S. <i>Mosquito Control</i>	Addresses mosquito control efforts in the state	The Proposed Action would not affect mosquito control efforts.
Chapter 403, F.S. <i>Environmental Control</i>	Establishes public policy concerning environmental control (i.e., pollution control) in the state	The Proposed Action would have negligible impacts on groundwater and surface water quality and quantity, protection of potable water supply, floodplains and wetlands, and the conservation of environmentally sensitive living resources. The Proposed Action would have minor impacts on air quality. Minimization measures for these impacts are identified in the EA.
Chapter 553, F.S. <i>Building Construction Standards</i>	Addresses building construction standards for a unified Florida Building Code	The Proposed Action would comply with the state's construction standards; therefore, no impacts on building construction standards would occur. New facilities would be constructed in conformance with Executive Order 14008, DoD's Unified Facilities Criteria 2-100-01, the DoD's <i>2021 Climate Adaptation Plan</i> , Federal Emergency Management Agency Federal Flood Risk Management Standards, including elevating facilities above the floodplain, and Northwest Florida Water Management District permit requirements to avoid or minimize flood impacts.
Chapter 582, F.S. <i>Soil and Water Conservation</i>	Provides for the control and prevention of soil erosion	Soil disturbance would occur during construction and renovation projects associated with the Proposed Action but would be controlled through implementation of environmental protection measures and BMPs. Additionally, adherence to site-specific Erosion and Sediment Control Plans, both site-specific and installation SWPPPs, and Section 438 of the Energy Independence and Security Act would further minimize impacts.
Chapter 597, F.S. <i>Aquaculture</i>	Establishes public policy to enhance the growth of aquaculture	The Proposed Action would not affect aquaculture.

Key: BMP – best management practices; CFR – Code of Federal Regulations; DAF – Department of the Air Force; DoD – Department of Defense; EA – Environmental Assessment; F.S. – Florida Statute; SWPPP – Stormwater Pollution Prevention Plan

Based on the information and analysis provided in **Table C-1**, the DAF finds that the Proposed Action at Eglin AFB, would be consistent with the applicable enforceable policies and mechanisms of the Florida Coastal Management Program.

Pursuant to 15 CFR 930.41, the Florida State Clearinghouse has 60 days from receipt of this document to concur with, or object to, this Consistency Determination, or to request an extension in writing under 15 CFR 930.41(b). Florida's concurrence will be presumed if Eglin AFB does not receive its response by the 60th day from receipt of this determination.



D

Supplemental Information
for Resource Analyses



D. Appendix D: Supplemental Information for Resource Analyses

D.1 Definition of the Resources

This section provides a definition of each environmental resource and its regulatory setting, if applicable.

D.1.1 Air Quality

Air quality is defined by the concentration of various pollutants in the atmosphere. Air pollution occurs when one or more pollutants (e.g., dust, fumes, gas, mist, odor, smoke, vapor) are present in the outdoor atmosphere in quantities great enough to cause harm to the natural environment, including human, plant, and animal life. Under the Clean Air Act, the six pollutants defining air quality, called “criteria pollutants”, are carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone (O₃), suspended particulate matter (measured less than or equal to 10 microns in diameter and less than or equal to 2.5 microns in diameter), and lead. Carbon monoxide, sulfur oxides, nitrogen oxides (NO_x), lead, and some particulates are emitted directly into the atmosphere from emissions sources. NO_x, O₃, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile organic compounds and NO_x emissions are precursors of O₃ and are used to represent O₃ generation.

Under the Clean Air Act (42 U.S.C. §§ 85 *et seq.*), the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 Code of Federal Regulations [CFR] Section [§] 50) for criteria pollutants. The NAAQS protect against adverse health effects and welfare effects. Each state has the authority to adopt standards stricter than those established by USEPA. The State of Florida has accepted the federal standards.

Areas that are and have historically been in compliance with the NAAQS or have not been evaluated for NAAQS compliance are designated as attainment areas. Areas that violate a federal air quality standard are designated as nonattainment areas. Areas that have transitioned from nonattainment to attainment are designated as maintenance areas. Nonattainment and maintenance areas are required to adhere to a State Implementation Plan to reach attainment or ensure continued attainment.

According to the *Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II – Advanced Assessments*, attainment areas may be identified as “Near Nonattainment” or “Clearly Attainment.” Areas identified as “Near Nonattainment” are within 5 percent of exceeding any NAAQS, while areas identified as “Clearly Attainment” are not within 5 percent of exceeding any NAAQS.

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity determination are called *de minimis* levels and are specified at 40

CFR 93.153. *De minimis* levels (in tons per year) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question. If the results of the applicability analysis indicate that the total emissions would not exceed the *de minimis* emissions levels, then the conformity process is completed, and a general conformity determination is not required. The General Conformity Rule does not apply to federal actions occurring in attainment or unclassified areas.

Climate Change and Greenhouse Gases (GHGs). Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. Of particular interest, GHGs are gas emissions that trap heat in the atmosphere. GHGs include water vapor, carbon dioxide (CO₂), methane, nitrous oxide, tropospheric O₃, and several fluorinated and chlorinated gaseous compounds. Most GHGs occur naturally in the atmosphere but increases in concentrations result from human activities such as burning fossil fuels. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to cause negative economic and social consequences across the globe. The dominant GHG emitted is CO₂, accounting for 79 percent of all GHG emissions as of 2020, the most recent year for which data are available (USEPA 2022a). To estimate global warming potential, all GHGs are expressed relative to a reference gas, CO₂, which is assigned a global warming potential of one (1). All GHGs are multiplied by their global warming potential, and the results are added to calculate the total equivalent emissions of CO₂ (CO₂e).

Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, signed January 20, 2021, reinstated the *Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews*, issued on August 5, 2015, by the Council on Environmental Quality (CEQ) that required federal agencies to consider GHG emissions and the effects of climate change in NEPA reviews (CEQ 2016). EO 13990 requires federal agencies to capture the full costs of GHG emissions as accurately as possible, including taking global damages into account. Doing so facilitates sound decision making, recognizes the breadth of climate impacts, and supports the international leadership of the United States on climate issues. The CEQ *National Environmental Policy Act Interim Guidance on Consideration of Greenhouse Gas Emissions and Climate Change*, issued on January 9, 2023, recommends determining the social cost of GHG emissions from a proposed action where feasible as a means of comparing the GHG impacts of the alternatives. Accordingly, estimated CO₂e emissions associated with the Proposed Action are provided in this EA for informative purposes. The "social cost of GHGs" is an estimate of the monetized damages associated with incremental increases in GHG emissions, such as reduced agricultural productivity, human health effects, property damage from increased flood risk, and the value of ecosystem services. The interim social cost established by the Interagency Working Group for the year 2026 is estimated at \$57 per metric ton of CO₂; \$1,800 per metric ton of methane; and \$21,000 per metric ton of nitrous oxide using a 3 percent average discount rate (in 2020 dollars; IWG-SCGHG 2021). The 2016 Final Guidance issued by CEQ emphasized a netting approach to GHG analysis and directs federal agencies to determine an appropriate method for analyzing GHG emissions (CEQ 2023).

EO 14008, *Tackling the Climate Crisis at Home and Abroad*, further strengthens EO 13990 by implementing objectives to reduce GHG emissions and bolster resilience to the impacts of climate change and requiring federal agencies to develop and implement climate action plans. The DAF *Climate Action Plan* recognizes the department's role in contributing to climate change and aims to address the challenges and risks posed by climate change through the implementation of climate priorities including making climate-informed decisions and optimizing energy use and pursuing alternative energy sources. DAF also follows the DoD *Climate Adaptation Plan* and considers the DoD *Climate Risk Analysis* for climate change planning (DAF SAF/IE 2022). *The Long-term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050* sets target benchmarks to achieve net-zero GHG emissions by no later than 2050 through emission-reducing investments such as carbon-free power generation, zero-emission vehicles, energy-efficient buildings, and expansion and protection of forest areas (DOS and EOP 2021).

USEPA implements the GHG Reporting Program, requiring certain facilities to report GHG emissions from stationary sources, if such emissions exceed 25,000 metric tons of CO₂e per year (40 CFR 98). Major source permitting requirements for GHGs are triggered when a facility exceeds the major threshold of 100,000 tpy for stationary source CO₂e emissions. For a facility that is already a major source of criteria pollutants under USEPA's Prevention of Significant Deterioration program, major modification permitting requirements, including incorporating best available and economically feasible emissions controls for GHGs, would be triggered by a net change of 75,000 tpy for stationary source CO₂e emissions.

D.1.2 Biological Resources

Biological resources include native or naturalized, nonnative, and invasive plants and animals; sensitive and protected floral and faunal species; and the habitats, such as wetlands, forests, grasslands, in which they exist. Habitat can be defined as the resources and conditions in an area that support a defined suite of organisms. Protected and sensitive biological resources include species listed as threatened, endangered, proposed, or candidate under the Endangered Species Act (ESA); migratory birds; species of concern managed under conservation agreements or management plans; and species that are protected by laws or programs of states. Sensitive habitats include areas designated by the U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration (NOAA) as critical habitat protected under the ESA and sensitive ecological areas designated by other federal or state regulations.

Section 7 of the ESA (16 U.S.C. § 1536) requires federal agencies, in consultation with USFWS and NOAA who administers the ESA, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also generally prohibits any action that causes a "take" of any listed species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Not all take is prohibited. Where appropriate, incidental take statements can be provided that allow take of threatened or endangered species that are incidental to an otherwise legal activity. Air Force Policy Directive 32-70, Environmental Considerations in Air Force Programs and Activities, directs the implementation of the ESA.

The Sikes Act (16 U.S.C. § 670 a(a)(2)) authorizes the development of integrated installation plans (e.g., Integrated Natural Resources Management Plan) and reflects mutual agreement of the parties concerning, conservation, protection, and management of fish and wildlife resources.

The Migratory Bird Treaty Act of 1918, as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, require federal agencies to minimize or avoid impacts on migratory birds. The Migratory Bird Treaty Act prohibits the intentional and unintentional taking, killing, or possessing of migratory birds unless permitted by regulation. A Memorandum of Understanding (MOU) was executed in September 2014 between DoD and USFWS to promote the conservation of migratory birds. The original MOU expired in 2019; however, an addendum signed on April 21, 2022, extends the MOU indefinitely or until either party determines the MOU needs to be revised.

The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. §§ 668 to 668c) prohibits the “take” of bald or golden eagles in the United States without a 50 CFR 22.26 permit. The Bald and Golden Eagle Protection Act defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb.” For purposes of these guidelines, “disturb” means “to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause: (1) injury to an eagle; (2) a decrease in its productivity by substantially interfering with normal breeding, feeding, or sheltering behavior; or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

Marine biological resources include and occupy the water column and substrates found within the Gulf of Mexico. Sensitive habitats and species within these waterbodies are protected under federal or state laws such as the Marine Mammal Protection Act (MMPA) and ESA. Other habitats and species in the Gulf of Mexico also are protected under the Magnuson-Stevens Fisheries Management and Conservation Act (MSA). The MMPA established, with limited exceptions, a moratorium on the “taking” of marine mammals in waters or on lands under U.S. jurisdiction. The act further regulates “takes” of marine mammals in the high seas by vessels or persons under U.S. jurisdiction. The term take, as defined in Section 3 (16 U.S.C. § 1362) of the MMPA, means “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal.” Harassment was further defined in the 1994 amendments to the MMPA, which provided for two levels of harassment: Level A (injury) and Level B (behavioral harassment).

The MSA is the primary law governing marine fisheries management in U.S. federal waters. First passed in 1976, the MSA fosters long-term biological and economic sustainability of our nation’s marine fisheries. Key objectives of the MSA are to: 1) prevent overfishing; 2) rebuild overfished stocks; 3) increase long-term economic and social benefits; and 4) ensure a safe and sustainable supply of seafood. One of the principal authorities for protecting and conserving marine fishery habitats is the Essential Fish Habitat (EFH) provision of the MSA, which requires federal agencies to consult with NOAA if actions are proposed that adversely affect EFH. NOAA provides consultation to federal agencies to avoid, minimize, mitigate, or otherwise offset effects of proposed actions on EFH.

Florida-protected wildlife species are protected under Florida Administrative Code Chapter 68A-27. Florida Fish and Wildlife Conservation Commission maintains the list of state-listed wildlife

species. The Florida Department of Agriculture and Consumer Services maintains a list of state-listed plant species.

Air Force Manual 32-7003, *Environmental Conservation*, calls for the protection and conservation of state-listed species when not in direct conflict with the military mission. Management actions conducted by the Eglin and Tyndall Air Force Base (AFB) Natural Resources Offices provide support and protections for federally and state-protected species. Air Force Manual (AFMAN) 32-7003, *Environmental Conservation* calls for the protection and conservation of state listed species when not in direct conflict with the military mission. Air Force Instruction 91-212, *Bird/Wildlife Aircraft Strike Hazard (BASH) Management* is responsible for minimizing risks to pilots and aircraft from birds and other wildlife species on the airfield and surrounding operating areas. By following BASH Plans, the DAF proactively and actively engages in operational strategies (such as avoiding training operations at common migrating altitudes, altering plans for operations to avoid migratory flight paths where possible, and maintaining awareness of migratory seasons) that help to avoid or minimize effects on migrating birds and bat species.

D.1.3 Cultural Resources

Cultural resources are historic sites, buildings, structures, objects, or districts considered important to a culture, subculture, or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural or engineering resources, and traditional cultural resources. Federal laws and EOs that pertain to cultural resources management include the National Historic Preservation Act (NHPA) (1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990). Eglin AFB is required to comply with Department of the Air Force (DAF) regulations and instructions, including Air Force Manual 32-7003, *Environmental Conservation*, and DAF Instruction 90-2002, *Interactions with Federally Recognized Tribes*. The *Integrated Cultural Resources Management Plan* (Eglin AFB 2022a) is the guidance document for cultural resources for planning and proposed activities at Eglin AFB.

Archaeological resources comprise areas where human activity has measurably altered the earth or deposits of physical remains are found (e.g., projectile points, bottles), but standing structures do not remain. Architectural resources include standing buildings, bridges, dams, other structures, and designed landscapes of historic or aesthetic significance. Generally, architectural resources must be more than 50 years old to warrant consideration for the National Register of Historic Places (NRHP). More recent structures might warrant consideration if they are of exceptional importance or if they have the potential to gain significance in the future. Resources of traditional, religious, and cultural importance can include archaeological resources, sacred sites, structures, neighborhoods, prominent topographic features, habitat, plants, animals, or minerals considered essential for the preservation of traditional culture.

The NHPA defines historic properties as buildings, structures, sites, districts, or objects listed in or eligible for listing in the NRHP. Resources found significant under NRHP criteria are considered eligible for listing in the NRHP. Historic properties are generally 50 years of age or older, are historically significant, and retain sufficient integrity to convey their historic

significance. Such resources might provide insight into the cultural practices of previous civilizations, or they might retain cultural and religious significance to modern groups. Cultural resources listed as National Historic Landmarks are historic properties of exceptional national significance.

Under Section 106 of the NHPA, federal agencies must consider the effects of their undertakings (project) on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Under this process, the federal agency evaluates the NRHP eligibility of resources within the proposed undertaking's area of potential effects and assesses the possible effects of the proposed undertaking on historic properties in consultation with the State Historic Preservation Officer and other consulting or interested parties, including the public.

D.1.4 Geological Resources

Geological resources consist of Earth's surface and subsurface materials. Within a given physiographic province, these resources typically are described in terms of geology, topography and physiography, soils and soil quality, and where applicable, geologic hazards.

Geology is the study of the Earth's composition and provides information on the structure and configuration of surface and subsurface features. Such information derives from field analysis based on observations of the surface and borings to identify subsurface composition.

Topography and physiography pertain to the general shape and arrangement of the land surface, including its elevation and the position of its natural and human-made features.

Soils are the unconsolidated materials overlying bedrock or other parent material. Soils are described typically in terms of their complex type, slope, and physical characteristics. Differences among soil types, in terms of their structure, elasticity, strength, shrink-swell potential, drainage, and erosion potential, affect their abilities to support certain applications or uses. In appropriate cases, soil properties must be examined for their compatibility with construction activities or types of land use.

Geologic hazards are natural geologic events that can endanger human lives and threaten property. Examples of geologic hazards include erosion, earthquakes, landslides, ground subsidence, and sinkholes.

D.1.5 Hazardous Materials and Wastes

The terms "hazardous materials" and "hazardous waste" refer to substances defined as hazardous by the Comprehensive Environmental Response, Compensation, and Liability Act and the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act. In general, "hazardous materials" refers to any item or agent (biological, chemical, or physical) that has the potential to cause harm to humans, animals, or the environment, either by itself or through interaction with other factors. A complete list of federally recognized hazardous substances as well as their reportable quantities is provided in 40 CFR 302.4. Many substances not on this list may be considered hazardous according to their ignitability, corrosivity, reactivity, or toxicity as defined by 40 CFR 261.20-24.

Hazardous wastes that are regulated under the Resource Conservation and Recovery Act are defined as any solid, liquid, contained gaseous, or semisolid waste, or any combination of wastes that either exhibit one or more of the hazardous characteristics of ignitability, corrosivity, toxicity, reactivity, or are listed as a hazardous waste under 40 CFR 261.

Issues associated with hazardous material and waste typically center around waste streams; underground storage tanks; aboveground storage tanks; and the storage, transport, use, and disposal of pesticides, fuels, lubricants, and other industrial substances. Petroleum products, which are materials derived from crude oil and are often used in vehicles and aircraft, are considered hazardous materials because they present health hazards to users in the event of incidental releases of the products or extended exposure to their vapors. Additionally, when such materials are used or not properly disposed, they can threaten the health and well-being of wildlife, habitats, soil and water systems, and humans.

Toxic substances are substances that might pose a risk to human health and are addressed separately from hazardous materials and hazardous wastes. A toxic substance is a chemical or mixture of chemicals that may present an unreasonable risk of injury to health or the environment. These substances include asbestos-containing material (ACM), lead-based paint (LBP), and polychlorinated biphenyls (PCBs), which are regulated by USEPA under the Toxic Substances Control Act. ACM is generally found in building materials such as floor tiles, mastic, roofing materials, pipe wrap, and wall plaster. USEPA implemented bans on ACM between 1973 and 1990. LBP was commonly used in building construction prior to its ban in 1978. PCBs are man-made chemicals that persist in the environment and were widely used in building materials (e.g., caulk) and electrical products (e.g., light ballasts) prior to its ban in 1979.

The Installation Restoration Program (IRP) is a Department of Defense (DoD) program to identify, characterize, and remediate environmental contamination from past activities at military installations. The Military Munitions Response Program addresses non-operational rangelands that are suspected or known to contain munitions and explosives of concern, which includes unexploded ordnance, discarded military munitions, and munitions constituents. Eglin AFB has a third category of sites known as Areas of Concern/Points of Interest, which are potential areas of contamination investigated for inclusion in the IRP or the Military Munitions Response Program.

Eglin AFB implements a comprehensive *Hazardous Waste Management Plan* (Eglin AFB 2019) that addresses mandatory hazardous waste management requirements of the Florida Department of Environmental Protection, DAF, and USEPA. The *Hazardous Waste Management Plan* applies to all organizations on the installation, to include contractors, and provides a framework for complying with environmental standards applicable to hazardous waste, universal waste, special wastes, and petroleum wastes. It establishes procedures and policies, and assigns responsibilities associated with the generation, handling, use, management, transportation, and disposal of hazardous materials and wastes at Eglin AFB in accordance with DAF Manual 32-7002, *Environmental Compliance and Pollution Prevention*.

D.1.6 Infrastructure and Transportation

Infrastructure consists of the systems and physical structures that enable a population in a specified area to function. Infrastructure is wholly man-made with a high correlation between the type and extent of infrastructure and the degree of which an area is characterized as “urban” or developed. The availability of infrastructure and its capacity to support growth are generally regarded as essential to the economic growth of an area. The infrastructure components discussed in this EA are utilities such as electricity, natural gas, liquid fuel, potable water, wastewater, stormwater management, communications, and solid waste management.

Transportation refers to roadway, rail, and air systems and the movement of vehicles on these transportation systems.

D.1.7 Land Use

Land Use. Land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a land parcel. In many cases, land use descriptions are codified in master planning and local zoning laws. Land use planning ensures orderly growth and compatible uses among adjacent property parcels or areas; however, no nationally recognized convention or uniform terminology for describing land use categories exists. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property could be categorized as unimproved, undeveloped, preservation or conservation area, or natural or scenic viewing area. Land use categories to describe human activity could include residential, commercial, industrial, agricultural, institutional, and recreational.

In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential impacts on a project area and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project areas, the types of land use on adjacent properties and their proximity to a proposed action, the duration of the proposed activity, and the permanence of a proposed action.

Coastal Zone Consistency. The federal Coastal Zone Management Program comprehensively addresses the nation’s coastal issues through a voluntary partnership between the federal government and coastal states and territories. Authorized by the Coastal Zone Management Act of 1972 (16 United States Code § 1451 *et seq.*, as amended), the program aims to protect, restore, and responsibly develop the nation’s diverse coastal communities and resources. The coastal zone refers to the coastal waters and adjacent shorelines, including islands, transitional and intertidal areas, salt marshes, wetlands, and beaches.

Section 307 of the Coastal Zone Management Act, called the “federal consistency” provision, provides a state with input authority in federal agency decision making for activities that may affect a state’s coastal uses or resources. The state would not otherwise have such authority through other federal programs. Generally, federal consistency requires that federal actions, within and outside the coastal zone, which have reasonably foreseeable impacts on any coastal use (land or water) or natural resource of the coastal zone, be consistent with the enforceable policies of a state’s federally approved coastal management program. Federal actions include

federal agency activities, federal license or permit activities, and federal financial assistance. Federal agency activities must be consistent to the maximum extent practicable with the enforceable policies of a state's coastal management program.

D.1.8 Noise

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise intrusive. Human response to noise varies depending on the type and characteristics of the noise, distance between the noise source and the receptor, receptor sensitivity, and time of day.

Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighting," measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are provided in **Table D-1**.

Table D-1. Common Sounds and Their Levels

Outdoor	Sound Level (dBA)	Indoor
Jet Flyover at 1,000 feet	100	Rock Band
Tractor	90	Blender
Noisy restaurant	85	Garbage disposal
Downtown (large city)	80	Ringing telephone
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Key: dBA – A-weighted decibel

Source: Harris 1998

The sound pressure level noise metric describes steady noise levels, although very few noises are constant; therefore, additional noise metrics have been developed to describe noise, including:

- Maximum Sound Level (L_{max}) – L_{max} is the maximum sound level in dB.
- Peak Sound Pressure Level (L_{pk}) – L_{pk} is the true peak of a sound pressure wave, or the maximum value reached by the sound pressure. L_{pk} is used to capture the true instantaneous sound pressure of impulsive sounds and is generally 3 dB above the L_{max} .
- Sound Exposure Level (SEL) – SEL is a measure of the total energy of an acoustic event. It represents the level of a 1-second-long constant sound that would generate the same energy as the actual time-varying noise event such as an aircraft overflight. SEL provides a measure of the net effect of a single acoustic event, but it does not directly represent the sound level at any given time.
- Day-night Sound Level (DNL) – DNL is the average sound energy in a 24-hour period with a 10 dB penalty added to the nighttime levels. DNL is a useful descriptor for noise because: (1) it averages ongoing yet intermittent noise, and (2) it measures total sound

energy over a 24-hour period. DNL provides a measure of the overall acoustical environment, but as with SEL, it does not directly represent the sound level at any given time.

The Noise Control Act of 1972 (42 U.S.C. § 4901 *et seq.*) directs federal agencies to comply with applicable federal, state, and local noise control regulations. The Noise Control Act specifically exempts both aircraft and military training activities from state and local noise ordinances.

DAF Instruction 32-1015, *Integrated Installation Planning*, instructs air installations to maintain an active and compliant Air Installation Compatible Use Zone Program to ensure land use compatibility with different aircraft noise levels. Generally, most land uses exposed to noise levels below 65 dB DNL are considered compatible with airfield operations (Air Force Handbook 32-7084). According to USEPA, continuous and long-term noise in excess of 65 dB DNL is normally incompatible with noise-sensitive land uses such as residences, schools, churches, and hospitals (USEPA 1974). **Table D-2** provides a general overview of recommended noise limits from aircraft operations for land use planning purposes. DAF also uses supplemental metrics (such as L_{max} and SEL) to quantify other potential effects on compatibility, such as nighttime sleep disturbance. For sleep disturbance, the supplemental metric is the number of events at or above a specified threshold ("NA" metric), with SEL as its companion (single-event) metric to measure effects from events occurring during nighttime hours (10 pm to 7 am). DNL at any given point on the ground is typically governed by the SEL and the numbers of daytime and nighttime events.

Table D-2. Recommended Noise Ranges for Compatible Land Use Planning

General Level of Noise	Aircraft Noise (DNL)	Compatibility with Noise Sensitive Land Use
Low	< 65 dBA	Compatible
Moderate	65-75 dBA	Normally not compatible
High	> 75 dBA	Not compatible

Key: dBA – A-weighted decibel; DNL – day-night sound level

Sources: Harris 1998, USEPA 1971

D.1.9 Safety

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Safety addresses the well-being, safety, and health of members of the public, contractors, and DAF personnel during the various aspects of the Proposed Action.

Safety and accident hazards can often be preemptively identified and reduced or eliminated. Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Hazardous activities can include construction, demolition, transportation, maintenance and repair activities, and activities that occur in extremely noisy environments. Any facility or human-use area with potentially corrosive or explosive material creates an unsafe environment for nearby populations. Activities in these areas must adhere strictly to handling, transport, storage, and

disposal protocols to ensure the safety of personnel on the installation, as well as nearby off-installation populations.

Safety can be improved by following regulatory requirements designed for employee benefit and through implementation of operational practices that reduce the risk of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers is safeguarded by numerous DoD and DAF regulations designed to comply with standards issued by the Occupational Safety and Health Administration (OSHA). These standards specify the amount and type of training required for industrial workers, the use of personal protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors. OSHA standards, which are found in 29 CFR 1910 and 29 CFR 1926, and 91 series DAF Instructions were developed to promote a safe working environment. These standards establish general environmental controls, including the use of personal protective equipment and availability of Safety Data Sheets as needed. OSHA standards limit exposure to noise, ionizing and nonionizing radiation, and toxic and hazardous substances as well as establish requirements for handling and storing compressed gases and flammable liquids.

DAF Instruction 91-202, *The U.S. Air Force Mishap Prevention Program*, ensures DAF operations and construction procedures meet or exceed OSHA and Air Force Occupational Safety and Health guidance (DoD Directive 4715.1E, *Environment, Safety, and Occupational Health*) as well as other federal safety and health requirements. DAF Manual 91-203, *Air Force Occupational Safety, Fire, and Health Standards*, provides specific work procedures for a safe workplace and details safety components of construction work including civil engineering activities, motor vehicle operations and maintenance, materials handling, mishap prevention, fire prevention, and tools and machinery operations. DAF Instruction 91-202, along with the specific safety requirements contained in standard operating procedures that must be followed by all aircrews operating from the airfield (DAF Manual 11-2F-35AV3, *Flying Operations/F-35A Operations Procedures*), ensure safety during flight operations.

DAF categorizes aircraft mishaps based on the severity of the incident. Class A mishaps result in fatality, permanent total disability, damage greater than or equal to \$2.5 million and/or a destroyed aircraft of an aircraft. Class B mishaps result in partial disability, hospitalization, and/or damage greater than \$600,000 but less than \$2.5 million.

To ensure safety from munitions, explosive safety clearance zones must be established around facilities used for the storage, handling, or maintenance of munitions. Defense Explosives Safety Regulation 6055.09 and DAF Manual 91-201, *Explosive Safety Standards*, which applies to all DAF activities, established the size of safety clearance zones, also referred to as Explosive Safety Quantity Distance arcs, based upon Quantity-Distance criteria or the category and weight of the explosives contained within a facility. Regulatory requirements and procedures ensure there is minimal risk to the health and safety of installation personnel, as well as the public, from installation-related operations and activities.

D.1.10 Socioeconomics

Socioeconomics refers to the basic attributes and resources associated with the human environment and the economy, particularly characteristics of population and economic activity.

There are several indicators of economic conditions for a specific geographic area, such as demographics, employment characteristics, and income, which provide key insights into socioeconomic conditions that might be affected by a proposed action.

Economic activity typically encompasses employment, personal income, and industrial or commercial growth. In addition to the local economic characteristics at the installation and within Okaloosa County, economic sectors addressed in this EA are related to marine transportation, recreational fishing, and ecotourism offshore in the Gulf of Mexico. Marine transportation includes use of marine vessels and ports to support tourist, recreational, or fishing industry activities. Ecotourism refers to environmentally responsible travel to natural areas to enjoy and appreciate nature (and accompanying cultural features, both past and present), while promoting conservation, decreasing visitor impact, and providing beneficially active socio-economic involvement of local peoples. Recreational Fishing refers to the practice of fishing for pleasure from a boat, pier, or shore. As a sector of the tourism economy, recreational fishing may also refer to the collection of fees for accessing fishing areas, sale or purchase of fishing equipment and permits, boat purchase, or charter.

D.1.11 Water Resources

Surface Water. Surface water, which is defined as any water on the Earth's surface (above ground level), includes lakes, rivers, streams, ponds, and ocean waters. Ponds occur where local geologic conditions (shallow rock, clay, or silt layers) restrict the downward movement of water to the water table. Surface waters are important for a variety of reasons including economic, ecological, and recreational functions and human health.

The Clean Water Act (CWA) (33 U.S.C. §1251 *et seq.*, as amended) establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES) on the amounts of specific pollutants that are discharged to surface waters to restore and maintain the chemical, physical, and biological integrity of the water. An NPDES permit would be required for any change in the quality or quantity of wastewater discharge or stormwater runoff from construction sites where 1 or more acres would be disturbed.

Per Section 401 of the CWA, any applicant for a federal license or permit to conduct any activity, including the construction or operation of facilities that could result in a discharge into navigable waters, is required to provide the licensing or permitting agency a water quality certification from the state in which the discharge originates or will originate. In addition to supplying Section 401 water quality certification, Part IV, Management and Storage of Surface Waters, of Florida Statutes Chapter 373, Water Resources mandates a state permitting process. Permitting under Florida Statutes Chapter 373 is administered by the Florida Department of Environmental Protection (FDEP) and the Northwest Florida Water Management District. Within the project area, permitting is under the jurisdiction of FDEP in accordance with an operating agreement between the two agencies.

USEPA has delegated authority to FDEP for the issuance of NPDES stormwater permits. The Florida NPDES stormwater program requires construction site operators engaged in activities that disturb 1 acre or more to obtain coverage under a Construction Generic Permit for stormwater discharges from construction activities. Construction or demolition that necessitates

a permit requires preparation of a Notice of Intent to discharge stormwater and a SWPPP that is implemented during construction. FAC Chapters 62-621 and 62-330 address NPDES permitting and Florida Environmental Resource Permits, respectively.

Energy Independence and Security Act Section 438 (42 U.S.C. § 17094) establishes stormwater design requirements for federal construction projects that disturb a footprint greater than 5,000 square feet of land. Additional guidance is provided in the USEPA Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Energy Independence and Security Act Section 438.

Surface Water Quality. Section 303 of the Clean Water Act requires states to establish water quality standards for waterways, identify those that fail to meet the standards, and take action to clean up impaired waterways. The State of Florida has jurisdiction over surface water quality standards for all waters of the state in accordance with the provisions of the Clean Water Act and has adopted the Impaired Waters Rule (Florida Administrative Code Chapter 62-303), with amendments, as the method for assessing the state's waters for Section 303(d) listing. A list of waters determined to be impaired are submitted to USEPA for approval as Florida's 303(d) list.

Water quality may also be evaluated according to use classification. State waters are classified as Class I, II, III, III-Limited, IV, or V, where Class I is potable water, Class II is for shellfish harvesting or propagation, Class III is for recreation, propagation and maintenance of a healthy, well-balanced population of fish and wildlife, Class III-Limited is recreation or limited recreation; and/or propagation and maintenance of a limited population of fish and wildlife, Class IV is for agricultural water, and Class V is for navigation and industrial use.

Some state waters are designated as Outstanding Florida Waters, defined as water bodies considered worthy of special protection because of particular recreational or ecological characteristics. The designation is intended to protect the existing water quality. Most Outstanding Florida Waters are areas managed by the state or federal government as parks, including wildlife refuges, preserves, marine sanctuaries, estuarine research reserves, waters within state or national forests, scenic and wild rivers, or aquatic preserves (FDEP 2021).

Water quality in marine environments such as the surf zone and littoral zone is based on physicochemical characteristics, including pH, temperature, oxygen, nutrients, salinity, and other dissolved elements. These characteristics are influenced by marine physical, chemical, and biological processes. Physical processes include currents and tidal flows, seasonal weather patterns and temperature, sediment characteristics, and local conditions such as the volume of freshwater and sediments delivered by rivers. Chemical processes involve salinity, pH, dissolved minerals and oxygen, particulates, nutrients, trace minerals, dissolved ions, and pollutants. Biological processes involve the influence of living things on the physical and chemical environment. The two dominant biological processes in the ocean are photosynthesis and respiration.

Water and sediment quality benchmarks are available for some metals and a small number of munitions constituents (explosives). Metals occur naturally in seawater and fresh water, and several are necessary for marine and/or freshwater organisms and ecosystems to function properly (e.g., iron, zinc, copper, manganese). Many metals however can be toxic at high

concentrations, and some metals may cause negative effects in aquatic organisms even at very low concentrations (e.g., lead, cadmium, and mercury). Potential impacts could be associated with the release of materials into the water that then disperse, react, or dissolve; deposition of materials on the ocean bottom and any subsequent interactions with sediment or the water column, or the accumulation of such materials over time; and deposition and any subsequent disturbance of sediment or the creation of turbidity.

The USEPA National Recommended Water Quality Criteria for aquatic life provide recommended water quality criteria for the protection of aquatic life and human health in marine and fresh surface waters (see **Table D-3**). The criteria, which provide acute and chronic metal toxicity levels, are intended to provide guidance to states in establishing water quality standards and to provide a basis for controlling pollutant discharges. In addition, Florida has identified state contaminant thresholds for metals in freshwater sediment (see **Table D-4**).

Table D-3. Federal Aquatic Life Thresholds for Metals in Marine and Freshwater

Metal	Freshwater		Marine	
	Acute Toxicity (µg/L)	Chronic Toxicity (µg/L)	Acute Toxicity (µg/L)	Chronic Toxicity (µg/L)
Cadmium	1.8	0.72	33	7.9
Chromium	16	11	1,100	50
Copper	NA	NA	4.8	3.1
Lead	65	2.5	210	8.1
Mercury	1.4	0.77	1.8	0.94
Nickel	470	52	74	8.2
Silver	3.2	NA	1.9	NA
Zinc	120	120	90	81

Key: NA = not applicable; µg/L = micrograms per liter

Source: USEPA 2022b

Table D-4. Florida Sediment Contaminant Thresholds for Metals in Freshwater

Metal	Threshold Effects Concentration (mg/kg)	Probable Effects Concentration (mg/kg)
Arsenic	9.8	33
Cadmium	1	5
Chromium	43.4	111
Copper	32	149
Lead	36	128
Mercury	0.18	1.06
Nickel	23	48
Zinc	121	459
Silver	1	2.2

Key: mg/kg = milligrams per kilogram

Source: FDEP 2020

The USEPA developed freshwater and marine toxicity guidelines for various chemicals in sediments and the water column, including a very small number of munitions constituents. Available screening values are shown in **Table D-5**. Other researchers have developed marine sediment quality benchmarks for numerous munitions constituents, but these values have not been adopted by federal or state regulatory agencies (Pascoe et al. 2010).

Table D-5. Toxicity Screening Guidelines for Munitions Constituents

Munitions Constituent	Sediment (mg/kg)		Water Column (µg/L)	
	Freshwater	Marine	Freshwater	Marine
2,4,6-trinitrotoluene	0.092	NA	100	100
Research department explosive (hexahydro-1,3,5-trinitro-1,3,5-triazine)	0.013	NA	360	NA
High melting explosive (octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine)	NA	NA	150	NA

Key: µg/L = micrograms per liter; mg/kg = milligrams per kilogram; NA = not available

Sources: USEPA 2006a, USEPA 2006b, USEPA 2006c, USEPA 2006d

Groundwater. Subsurface waters are described in terms of the water table and underlying aquifers. The water table is defined as the upper level of the saturated (wet) zone of subsurface soil. The depth of the water table beneath the ground surface in any given area may fluctuate widely based on the amount of rainfall, groundwater withdrawal, evaporation, and transpiration (uptake and transport of water to the atmosphere through plants). The depth of the water table may fluctuate up to several feet seasonally, depending on the type of soil. Generally, well-drained soils have shorter periods of elevated water levels compared to poorly drained soils. Wetland soils typically have a seasonal high-water table less than 1 foot below the surface.

Below the water table, nearly all open spaces in sediments and rock are filled with water. This area is known as the saturated zone, and the water contained in this zone is called *groundwater*. An aquifer is a geological formation (e.g., a layer of rock or clay) through which groundwater can easily move. The water in some aquifers can be brought to the surface through wells to supply water for drinking or other human use.

Floodplains. Floodplains are lowland areas adjacent to surface water bodies (i.e., lakes, wetlands, and rivers) that are periodically covered by water during flooding events. Floodplains and riparian habitat are biologically unique and highly diverse ecosystems that provide a rich diversity of aquatic and terrestrial species and act as a functional part of natural systems (Eglin AFB 2022b). The 100-year floodplain (designated zone AE on a FEMA floodplain map) is defined as the area that has a 1 percent chance of inundation by a flood in any given year (once per 100 years on average). The 500-year floodplain has a 0.2 percent chance of flooding in any year (once per 500 years on average). The coastal high hazard area (designated zone VE) has a 1 percent or greater chance of flooding as well as additional hazard associated with storm winds and wave action.

D.2 References

- | | |
|----------|---|
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E

Plans, Best Management
Practices, and Management
Actions



E. Appendix E: Management Practices

This appendix summarizes the management actions identified to reduce impacts from the Proposed Action on environmental resources at Eglin Air Force Base (AFB), Florida and Tyndall AFB, Florida project areas. The regulations, plans, permits, BMPs, and management actions are required for ongoing operations and fighter mission activities at Eglin AFB and Tyndall AFB to ensure continued avoidance and minimization of effects on resources. F-35A Developmental Test (DT) operations would adhere to the same flight and range safety protocols, Bird/Wildlife Aircraft Strike Hazard (BASH) plans, management actions, and best practices employed by the existing fighter missions operating out of Eglin AFB.

E.1 Plans

The Proposed Action would adhere to the following plans.

- Eglin AFB *Integrated Natural Resources Management Plan*
- Eglin AFB *Integrated Cultural Resources Management Plan*
- Eglin AFB *Integrated Solid Waste Management Plan*
- Eglin AFB *Hazardous Waste Management Plan*
- Eglin AFB *Spill Prevention, Control, and Countermeasures Plan*
- Eglin AFB *Bird/Wildlife Aircraft Strike Hazard Plan*

E.2 Regulations and Permits

The following regulations and permits apply to the Proposed Action.

- Clean Air Act (42 United States Code [U.S.C.] Chapter 85)
- Executive Order (EO) 13990, *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*
- EO 14008, *Tackling the Climate Crisis at Home and Abroad*
- *Endangered Species Act* and Section 7 of the *Endangered Species Act* (16 U.S.C. § 1536)
- *The Sikes Act* (16 U.S.C. § 670 a(a)(2))
- *Migratory Bird Treaty Act* of 1918, as amended
- EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*
- *Bald and Golden Eagle Protection Act* of 1940 (16 U.S.C § 668 to 668c)
- *Magnuson-Stevens Fisheries Management and Conservation Act*
- *Florida Black Bear Conservation Rule* 68A-4.009
- *Clean Water Act* (33 U.S.C. §1344) and NPDES permit program (32 U.S.C. § 1251 *et seq.*)
- *Energy Independence and Security Act* (42 U.S.C. § 152)
- *Toxic Substances Control Act* (15 U.S.C. § 53)
- *Resource Conservation and Recovery Act* (42 U.S.C. § 6901 *et seq.*)
- *Comprehensive Environmental Response, Compensation, and Liability Act* (42 U.S.C. §§ 9601 *et seq.*)

- *National Historic Preservation Act* (54 U.S.C. §§ 100101 *et seq.*)
- *Archaeological and Historic Preservation Act* (16 U.S.C. §§ 469-469c)
- *American Indian Religious Freedom Act* (42 U.S.C. § 1996)
- *Archaeological resources Protection Act* (16 U.S.C. §§ 470aa-470mm)
- *Native American Graves Protection and Repatriation Act* (25 U.S.C. §§ 3001 *et seq.*)
- *Coastal Zone Management Act* (16 U.S.C. §§ 1451 *et seq.*)
- *Noise Control Act of 1972* (42 U.S.C. §§ 4901 *et seq.*)
- *Occupational Safety and Health Administration Standards* (29 CFR 1910 and 1926) and 91 series DAF Instructions
- Florida Administrative Code Chapter 62-203, *Identification of Impaired Surface Waters*
- Department of Defense (DoD) *Military Munitions Response Program*: 32 CFR 179, *Munitions Site Prioritizations Protocol Final Rule* and 40 CFR 260, 261, 262, 263, 264, 265, 266, and 270 Vol. 62 No. 29, *Military Munitions Final Rule: Hazardous Waste Identification and Management; Explosives Emergencies; Manifest Exemption for Transport of Hazardous Waste on Right-of-Ways on Contiguous Properties*
- United States (U.S.) Environmental Protection Agency *Munitions Response Guidelines* (2010); *Munitions and Explosives of Concern Hazard Assessment Methodology* (2008); and *Handbook on Management of Munitions Response Actions* (2005)
- U.S. Fish and Wildlife Service *National Bald Eagle Management Guidelines*
- DoD Directive 4715.1E, *Environment, Safety, and Occupational Health*
- U.S. Department of the Air Force (DAF) Handbook 32-7084, *AICUZ Program Manager's Guide*
- DAF Instruction 32-7020, *Environmental Restoration Program*
- DAF Instruction 32-1015, *Integrated Installation Planning*
- DAF Instruction 91-202, *The U.S. Air Force Mishap Prevention Program*
- DAF Manual 90-2002, *Interactions with Federally recognized Tribes*
- Defense Explosives Safety Regulation 6055.09 and DAF Manual 91-201, *Explosive Safety Standards*
- DAF Manual 32-7002, *Environmental Compliance and Pollution Prevention*
- DAF Manual 91-203, *Air Force Occupational Safety, Fire, and Health Standards*
- DAF Manual 11-2F-35AV3, *Flying Operations/F-35A Operations Procedures*
- DAF Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*
- Eglin AFB Instruction (EAFBI) 13-204, *Air Operations*
- EAFBI 13-212, *Range Planning and Operations*

E.3 Best Management Practices (BMPs) and Management Actions

Under the Proposed Action, Eglin AFB would comply with DAF, federal, and state laws and regulations and would be responsible for implementing the following BMPs and management actions:

E.3.1 Air Quality

- **Construction Measures:**
 - During construction and operation, use of electricity from the installation would be used preferentially over the use of generators. All generator use would be pre-approved by the installation Air Quality Manager and would adhere to applicable operating procedures.
 - All non-road diesel equipment would comply with the Federal Clean Air Nonroad Diesel Rule, which regulated emissions from nonroad diesel engines and sulfur content in nonroad diesel fuel.
 - Vehicles and equipment used during construction would be well-maintained and use diesel particulate filters to reduce emissions of criteria pollutants.
 - Non-road and on-road vehicles operating in construction areas would be subject to speed restrictions to minimize generation of fugitive dust.
 - All stockpiles of excavated materials located within demolition and construction areas would be removed or completely covered with tarping and sufficiently weighed down to prevent uncontrolled dust and material from entering the atmosphere.
 - Dust suppression techniques would be used during construction to reduce air pollution. Recommended methods include application of water, soil stabilizers, or vegetation; use of wind break enclosures; use of covers on soil stockpiles and dump truck loads; use of silt fences; and suspension of earth-movement activities during high-wind conditions (gusts exceeding 25 miles per hour).
 - To the greatest extent feasible, measures to reduce diesel emissions would be implemented. These measures could include switching to cleaner fuels, retrofitting current equipment with emission reduction technologies, repowering old equipment with modern engines, replacing older vehicles, and reducing idling through operator training.
 - Open areas would be landscaped or planted with vegetation to prevent emissions of unconfined particulate matter.

E.3.2 Biological Resources

- **Construction Measures:**
 - To minimize the introduction and spread of non-native and invasive species, all construction equipment would be inspected and cleaned to remove seeds, plants, and soil. All construction materials and any fill will also be inspected to ensure it is as free of seeds, plants, or undesirable soil as practicable. Additionally, where appropriate, disturbed areas will be revegetated with native plant species.
 - Measures from project-specific and installation Stormwater Pollution Prevention Plans (SWPPPs) and Erosion and Sediment Control Plans (ESCPs) would be implemented to minimize sedimentation of and stormwater runoff, such as:
 - Silt fencing
 - Sediment traps
 - Application of water to disturbed soils
 - Revegetation of disturbed areas with native plants

- **Operational Measures:**
 - Requirements for Proposed Action activities conducted in the ETTC, Eglin AFB Airfield and Land Ranges:
 - Routine surveys of the installation would continue to determine presence of protected species.
 - Operators would adhere to the existing robust BASH programs, including implementing multiple techniques to minimize aircraft strikes from raptors, waterfowl, and other migratory birds and wildlife would continue.
 - Requirements for Proposed Action activities conducted in the EGTR:
 - F-35A Weapons DT mission crews would be required to implement the avoidance, minimization, and mitigation measures specified in:
 - Section 6.3 of the 2017 NMFS Programmatic BO and Conference Report,
 - The 2019 NMFS BO (which refers to the 2017 NMFS Programmatic BO and Conference Report measures), and
 - The 2023 NMFS BO (Section 7: *Procedural Mitigation Measures* and Section 8: *Monitoring and Reporting Requirements*) and the associated Letter of Authorization (LOA).
 - NOTE: The 2023 NMFS LOA is valid from April 13, 2023 through April 13, 2030. Operators must have a copy of the 2023 NMFS LOA with them at all times when conducting Weapons DT operations in the EGTR. Operators can obtain copies of the 2023 NMFS LOA and the 2017 and 2019 NMFS BOs from the Eglin AFB Environmental Management Office.

E.3.3 Cultural Resources

- **Construction Measures:**
 - Should inadvertent discoveries be made during construction or demolition at Eglin AFB, the standard operating procedures for inadvertent discoveries of archaeological resources outlined in the installation's Installation Cultural Resources Management Plan would be implemented.

E.3.4 Geological Resources

- **Construction Measures:**
 - Construction equipment, privately owned vehicles, and government owned vehicles would use existing paved roads and surfaces during construction and operations to minimize impacts on soils.
 - Protective erosion control measures, such as installing silt fencing, improving drainage, avoiding soil compaction, and planting vegetation would be implemented to minimize soil erosion and sedimentation during the construction.
 - As needed, Eglin AFB would obtain coverage under the 2017 National Pollutant Discharge Elimination System Construction General Permit for projects that individually or cumulatively disturb one acre or more of land. The Construction General Permit requires the preparation, approval, and implementation of site-specific Erosion and Sediment Control Plan as well as the installation and the project-specific Stormwater Pollution Prevention Plans prior to construction,

including appropriate structural and non-structural erosion, sediment, and waste control BMPs.

- All project activities would be reviewed to ensure proper erosion and sediment control measures are considered and incorporated into project designs.
- *Operational Measures:*
 - Range protocols would be followed to recover munitions debris and spent shells, which would ensure minimized potential for deposition of metals and munitions constituents in the soil that may erode in winds or rainwater and be transported to affect nearby water resources.

E.3.5 Hazardous Materials and Wastes

- *Construction Measures:*
 - All construction equipment would be maintained according to the manufacturer's specifications and drip mats would be placed under parked equipment as needed.
 - Storage containers, such as tanks, associated with generators, waste oil/used oil tanks, and bowsers at and near the project areas, would be relocated or clearly marked and avoided to ensure no damage would occur during construction and modification actions
 - All hazardous materials, petroleum products, and hazardous wastes used or generated during construction would be contained, stored, and managed appropriately (e.g., secondary containment, inspections, spill kits) in accordance with applicable regulations to minimize the potential for releases.
 - To ensure safety and reduce the potential for an accidental release, during renovation activities no containers of hydrazine would be present within Building 138 or near any renovation activities associated with the building.
 - Should unknown, potentially hazardous wastes be discovered or unearthed during construction, demolition, and renovation, construction contractors would immediately cease work, contact appropriate installation personnel, and await sampling and analysis results before taking any further action. Any unknown wastes determined to be hazardous would be managed or disposed of in accordance with applicable laws and regulations.
- *Operational Measures:*
 - To manage new waste streams in the newly constructed hangars, Initial Accumulation Points would be established, as necessary, and maintained in accordance with the Eglin AFB's *Hazardous Waste Management Plan*.

E.3.6 Infrastructure and Transportation

- *Construction Measures:*
 - Construction vehicles would remain within a project area for the duration of the construction period, which would minimize impacts on installation roadways.

E.3.7 Noise

- *Construction Measures:*

- To reduce noise effects on noise sensitive receptors, heavy construction equipment would include noise abatement components such as mufflers, engine enclosures, engine vibration isolators, or other sound dampening supplements that could reduce the sound level by up to 10 A-weighted decibels; construction would be limited to normal weekday business hours (generally 7 a.m. to 6 p.m.); construction contractors would aim to maintain uniform noise levels and avoid impulse noises; and construction crews would turn off idling equipment when not in use.
- Construction equipment would remain within a project area for the duration of the construction period, reducing the frequency of increased truck traffic and associated noise levels.
- To prevent effects on construction crew safety from elevated noise levels, contractors would require construction personnel, and particularly equipment operators, to wear hearing protection to limit exposure to noise and protect hearing.
- Area users would be notified before noisy construction activities occur, and would provide updates, as necessary, as to when and where construction actions would take place.
- **Operational Measures:**
 - Aircraft operations overpopulated areas are avoided to the extent practicable. When operations overpopulated areas are necessary, pilots are required to adhere to established minimum altitudes. Per EAFBI 13-204, F-35A DT aircraft in airspace controlled by the Eglin Radar Control Facility will operate at or above the following minimum noise abatement altitudes: 1,500 feet above ground level (AGL) beyond 5 nautical miles from an airfield and 500 feet AGL within designated noise abatement areas during water overflight.
 - To reduce noise in Valparaiso, F-35A aircraft operations on Eglin AFB Runway 1/19 are limited in accordance with the 2014 *F-35 Supplemental Environmental Impact Statement and Record of Decision*. Per the *Record of Decision*, Arrivals to Runway 19 and departures from Runway 01 are limited to those flight operations necessary for emergencies, unplanned contingencies, and weather affecting aircraft performance limitations and requirements.
 - Late-night air operations are minimized to the extent possible while still accomplishing training and testing requirements, thereby reducing late-night noise disturbances. Only approximately 1 percent of total flying operations at Eglin AFB are conducted between 10:00 pm and 7:00 am per the *Air Installation Compatible Use Zones Study*.
 - Afterburners, which are engaged during takeoff and supersonic flight, would be de-selected prior to crossing the installation fenceline to reduce noise effects on areas outside the boundary of the installation.
 - Static engine runs for F-35A DT aircraft would be conducted in a hush house or at a designated location near the center of the installation to avoid noise effects on areas outside the boundary of the installation. Where a hush house cannot be used or intensive maintenance is required, aircraft would be sent off-installation for testing and maintenance. When high-power static engine runs (i.e., runs

exceeding 80 percent power) are required, aircraft engines will be sent to Hill AFB, Utah. High-power static engine runs are not conducted at Eglin AFB per the *Air Installation Compatible Use Zones Study*.

- Military personnel within the boundary of Eglin AFB during range activities (i.e., supersonic flights and munitions expenditures) in TA B-70 would be required to wear ear protection. Areas southwest of TA-B-70 that are normally accessible to the public would be cleared of non-mission personnel to maintain to reduce exposure to unsafe noise levels and prevent hearing impairment.
- For munitions expenditures within the Eglin Gulf Test and Training Range (EGTTR), DAF would establish a safety footprint around target areas where there is a potential for harmful noise from detonations. Members of the public would be restricted from the established safety footprint. Mission support personnel will maintain a safe distance from the target area and follow strict operating procedures when present within the safety footprint. Safety footprints vary based on several factors, including weapon type, flight profile, altitude of delivery, speed, or flight system of the specified activity. In addition, the Eglin Range Safety Office applies a safety buffer called the “impact limit line” that defines the outermost impact boundary of items generated by a munition expenditure. During a test, public and commercial users within the safety buffer are prohibited.
- All EGTTR testing activities would adhere to the mitigation and monitoring measures required by the 2017, 2019, and 2023 National Marine Fisheries Service Biological Opinions and Conference Reports to reduce impacts from noise on marine wildlife.

E.3.8 Safety

- **Construction Measures:**
 - All construction workers and F-35A DT personnel will be required to adhere to all Occupational Safety and Health Administration and Air Force Occupational Safety and Health standards during construction and operations.
 - Construction contractors will be required to adhere to an installation-approved foreign object debris inspection and removal plan when conducting any service, construction, or renovation activities on or near any apron, taxiway, or runway locations, including aircraft maintenance, fueling, and associated areas that aircraft are known to travel.
- **Operational Measures:**
 - Offshore munitions testing areas will be cleared prior to a munitions expenditure to ensure the safety of commercial and recreational boats.
 - All flight safety policies, and bird-aircraft strike hazard reduction measures will be followed to reduce the potential for mishaps.

E.3.9 Socioeconomics

- **Operational Measures:**
 - Operators would coordinate issuance of a notice to mariners in advance of munitions expenditure operations to be conducted in the Gulf of Mexico such that

civilian and commercial users operating in the area will have adequate awareness of the planned DT activities and time to plan reroutes for avoidance.

E.3.10 Water Resources

- **Construction Measures:**
 - To minimize impacts on floodplains or from flooding, new facilities would be constructed in conformance with EO 14008, *Tackling the Climate Crisis at Home and Abroad*, DoD's Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning – with Change 1*, and UFC 3-201-01, *Civil Engineering – with Change 5*, DoD's Directive-Type Memorandum 22-003, *Flood Hazard Area Management for DoD Installations*, and the DoD's 2021 *Climate Adaptation Plan*.
 - New development would be constructed away from the shoreline creating flood buffer areas, elevated foundations, and relocated key infrastructure to prevent and reduce losses; guided structural retrofits to make existing structures more resilient to flooding; and constructed living shorelines and rock barriers at the shore to reduce wave energy for storm surge.
 - Construction of new facilities would incorporate the following requirements per the Federal Emergency Management Agency Federal Flood Risk Management Standard and UFC 3-201-01:
 - Mission critical facilities must be constructed 3 feet above the base flood elevation, and non-mission critical facilities must be elevated 2 feet above the base flood elevation.
 - For facility renovations that exceed 50 percent of the facility replacement cost, flood mitigation measures would include locating critical infrastructure (e.g., electrical and heating, ventilation, and air conditioning [HVAC] systems) above the flood elevation whenever practical. Preliminary estimates indicate the cost for renovation of the hangars would not likely exceed 50 percent of the facility replacement costs.
 - Construction would comply with Section 438 of the Energy Independence and Security Act, which establishes stormwater design requirements for development projects to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the project area with regard to the temperature, rate, volume, and duration of flow.
 - New construction, facility addition and renovation, and infrastructure construction and repair projects under Alternative 1 would be subject to the following Northwest Florida Water Management District permit requirements to avoid or minimize flood impacts:
 - Construction projects that create more than 4,000 square feet of impervious and semi-impervious surfaces for new facility construction or addition, or 9,000 square feet of impervious and semi-impervious surface for vehicle traffic, would require application for an Environmental Resource Permit through the Northwest Florida Water Management District. Construction of the two new hangars, the Building 64 addition, and relocation of the boatshed to be completed under the Proposed

Action would exceed these thresholds of additional impervious or semi-impervious surfaces and would require Environmental Resource Permits. The proposed parking areas would be constructed by converting existing developed area to the new intended use.

- Design measures for construction of new facilities would include the construction of appropriately sized stormwater management features, such as drainage swales and detention basins, to compensate for the increase in impervious surface.
 - Facilities that create more than 4,000 square feet of new impervious and semi-impervious surface area would require construction of stormwater mitigation measures such as drainage swales or stormwater detention basins. Construction of the new hangars, and the Building 64 addition would exceed this threshold of additional impervious or semi-impervious surfaces and would require construction of stormwater measures.
 - The construction of facility infrastructure projects, such as roadways and parking lots, would also include design measures such as drainage swales and/or detention basins to avoid or minimize flooding impacts. All drainage swales or stormwater detention basins would be designed to provide for water quality and quantity treatment sufficient to withstand a 25-year, 24-hour storm event.
- *Operational Measures:*
 - Range protocols to recover munitions debris and spent shells, would be conducted as described for geological resources.
 - BMPs, in conjunction with the installation and project-specific SWPPPs, would be used to reduce stormwater runoff where possible at the proposed facility and infrastructure locations. Examples of these BMPs would include using low-impact development where applicable and adhering to the project-specific and installation SWPPPs and ESCPs. A potential option to reduce flood impacts would be to elevate ground floors of newly constructed facilities above the floodplain level.

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F

Air Quality Supporting
Documentation



F. Appendix F: Air Quality Supporting Documentation

This appendix discusses emission factor development and calculations including assumptions employed in the analyses presented in **Section 3.1** of the Environmental Assessment. Portions of this report have been deleted or redacted in accordance with operational security requirements.

F.1 Aircraft and Construction Emissions Calculations

The Air Conformity Applicability Model (ACAM) version 5.0.18a was used to perform an analysis to assess the potential air quality impacts associated with the Proposed Action in accordance with Air Force Manual 32-7002, *Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process* (EIAP, 32 Code of Federal Regulations [CFR] Part 989) and the General Conformity Rule (40 CFR Part 93, Subpart B). This appendix provides the ACAM results.

The emission factors presented in this Appendix are imbedded within ACAM and come from the following DAF documents: (1) *Air Emissions Guide for Air Force Stationary Sources, Methods for Estimating Emissions of Air Pollutants for Stationary Sources at U.S. Air Force Installations*, Air Force Civil Engineer Center (June 2020), and (2) *Air Emissions Guide for Air Force Mobile Sources, Methods for Estimating Emissions of Air Pollutants for Mobile Sources at U.S. Air Force Installations*, Air Force Civil Engineering Center (June 2020). Additional data and methodology used to prepare the ACAM reports are below.

F.1.1. Time in Mode (TIM) Summary for F-35A Aircraft

Table F-1. TIMs Summary for F-35A Aircraft at Eglin AFB

	Idle In/Out (min)	Takeoff AB (min)	Takeoff Mil (min)	Climbout (min)	Approach (min)
LTO Flight	0.70	0.02	0.77	0.24	3.43
LTO Taxi	25.10	0.00	0.00	0.00	0.00
Total LTO	25.80	0.02	0.77	0.24	3.43
Closed Patterns	0.13	0.00	0.27	0.22	2.85

Key: AB – afterburner; LTO – landing and takeoff operation; Mil – military; min - minutes

The analysis for all construction and operation actions assumes the following: (1) during construction, no materials are required to be hauled on- or off-site as excavated spoils will be used on-site and (2) no new emergency generators, or if any were needed for new facilities.

F.1.2 Air Conformity Applicability Model Report Record of Air Analysis (ROAA)

1. General Information: The Air Force's Air Conformity Applicability Model (ACAM) was used to perform an analysis to assess the potential air quality impact/s associated with the action in accordance with the Air Force Manual 32-7002, Environmental Compliance and Pollution Prevention; the Environmental Impact Analysis Process (EIAP, 32 CFR 989); and the General Conformity Rule (GCR, 40 CFR 93 Subpart B). This report provides a summary of the ACAM analysis.

a. Action Location:

Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton; Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Beddown of F-35A Developmental Test Aircraft at Eglin AFB, Florida

c. Project Number/s (if applicable):

d. Projected Action Start Date: 7 / 2024

e. Action Description:

The Proposed Action includes beddown of four F-35A DT aircraft, a maximum of 270 personnel and 439 dependents, construction of a 2-bay aircraft maintenance hangar and aircraft parking area, construction of a 2-bay aircraft test hangar, an addition to Building 64, and renovations to four existing support facilities. In addition to Eglin AFB, DAF will conduct F-35A DT operations at Tyndall AFB.

The earliest arrival times for the four F-35A DT aircraft are January 2016, February 2026, May 2026, and November 2026. A maximum of 270 personnel and 439 dependents could accompany the F-35A DT program. It was assumed all personnel and dependents would arrive by the first aircraft arrival, approximately January 2026.

The four F-35A DT aircraft will conduct approximately 2,346 airfield operations per year, comprised of 2,322 operations at Eglin AFB and 24 operations at Tyndall AFB. Weapons DT flight operations will be conducted across existing SUA over land and over water within the Eglin Test and Training Complex, and within the existing Gulf Regional Airspace Strategic Initiative Air Traffic Control Assigned Airspace. Expenditures of defensive countermeasures will include 210 chaff bundles and 210 flares per year and will occur over water within W-151 and W-470. Expenditures of munitions will include approximately 95 inert munitions and 5 live munitions and will occur over land and over water in areas authorized for their use. Approximately 150 supersonic flight and Weapons DT operations per year will be conducted in restricted area R-2915A over TA 570.

The Proposed Action includes construction of a 41,400 ft² 2-bay aircraft maintenance hangar and aircraft parking area; construction of a 2-bay aircraft test hangar; a 24,232 ft² addition to Building 64; and renovations to Buildings 32, 100, 101, and 138 at Eglin AFB. Construction of the 2-bay aircraft test hangar will include demolition of Building 965 and relocation of the maritime operations group and associated boat storage area. No construction activities will occur at Tyndall AFB.

f. Point of Contact:

Name: Carolyn Hein
Title: Contractor
Organization: HDR
Email: [REDACTED]
Phone Number: [REDACTED]

2. Air Impact Analysis: Based on the attainment status at the action location, the requirements of the General Conformity Rule are:

☐ applicable
☒ not applicable

Total net direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the start of the action through achieving “steady state” (i.e., net gain/loss upon action fully implemented) emissions. The ACAM analysis used the latest and most accurate emission estimation techniques available; all algorithms, emission factors, and methodologies used are described in detail in the USAF Air Emissions Guide for Air Force Stationary Sources, the USAF Air Emissions Guide for Air Force Mobile Sources, and the USAF Air Emissions Guide for Air Force Transitory Sources.

“Insignificance Indicators” were used in the analysis to provide an indication of the significance of potential impacts to air quality based on current ambient air quality relative to the National Ambient Air Quality Standards (NAAQSs). These insignificance indicators are the 250 ton/yr Prevention of Significant Deterioration (PSD) major source threshold for actions occurring in areas that are “Clearly Attainment” (i.e., not within 5% of any NAAQS) and the GCR de minimis values (25 ton/yr for lead and 100 ton/yr for all other criteria pollutants) for actions occurring in areas that are “Near Nonattainment” (i.e., within 5% of any NAAQS). These indicators do not define a significant impact; however, they do provide a threshold to identify actions that are insignificant. Any action with net emissions below the insignificance indicators for all criteria pollutant is considered so insignificant that the action will not cause or contribute to an exceedance on one or more NAAQSs. For further detail on insignificance indicators see chapter 4 of the Air Force Air Quality Environmental Impact Analysis Process (EIAP) Guide, Volume II - Advanced Assessments.

The action’s net emissions for every year through achieving steady state were compared against the Insignificance Indicator and are summarized below.

Analysis Summary:

2024

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.392	100	
NOx	2.238	100	
CO	2.767	250	
SOx	0.007	250	
PM 10	18.913	250	
PM 2.5	0.087	250	
Pb	0.000	25	No
NH3	0.001	250	
CO2e	665.1		

2025

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	2.167	100	
NOx	4.829	100	
CO	7.131	250	
SOx	0.015	250	
PM 10	2.686	250	
PM 2.5	0.169	250	
Pb	0.000	25	No

NH3	0.006	250	
CO2e	1508.5		

2026

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.987	100	
NOx	6.233	100	
CO	7.925	250	
SOx	0.372	250	
PM 10	0.664	250	
PM 2.5	0.616	250	
Pb	0.000	25	No
NH3	0.013	250	
CO2e	1828.8		

2027 - (Steady State)

Pollutant	Action Emissions (ton/yr)	INSIGNIFICANCE INDICATOR	
		Indicator (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.888	100	
NOx	16.019	100	
CO	18.800	250	
SOx	1.463	250	
PM 10	2.245	250	
PM 2.5	2.052	250	
Pb	0.000	25	No
NH3	0.040	250	
CO2e	4955.3		

None of estimated annual net emissions associated with this action are above the insignificance indicators, indicating no significant impact to air quality. Therefore, the action will not cause or contribute to an exceedance on one or more NAAQSs. No further air assessment is needed.



Carolyn Hein, Contractor

05/02/2023
DATE

F.1.3 Detail Air Conformity Applicability Model Report

1. General Information

- Action Location

Base: EGLIN AFB
State: Florida
County(s): Okaloosa; Santa Rosa; Walton; Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Beddown of F-35A Developmental Test Aircraft at Eglin AFB, Florida

- Project Number/s (if applicable):

- Projected Action Start Date: 7 / 2024

- Action Purpose and Need:

The purpose of the Proposed Action is to facilitate integration of air-to-air and air-to-ground weapons on the F-35A aircraft. This is done through a Weapons DT program, which is a routine procedure for fielding any combat aircraft weapon system.

The Proposed Action is needed to conduct developmental testing of weapon systems to be integrated onto the F-35A aircraft to evaluate whether the systems fulfil design specifications, verify the design and manufacturer process per the design specifications, and to validate how the systems integrate into the aircraft, fulfill design requirements, and meet performance standards for safety, function, and effectiveness.

- Action Description:

The Proposed Action includes beddown of four F-35A DT aircraft, a maximum of 270 personnel and 439 dependents, construction of a 2-bay aircraft maintenance hangar and aircraft parking area, construction of a 2-bay aircraft test hangar, an addition to Building 64, and renovations to four existing support facilities. In addition to Eglin AFB, DAF will conduct F-35A DT operations at Tyndall AFB.

The earliest arrival times for the four F-35A DT aircraft are January 2026, February 2026, May 2026, and November 2026. A maximum of 270 personnel and 439 dependents could accompany the F-35A DT program. It was assumed all personnel and dependents would arrive by the first aircraft arrival, approximately January 2026.

The four F-35A DT aircraft will conduct approximately 2,346 airfield operations per year, comprised of 2,322 operations at Eglin AFB and 24 operations at Tyndall AFB. Weapons DT flight operations will be conducted across existing SUA over land and over water within the Eglin Test and Training Complex, and within the existing Gulf Regional Airspace Strategic Initiative Air Traffic Control Assigned Airspace. Expenditures of defensive countermeasures will include 210 chaff bundles and 210 flares per year and will occur over water within W-151 and W-470. Expenditures of munitions will include approximately 95 inert munitions and 5 live munitions and will occur over land and over water in areas authorized for their use. Approximately 150 supersonic flight and Weapons DT operations per year will be conducted in restricted area R-2915A over TA 570.

The Proposed Action at Eglin AFB includes construction of a 41,400 ft² 2-bay aircraft maintenance hangar and aircraft parking area; construction of a 2-bay aircraft test hangar; a 24,232 ft² addition to Building 64; renovations to Buildings 32, 100, 101, and 138; construction of a 2-bay aircraft test hangar; demolition of Building 965 and relocation of the maritime operations group and associated boat storage area. No construction activities will occur at Tyndall AFB.

- Point of Contact

Name: Carolyn Hein

Title: Contractor
Organization: HDR
Email: [REDACTED]
Phone Number: [REDACTED]

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Construct 2-Bay Aircraft Maintenance Hangar
3.	Construction / Demolition	Construct 2-Bay Aircraft Test Hangar
4.	Construction / Demolition	Relocate Boat Shed
5.	Construction / Demolition	Building 64 Addition
6.	Construction / Demolition	Facility Renovations
7.	Heating	Heating of New Facilities
8.	Heating	Remove Heat Requirement for Building 965
9.	Aircraft	Beddown of Four F-35A DT Aircraft and Associated LTOs, APU, AGE, and Engine Run-up Testing Ops
10.	Aircraft	F-35A DT TGOs
11.	Personnel	Beddown of 270 F-35A DT Personnel

Emission factors and air emission estimating methods come from the United States Air Force's Air Emissions Guide for Air Force Stationary Sources, Air Emissions Guide for Air Force Mobile Sources, and Air Emissions Guide for Air Force Transitory Sources.

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location

County: Okaloosa
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct 2-Bay Aircraft Maintenance Hangar

- Activity Description:

Construction of the 2-bay aircraft maintenance hangar would occur from October 2024 through September 2026.

Site grading includes removal of existing pavements (e.g., the flightline roadways, apron, aircraft parking areas) and preparing areas for new pavements or construction (e.g., parking areas, concrete pads, roadways, facility construction). Site grading would occur on an area of approximately 300,000 ft². Site grading would begin in October 2024 and last approximately 3 months.

Construction of the 2-bay aircraft maintenance hangar would include the new hangar (41,400 ft²) and four aircraft shelters (3801 ft² each), for a total of 56,604 ft². The height of the new hangar and sunshades was assumed to be 20 feet. Construction would begin January 2025 and last approximately 15 months.

Architectural coatings would be applied to the 2-bay aircraft maintenance hangar, totaling 41,400 ft². Architectural coating application would begin March 2026 and last approximately 1 month.

Paving for the new airfield pavement, aircraft parking areas, rerouted flightline roadway, POV parking area, mechanical courtyard, and concrete pads would occur on an area totaling approximately 247,500 ft². Paving would begin in April 2026 and last approximately 6 months.

The analysis assumes the following: (1) no materials are required to be hauled on- or off-site due to site grading and excavated spoils will be used on-site; (2) utilities are available at the site and no trenching for utilities would be required; and (3) no new emergency generator(s).

- Activity Start Date

Start Month: 10
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 9
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.169016
SO _x	0.008761
NO _x	2.925061
CO	4.142091
PM 10	9.068095

Pollutant	Total Emissions (TONs)
PM 2.5	0.114855
Pb	0.000000
NH ₃	0.003185
CO _{2e}	868.2

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 3
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 300000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

2.1.4 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 (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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

2.2 Building Construction Phase

2.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 1

Start Quarter: 1

Start Year: 2025

- Phase Duration

Number of Month: 15

Number of Days: 0

2.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 56604

Height of Building (ft): 20
Number of Units: N/A

- **Building Construction Default Settings**
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

2.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995
LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574
LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

2.2.4 Building Construction 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

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

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 (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)

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

2.3 Architectural Coatings Phase

2.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 3

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 1

Number of Days: 0

2.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft²): 56604

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995

LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574
LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

2.3.4 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 (ft²)

800: Conversion Factor square feet to man days (1 ft² / 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 (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

2.4 Paving Phase

2.4.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 4

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 6

Number of Days: 0

2.4.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 247500

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

2.4.4 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 (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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 (ft²)

43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location

County: Okaloosa

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Construct 2-Bay Aircraft Test Hangar

- Activity Description:

Construction of the 2-bay aircraft test hangar would occur from October 2024 through September 2026.

Site grading includes removal of existing pavements and preparing areas for new pavements or construction (e.g., parking areas, storage areas, roadways, taxiways, facility construction). Site grading would begin in November 2024 and last approximately 3 months.

Construction of new fencing for the 2-bay aircraft test hangar and equipment yard would require approximately 1,970 linear feet of trenching. A 1-foot trench width for fencing was assumed. Trenching would begin in January 2025 and last approximately 1 month.

Construction of the 2-bay aircraft test hangar would include the new hangar and a access gate. Construction would begin February 2025 and last approximately 15 months.

Architectural coatings would be applied to the 2-bay aircraft test hangar and flightline gate, totaling 38,920 ft². Architectural coating application would begin April 2026 and last approximately 1 month.

The project would require paving of roadway, a POV parking area, mechanical courtyard, AGE storage area, and an equipment yard Paving would begin in May 2026 and last approximately 5 months.

The analysis assumes the following: (1) no materials are required to be hauled on- or off-site due to site grading and excavated spoils will be used on-site; (2) utilities are available at the site and no trenching for utilities would be required; and (3) no new emergency generator(s).

- Activity Start Date

Start Month: 10

Start Month: 2024

- Activity End Date

Indefinite: False

End Month: 9

End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.969125
SO _x	0.009002
NO _x	2.935306
CO	4.203667
PM 10	7.645243

Pollutant	Total Emissions (TONs)
PM 2.5	0.112260
Pb	0.000000
NH ₃	0.003257
CO _{2e}	883.2

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 10

Start Quarter: 1

Start Year: 2024

- Phase Duration

Number of Month: 1

Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information

Area of Building to be demolished (ft²):

Height of Building to be demolished (ft): 20

- Default Settings Used: Yes

- Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Concrete/Industrial Saws Composite	1	8
Rubber Tired Dozers Composite	1	1
Tractors/Loaders/Backhoes Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Concrete/Industrial Saws Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

3.1.4 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/ft³)

BA: Area of Building to be demolished (ft²)

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 (ft²)

BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

0.25: Volume reduction factor (material reduced by 75% to account for air space)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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

3.2 Site Grading Phase

3.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 11
 Start Quarter: 1
 Start Year: 2024

- Phase Duration

Number of Month: 3
 Number of Days: 0

3.2.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): Not disclosed
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90

Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

3.2.4 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 (yd³)
 HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
 HC: Average Hauling Truck Capacity (yd³)
 (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
 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

3.3 Trenching/Excavating Phase

3.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
 Start Quarter: 1
 Start Year: 2025

- Phase Duration

Number of Month: 1
 Number of Days: 0

3.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1970
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

3.3.4 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 (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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

3.4 Building Construction Phase

3.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 2

Start Quarter: 1

Start Year: 2025

- Phase Duration

Number of Month: 15

Number of Days: 0

3.4.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial

Area of Building (ft²): 38920

Height of Building (ft): 20

Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

3.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0680	0.0013	0.4222	0.3737	0.0143	0.0143	0.0061	128.77
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0236	0.0006	0.0859	0.2147	0.0025	0.0025	0.0021	54.449
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0287	0.0006	0.2329	0.2666	0.0080	0.0080	0.0025	61.057
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0335	0.0007	0.1857	0.3586	0.0058	0.0058	0.0030	66.872
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0214	0.0003	0.1373	0.1745	0.0051	0.0051	0.0019	25.650

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995
LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574
LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

3.4.4 Building Construction 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

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

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 (ft²)

BH: Height of Building (ft)

(0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)

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

3.5 Architectural Coatings Phase

3.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 4

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 1

Number of Days: 0

3.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential

Total Square Footage (ft²): 38920

Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995
LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574

LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

3.5.4 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 (ft²)

800: Conversion Factor square feet to man days (1 ft² / 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 (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

3.6 Paving Phase

3.6.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 5

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 5

Number of Days: 0

3.6.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 161000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

3.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

3.6.4 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 (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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 (ft²)

43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location

County: Okaloosa

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Relocate Boat Shed

- Activity Description:

The existing boat shed would be demolished and the maritime operations group and associated equipment relocated prior to the start of new construction. For the purposes of this analysis, it was assumed preparation of the site for relocation of the boat shed and storage area would occur from July 2024 through September 2024.

Site grading would occur on the entire relocation site, totaling approximately 247,000 ft². Site grading would begin in July 2024 and last approximately 1 month.

Trenching to extend utilities to the site would require approximately 400 feet of excavation. A 3-foot trench width for utilities was assumed. Trenching would begin in August 2024 and last approximately 1 month.

Paving would occur on an area totaling approximately 247,000 ft². Paving would begin in September 2024 and last approximately 1 month.

The analysis assumes the following: (1) installation of the pre-fabricated boat shed would not produce emissions; (2) no materials are required to be hauled on- or off-site due to site grading and excavated spoils will be used on-site; and (3) no new emergency generator(s).

- Activity Start Date

Start Month: 7
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 9
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.080104
SO _x	0.001246
NO _x	0.406364
CO	0.533216
PM 10	2.486650

Pollutant	Total Emissions (TONs)
PM 2.5	0.017551
Pb	0.000000
NH ₃	0.000290
CO _{2e}	123.6

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 247000

Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

4.1.4 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 (yd³)
HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)
HC: Average Hauling Truck Capacity (yd³)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)
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

4.2 Trenching/Excavating Phase

4.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date

Start Month: 8
 Start Quarter: 1
 Start Year: 2024

- Phase Duration

Number of Month: 1
 Number of Days: 0

4.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information

Area of Site to be Trenched/Excavated (ft²): 1200
 Amount of Material to be Hauled On-Site (yd³): 0
 Amount of Material to be Hauled Off-Site (yd³): 0

- Trenching Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipment Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
 Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61

Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

4.2.4 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 (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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

4.3 Paving Phase

4.3.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 9

Start Quarter: 1

Start Year: 2024

- Phase Duration

Number of Month: 1

Number of Days: 0

4.3.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 247000

- Paving Default Settings

Default Settings Used: Yes

Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	8
Paving Equipment Composite	2	6
Rollers Composite	2	6

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

4.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

4.3.4 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 (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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 (ft²)
43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location

County: Okaloosa
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Building 64 Addition

- Activity Description:

Construction for the addition to Building 64 would occur from October 2024 through September 2025.

Site grading includes removal of existing pavements (e.g., existing POV parking) and preparing areas for new pavements or construction (e.g., facility additions). Site grading would occur on an area of approximately 120,000 ft². Site grading would begin in October 2024 and last approximately 2 months.

Construction of the facility additions would include a total of 24,232 ft² of new floor space. The height of the additions was assumed to be 20 feet. Construction would begin December 2024 and last approximately 8 months.

Architectural coatings would be applied to the additions totaling 24,232 ft². Architectural coating application would begin July 2025 and last approximately 1 month.

Paving for the new POV parking areas, sidewalks, and mechanical yard would occur on an area totaling approximately 100,400 ft². Paving would begin in August 2026 and last approximately 2 months.

The analysis assumes the following: (1) no materials are required to be hauled on- or off-site due to site grading and excavated spoils will be used on-site; (2) utilities are available at the site and no trenching for utilities would be required; and (3) no new emergency generator(s).

- Activity Start Date

Start Month: 10
Start Month: 2024

- Activity End Date

Indefinite: False
End Month: 9
End Month: 2026

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.555438
SO _x	0.004649
NO _x	1.580958
CO	2.161409
PM 10	2.449112

Pollutant	Total Emissions (TONs)
PM 2.5	0.061541
Pb	0.000000
NH ₃	0.001698
CO ₂ e	458.5

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date

Start Month: 10
Start Quarter: 1
Start Year: 2024

- Phase Duration

Number of Month: 2
Number of Days: 0

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information

Area of Site to be Graded (ft²): 120000
Amount of Material to be Hauled On-Site (yd³): 0
Amount of Material to be Hauled Off-Site (yd³): 0

- Site Grading Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	8
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	8
Tractors/Loaders/Backhoes Composite	2	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd³): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

5.1.4 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 (yd³)

HA_{OffSite}: Amount of Material to be Hauled Off-Site (yd³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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

5.2 Building Construction Phase

5.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 12

Start Quarter: 1

Start Year: 2024

- Phase Duration

Number of Month: 8

Number of Days: 0

5.2.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 24232
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

5.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}

Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH₄	CO_{2e}
Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

5.2.4 Building Construction 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

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

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 (ft²)
 BH: Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
 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

5.3 Architectural Coatings Phase

5.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 7
 Start Quarter: 1
 Start Year: 2025

- Phase Duration

Number of Month: 1
 Number of Days: 0

5.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 24232
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

5.3.4 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 (ft²)

800: Conversion Factor square feet to man days (1 ft² / 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 (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

5.4 Paving Phase

5.4.1 Paving Phase Timeline Assumptions

- Phase Start Date

Start Month: 8

Start Quarter: 1

Start Year: 2026

- Phase Duration

Number of Month: 2

Number of Days: 0

5.4.2 Paving Phase Assumptions

- General Paving Information

Paving Area (ft²): 100400

- Paving Default Settings

Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	2	6
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

5.4.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

5.4.4 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 (ft²)

0.25: Thickness of Paving Area (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd³ / 27 ft³)

HC: Average Hauling Truck Capacity (yd³)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd³)

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 (ft²)

43560: Conversion Factor square feet to acre (43560 ft² / acre)² / acre)

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location

County: Okaloosa

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Facility Renovations

- Activity Description:

Renovations to Buildings 32, 100, 101, and 138 would occur from October 2024 through September 2025 (12 months). The analysis assumes 25 percent of the total square footage is construction to equate the renovations.

Renovations would be as follows (areas are approximate):

Building 32, Egress Shop – 25,120 ft²

Building 100, Pod Shop – 29,330 ft²

Building 101, AGE Facility – 18,650 ft²

Building 138, Fuels Hangar – 17,710 ft²

Total square footage = 90,810 ft² (25 percent of total square footage = 22,703 ft²)

Assumed 90,810 ft² would require architectural coatings.

- Activity Start Date

Start Month: 10

Start Month: 2024

- Activity End Date

Indefinite: False

End Month: 9

End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.300701
SO _x	0.004414
NO _x	1.446898
CO	2.082754
PM 10	0.052681

Pollutant	Total Emissions (TONs)
PM 2.5	0.052620
Pb	0.000000
NH ₃	0.001695
CO _{2e}	430.2

6.1 Building Construction Phase

6.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date

Start Month: 10

Start Quarter: 1

Start Year: 2024

- Phase Duration

Number of Month: 12

Number of Days: 0

6.1.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft²): 22703
Height of Building (ft): 20
Number of Units: N/A

- **Building Construction Default Settings**
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	6
Forklifts Composite	2	6
Generator Sets Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40 (default)

- Vendor Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

6.1.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Cranes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Generator Sets Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0303	0.0006	0.2464	0.2674	0.0091	0.0091	0.0027	61.061
Tractors/Loaders/Backhoes Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875
Welders Composite								
	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CH ₄	CO _{2e}

Emission Factors	0.0227	0.0003	0.1427	0.1752	0.0059	0.0059	0.0020	25.653
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- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033
LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

6.1.4 Building Construction 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

$$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)

BA: Area of Building (ft²)

BH: Height of Building (ft)

(0.42 / 1000): Conversion Factor ft³ to trips (0.42 trip / 1000 ft³)

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 (ft²)
 BH: Height of Building (ft)
 (0.38 / 1000): Conversion Factor ft³ to trips (0.38 trip / 1000 ft³)
 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

6.2 Architectural Coatings Phase

6.2.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date

Start Month: 9
 Start Quarter: 1
 Start Year: 2025

- Phase Duration

Number of Month: 1
 Number of Days: 0

6.2.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information

Building Category: Non-Residential
 Total Square Footage (ft²): 90810
 Number of Units: N/A

- Architectural Coatings Default Settings

Default Settings Used: Yes
 Average Day(s) worked per week: 5 (default)

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

6.2.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO _{2e}
LDGV	000.227	000.002	000.112	003.995	000.003	000.003		000.024	00326.033

LDGT	000.249	000.003	000.200	004.463	000.005	000.004		000.026	00420.631
HDGV	001.020	000.006	000.905	015.294	000.024	000.021		000.052	00940.955
LDDV	000.055	000.001	000.084	003.818	000.002	000.002		000.008	00335.620
LDDT	000.064	000.001	000.127	002.601	000.003	000.003		000.008	00381.263
HDDV	000.117	000.004	002.489	001.691	000.053	000.049		000.032	01275.703
MC	003.044	000.003	000.569	012.909	000.024	000.021		000.052	00386.988

6.2.4 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 (ft²)

800: Conversion Factor square feet to man days (1 ft² / 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 (ft²)

2.0: Conversion Factor total area to coated area (2.0 ft² coated area / total area)

0.0116: Emission Factor (lb/ft²)

2000: Conversion Factor pounds to tons

7. Heating

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Okaloosa

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Heating of New Facilities

- Activity Description:

Heating for new facilities would begin following construction. For the purposes of this analysis, heating was assumed to be required starting in October 2026.

Heating would be required for the following facilities:

2-Bay Aircraft Maintenance Hangar: 41,400 ft²

Building 64 Addition: 24,232 ft²

Total area to be heated: 104,002 ft²

- Activity Start Date

Start Month: 10
Start Year: 2026

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.029390
SO _x	0.003206
NO _x	0.534372
CO	0.448873
PM 10	0.040612

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.040612
Pb	0.000000
NH ₃	0.000000
CO ₂ e	643.3

7.2 Heating Assumptions

- Heating

Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method

Area of floorspace to be heated (ft²): 104002
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft³): 0.00105
Energy Intensity (MMBtu/ft²): 0.1079

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

7.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
5.5	0.6	100	84	7.6	7.6			120390

7.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)
 FC: Fuel Consumption
 EF_{POL}: Emission Factor for Pollutant
 2000: Conversion Factor pounds to tons

8. Heating

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Remove
- Activity Location
 - County: Okaloosa
 - Regulatory Area(s): NOT IN A REGULATORY AREA
- Activity Title: Remove Heat Requirement for Building 965
- Activity Description:
 - Building 965 (5,005 ft²) would be demolished. Heating for this facility would no longer be required.
- Activity Start Date
 - Start Month: 10
 - Start Year: 2026
- Activity End Date
 - Indefinite: Yes
 - End Month: N/A
 - End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	-0.000911
SO _x	-0.000099
NO _x	-0.016564
CO	-0.013914
PM 10	-0.001259

Pollutant	Emissions Per Year (TONs)
PM 2.5	-0.001259
Pb	0.000000
NH ₃	0.000000
CO ₂ e	-19.9

8.2 Heating Assumptions

- Heating
 - Heating Calculation Type: Heat Energy Requirement Method
- Heat Energy Requirement Method
 - Area of floorspace to be heated (ft²): 5005
 - Type of fuel: Natural Gas
 - Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
 - Heat Value (MMBtu/ft³): 0.00105
 - Energy Intensity (MMBtu/ft²): 0.0695
- Default Settings Used: Yes
- Boiler/Furnace Usage
 - Operating Time Per Year (hours): 900 (default)

8.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO _x	NO _x	CO	PM 10	PM 2.5	Pb	NH ₃	CO ₂ e
5.5	0.6	100	84	7.6	7.6			120390

8.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

$$FC_{HER} = HA * EI / HV / 1000000$$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method

HA: Area of floorspace to be heated (ft²)

EI: Energy Intensity Requirement (MMBtu/ft²)

HV: Heat Value (MMBTU/ft³)

1000000: Conversion Factor

- Heating Emissions per Year

$$HE_{POL} = FC * EF_{POL} / 2000$$

HE_{POL}: Heating Emission Emissions (TONs)

FC: Fuel Consumption

EF_{POL}: Emission Factor for Pollutant

2000: Conversion Factor pounds to tons

9. Aircraft

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Okaloosa; Santa Rosa; Walton; Bay

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Beddown of Four F-35A DT Aircraft and Associated LTOs, APU, AGE, and Engine Run-up Testing Ops

- Activity Description:

For the purposes of this analysis, it was assumed delivery of the four F-35A DT aircraft to Eglin AFB would be complete following the conclusion of the construction period, or approximately October 2026. The F-35A DT aircraft would conduct a total of 2,346 airfield operations, comprised of 792 Landing and Takeoff Cycles/Operations (LTOs) (i.e., 792 takeoffs and 792 landings) and 762 Touch and Go Operations (TGOs) (i.e., closed patterns).

Numbers of airfield operations reflect a chase flight with each DT operation. Analysis assumes F-35A aircraft as chase.

- Activity Start Date

Start Month: 10

Start Year: 2026

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	1.423920
SO _x	1.264381
NO _x	13.031312
CO	11.610698
PM 10	1.942701

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.775530
Pb	0.000000
NH ₃	0.000000
CO _{2e}	3172.0

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.021384
SO _x	0.959171
NO _x	8.670312
CO	9.081327
PM 10	1.498432

Pollutant	Emissions Per Year (TONs)
PM 2.5	1.346526
Pb	0.000000
NH ₃	0.000000
CO _{2e}	2890.9

9.2 Aircraft & Engines

9.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35A
 Engine Model: F135-PW-100
 Primary Function: Combat
 Aircraft has After burn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

9.2.2 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.

9.3 Flight Operations

9.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 4
 Flight Operation Cycle Type: LTO (Landing and Takeoff)
 Number of Annual Flight Operation Cycles for all Aircraft: 792
 Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 25.8
 Approach [Approach] (mins): 3.43

Climb Out [Intermediate] (mins):	0.24
Takeoff [Military] (mins):	0.77
Takeoff [After Burn] (mins):	0.02

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	12
Approach (mins):	27
Intermediate (mins):	9
Military (mins):	9
AfterBurn (mins):	3

9.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

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
 FOC: Number of Flight Operation Cycles (for all aircraft)
 2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: 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 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

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

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)

9.4 Auxiliary Power Unit (APU)

9.4.1 Auxiliary Power Unit (APU) Assumptions

- Default Settings Used: Yes

- Auxiliary Power Unit (APU) (default)

Number of APU per Aircraft	Operation Hours for Each LTO	Exempt Source?	Designation	Manufacturer
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9.4.2 Auxiliary Power Unit (APU) Emission Factor(s)

- Auxiliary Power Unit (APU) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
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9.4.3 Auxiliary Power Unit (APU) Formula(s)

- Auxiliary Power Unit (APU) Emissions per Year

$$APU_{POL} = APU * OH * LTO * EF_{POL} / 2000$$

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

EF_{POL}: Emission Factor for Pollutant (lb/hr)

2000: Conversion Factor pounds to tons

9.5 Aircraft Engine Test Cell

9.5.1 Aircraft Engine Test Cell Assumptions

- Engine Test Cell

Total Number of Aircraft Engines Tested Annually: 4

- Default Settings Used: No

- Annual Run-ups / Test Durations

Annual Run-ups (Per Aircraft Engine): 1
 Idle Duration (mins): 12
 Approach Duration (mins): 27
 Intermediate Duration (mins): 9
 Military Duration (mins): 9
 After Burner Duration (mins): 3

9.5.2 Aircraft Engine Test Cell Emission Factor(s)

- See Aircraft & Engines Emission Factor(s)

9.5.3 Aircraft Engine Test Cell Formula(s)

- Aircraft Engine Test Cell Emissions per Pollutant & Power Setting (TONs)

$$\text{TestCellPS}_{\text{POL}} = (\text{TD} / 60) * (\text{FC} / 1000) * \text{EF} * \text{NE} * \text{ARU} / 2000$$

TestCellPS_{POL}: Aircraft Engine Test Cell 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: Total Number of Engines (For All Aircraft)

ARU: Annual Run-ups (Per Aircraft Engine)

2000: Conversion Factor pounds to TONs

- Aircraft Engine Test Cell Emissions per Year

$$\text{TestCell} = \text{TestCellPS}_{\text{IDLE}} + \text{TestCellPS}_{\text{APPROACH}} + \text{TestCellPS}_{\text{INTERMEDIATE}} + \text{TestCellPS}_{\text{MILITARY}} + \text{TestCellPS}_{\text{AFTERBURN}}$$

TestCell: Aircraft Engine Test Cell Emissions (TONs)

TestCellPS_{IDLE}: Aircraft Engine Test Cell Emissions for Idle Power Setting (TONs)

TestCellPS_{APPROACH}: Aircraft Engine Test Cell Emissions for Approach Power Setting (TONs)

TestCellPS_{INTERMEDIATE}: Aircraft Engine Test Cell Emissions for Intermediate Power Setting (TONs)

TestCellPS_{MILITARY}: Aircraft Engine Test Cell Emissions for Military Power Setting (TONs)

TestCellPS_{AFTERBURN}: Aircraft Engine Test Cell Emissions for After Burner Power Setting (TONs)

9.6 Aerospace Ground Equipment (AGE)

9.6.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage

Number of Annual LTO (Landing and Take-off) cycles for AGE: 792

- Aerospace Ground Equipment (AGE) (default)

Total Number of AGE	Operation Hours for Each LTO	Exempt Source?	AGE Type	Designation
1	0.33	No	Air Compressor	MC-1A - 18.4hp
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

9.6.2 Aerospace Ground Equipment (AGE) Emission Factor(s)

- Aerospace Ground Equipment (AGE) Emission Factor (lb/hr)

Designation	Fuel Flow	VOC	SO _x	NO _x	CO	PM 10	PM 2.5	CO _{2e}
MC-1A - 18.4hp	1.1	0.267	0.008	0.419	0.267	0.071	0.068	24.8
MJ-1B	0.0	3.040	0.219	4.780	3.040	0.800	0.776	141.2
A/M32A-86D	6.5	0.294	0.046	6.102	0.457	0.091	0.089	147.0

H1	0.4	0.100	0.011	0.160	0.180	0.006	0.006	8.9
MJ-2/TTU-228 - 130hp	7.4	0.195	0.053	3.396	0.794	0.089	0.086	168.8
NF-2	0.0	0.010	0.043	0.110	0.080	0.010	0.010	22.1
A/M32A-60A	0.0	0.270	0.306	1.820	5.480	0.211	0.205	221.1

9.6.3 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

10. Aircraft

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Okaloosa; Santa Rosa; Walton; Bay

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: F-35A DT TGOs

- Activity Description:

For the purposes of this analysis, it was assumed delivery of the four F-35A DT aircraft to Eglin AFB would be complete following the conclusion of the construction period, or approximately October 2026. The F-35A DT aircraft would conduct a total of 2,346 airfield operations, comprised of 792 Landing and Takeoff Cycles/Operations (LTOs) (i.e., 792 takeoffs and 792 landings) and 762 Touch and Go Operations (TGOs) (i.e., closed patterns).

Numbers of airfield operations reflect a chase flight with each DT operation. Analysis assumes F-35A aircraft as chase.

- Activity Start Date

Start Month: 10

Start Year: 2026

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.001306
SO _x	0.191081
NO _x	2.231722
CO	0.211302

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.231155
Pb	0.000000
NH ₃	0.000000
CO ₂ e	577.5

PM 10	0.256639
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- Activity Emissions [Test Cell part]:

Pollutant	Emissions Per Year (TONs)
VOC	0.000000
SO _x	0.000000
NO _x	0.000000
CO	0.000000
PM 10	0.000000

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000000
Pb	0.000000
NH ₃	0.000000
CO _{2e}	0.0

10.2 Aircraft & Engines

10.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine

Aircraft Designation: F-35A
 Engine Model: F135-PW-100
 Primary Function: Combat
 Aircraft has After burn: Yes
 Number of Engines: 1

- Aircraft & Engine Surrogate

Is Aircraft & Engine a Surrogate? No
 Original Aircraft Name:
 Original Engine Name:

10.2.2 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.

10.3 Flight Operations

10.3.1 Flight Operations Assumptions

- Flight Operations

Number of Aircraft: 4
 Flight Operation Cycle Type: CP (Close Pattern)
 Number of Annual Flight Operation Cycles for all Aircraft: 762
 Number of Annual Trim Test(s) per Aircraft: 0

- Default Settings Used: No

- Flight Operations TIMs (Time In Mode)

Taxi [Idle] (mins): 0.13
 Approach [Approach] (mins): 2.85
 Climb Out [Intermediate] (mins): 0.22
 Takeoff [Military] (mins): 0.27
 Takeoff [After Burn] (mins): 0

Per the Air Emissions Guide for Air Force Mobile Sources, the defaults values for military aircraft equipped with after burner for takeoff is 50% military power and 50% afterburner. (Exception made for F-35 where KARNES 3.2 flight profile was used)

- Trim Test

Idle (mins):	0
Approach (mins):	0
Intermediate (mins):	0
Military (mins):	0
AfterBurn (mins):	0

10.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for Flight Operation Cycles per Year

$$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * FOC / 2000$$

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

FOC: Number of Flight Operation Cycles (for all aircraft)

2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Flight Operation Cycles per Year

$$AE_{FOC} = AEM_{IDLE_IN} + AEM_{IDLE_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$$

AE_{FOC}: 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 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

$$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$$

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)

11. Personnel

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location

County: Okaloosa

Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Beddown of 270 F-35A DT Personnel

- Activity Description:

The Proposed Action would result in a net change of 270 personnel at Eglin AFB. For the purposes of this analysis, it was assumed all F-35A DT personnel would be at Eglin AFB following the conclusion of the construction period, or approximately October 2026.

- Activity Start Date

Start Month: 10

Start Year: 2026

- Activity End Date

Indefinite: Yes

End Month: N/A

End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.434232
SO _x	0.004055
NO _x	0.237785
CO	6.542789
PM 10	0.006195

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006106
Pb	0.000000
NH ₃	0.039784
CO _{2e}	582.3

11.2 Personnel Assumptions

- Number of Personnel

Active Duty Personnel: 270

Civilian Personnel: 0

Support Contractor Personnel: 0

Air National Guard (ANG) Personnel: 0

Reserve Personnel: 0

- Default Settings Used: Yes

- Average Personnel Round Trip Commute (mile): 20 (default)

- Personnel Work Schedule

Active Duty Personnel: 5 Days Per Week (default)

Civilian Personnel: 5 Days Per Week (default)

Support Contractor Personnel: 5 Days Per Week (default)

Air National Guard (ANG) Personnel: 4 Days Per Week (default)

Reserve Personnel: 4 Days Per Month (default)

11.3 Personnel On Road Vehicle Mixture

- On Road Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	37.55	60.32	0	0.03	0.2	0	1.9
GOVs	54.49	37.73	4.67	0	0	3.11	0

11.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH₃	CO_{2e}
LDGV	000.217	000.002	000.097	003.798	000.003	000.003		000.024	00318.106
LDGT	000.234	000.003	000.176	004.231	000.004	000.004		000.026	00412.011
HDGV	000.995	000.006	000.827	014.430	000.023	000.021		000.052	00945.995
LDDV	000.053	000.001	000.078	003.752	000.003	000.002		000.008	00323.574
LDDT	000.060	000.001	000.117	002.519	000.003	000.003		000.008	00374.999
HDDV	000.103	000.004	002.324	001.630	000.044	000.041		000.032	01247.498
MC	003.040	000.003	000.567	012.758	000.024	000.021		000.052	00387.105

11.5 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

F.2 Munitions Emissions Calculations

Air emissions from munitions are based on net explosive weight. Inert munitions have a net explosive weight of zero; therefore, only live munitions would produce air emissions. Emission factors for representative munitions were obtained from USEPA's AP-42 compilations of emissions factors from various sources and from previous NEPA analyses. Emissions factors are provided in **Table F-2**.

Emissions from munitions were calculated using the below equation. Available USEPA emissions factors (AP-42, Compilation of Air Emissions Factors) were used (USEPA 2013).

Table F-3 provides the detailed results of the calculated annual air emissions for each type of munition.

Pollutant Emissions = $EF * Qty / 2,000$

Pollutant Emissions = emissions for the associated pollutant (tpy)

EF = emissions factor for the associated pollutant (pounds per item)

Qty = quantity (item per year)

2,000 = conversion factor from pounds to tons (1 ton = 2,000 pounds)

Table F-2. Munitions Emissions Factors

NEW ¹ (lb/item)	Pounds per item					
	VOC	NO _x ²	CO	SO _x ²	PM ₁₀	PM _{2.5}
650-1,000	7.01	866.25	554.89	8.25	1.41	0.08
250-500	7.01	393.75	554.89	3.75	0.71	0.04
100-250	11.73	183.75	796	1.75	0.27	0.02
20-60	3.91	42.0	429.67	0.4	0.01	0.0004
0-20	1.64	10.5	117	0.1	0.0000015	0.0000000868
Inert	0.00	0.00	0.00	0.00	0.00	0.00

Key: AIM – Air Intercept Missile; CO – carbon monoxide; GBU – Guided Bomb Unit; NEW – net explosive weight; NO_x – nitrogen oxides; PM₁₀ - less than or equal to 10 microns in diameter PM_{2.5} – less than or equal to 2.5 microns in diameter; SO_x – sulfur oxides VOC – volatile organic compound

Notes:

¹ NEW refers to the equivalent amount of trinitrotoluene. The actual weight of a munition may be heavier due to other components.

² Emissions factors for NO_x and SO_x were derived from the air quality analysis in the 2014 *F-35 Supplemental Environmental Impact Statement*.

Sources: USEPA 2013

Table F-3. Estimated Munitions Emissions from the Proposed Action

Proposed Action Munitions Type	Example Munition	NEW (lb/item)	Proposed Action Quantity	Tons per year					
				VOC	NO _x	CO	SO _x	PM ₁₀	PM _{2.5}
GBU with a 500-pound bomb warhead	GBU-12	192	1	0.003505	0.091875	0.277445	0.000875	0.000705	0.00004
GBU with a 1,000-pound bomb warhead	GBU-32	445	1	0.003505	0.196875	0.277445	0.001875	0.000355	0.00002
GBU with a 2,000-pound bomb warhead	GBU-31	945	1	0.005865	0.433125	0.398	0.004125	0.000135	0.00001
AIM-9	AIM-9	28	1	0.001955	0.021	0.214835	0.0002	0.000005	0.0000002
AIM-120	AIM-120	17	1	0.00082	0.00525	0.0585	0.00005	0.00000000075	0.000000000434
Inert	Inert	0	95	0.00	0.00	0.00	0.00	0.00	0.00
Total				0.01565	0.748125	1.226225	0.007125	0.0012	0.0000702

Key: AIM – Air Intercept Missile; CO – carbon monoxide; GBU – Guided Bomb Unit; NEW – net explosive weight; NO_x – nitrogen oxides; PM₁₀ - less than or equal to 10 microns in diameter PM_{2.5} – less than or equal to 2.5 microns in diameter; SO_x – sulfur oxides VOC – volatile organic compound

Notes: ¹ NEW refers to the equivalent amount of trinitrotoluene. The actual weight of a munition may be heavier due to other components.

F.3 Social Cost of Greenhouse Gases Calculations

The social cost of greenhouse gases (GHGs) was calculated for the Proposed Action. The “social cost of GHGs” is an estimate of the monetized damages associated with incremental increases in GHG emissions, such as reduced agricultural productivity, human health effects, property damage from increased flood risk, and the value of ecosystem services. The social cost of the three primary GHGs (i.e., carbon dioxide [CO₂], methane [CH₄], and nitrous oxide [N₂O]) for the year 2026 are shown in **Table F-4**. Estimated annual GHG emissions for the Proposed Action are shown in **Table F-5**.

Table F-4. 2026 Social Cost of GHGs

GHG	Social Cost (\$ per metric ton)
CO ₂	57
CH ₄	1,800
N ₂ O	21,000

Note: Social cost shown uses a 3 percent average discount rate

Source: IWG-SCGHG 2021

Table F-5. Annual Estimated GHG Emissions from the Proposed Action

Year	CO ₂ e (tons per year)	CO ₂ e (metric tons per year)
2024	665.1	603.4
2025	1,508.5	1,368.5
2026	1,828.8	1,659.1
2027 and Later	4,955.3	4,495.4

Note: 1 US ton is equal to 0.907 metric tons.

The annual social cost of GHGs was calculated for the construction and aircraft transition period (2024 through 2026) and for F-35A DT operations (2027 and later). To calculate social cost of GHGs, CO₂e emissions were broken down using the following distribution assumption: 80 percent CO₂, 13 percent CH₄, and 7 percent N₂O (USEPA 2022).

CO₂e is a representation GHG emissions relative to a reference gas, CO₂. It is calculated by adding GHGs which have been multiplied by their global warming potential (GWP). CO₂ has a GWP equal to 1, while the GWP of CH₄ is 25 and the GWP of N₂O is 298. Based on these assumptions, the following equation was used to calculate the social cost of GHGs. **Table F-6** shows the social cost of GHGs that were calculated for the Proposed Action.

$$\text{Social Cost} = 57((\text{CO}_2\text{e} \times 0.8)/1) + 1,800((\text{CO}_2\text{e} \times 0.13)/25) + 21,000((\text{CO}_2\text{e} \times 0.07)/298)$$

Social Cost = social cost of GHGs (\$)

57 = social cost of CO₂ (\$ per metric ton)

CO₂e = equivalent emissions of CO₂ (metric tons)

0.8 = percent of CO₂e that is CO₂

1 = GWP of CO₂

1,800 = social cost of CH₄ (\$ per metric ton)

0.13 = percent of CO₂e that is CH₄

25 = GWP of CH₄
 21,000 = social cost of N₂O (\$ per metric ton)
 0.07 = percent of CO₂e that is N₂O
 298 = GWP of N₂O

Table F-5. Social Cost of GHGs for the Proposed Action

Year	CO ₂ e (metric ton)	Social Cost
2024	603.4	36,139.37
2025	1,368.5	81,963.41
2026	1,659.1	99,368.29
2027 and Later	4,495.4	269,242.48

F.4 References

Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (IWG-SCGHG). 2021. *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*. February 26, 2021.

U.S. Environmental Protection Agency (USEPA) 2008. *Chapter 15: Ordnance Detonation*. In AP-42, Fifth Edition, Volume I. February 2008. Available online: <<https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors>>. Accessed May 8, 2023.

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G

Biological Resources
Supporting Documentation



G. Appendix G: Biological Resources Supporting Documentation

Table G-1. Protected Species List for Eglin AFB

Common Name	Species Name	Status
Birds		
American oystercatcher	<i>Haematopus palliatus</i>	ST
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA
Black skimmer	<i>Rynchops niger</i>	ST
Eastern black rail	<i>Laterallus jamaicensis ssp. jamaicensis</i>	FT
Florida burrowing owl	<i>Athene cunicularia floridana</i>	ST
Florida sandhill crane	<i>Antigone canadensis pratensis</i>	ST
Least tern	<i>Sternula antillarum</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Marian's marsh wren	<i>Cistothorus palustris marianae</i>	ST
Piping plover	<i>Charadrius melodus</i>	FT
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Reddish egret	<i>Egretta rufescens</i>	ST
Rufa red knot	<i>Calidris canutus rufa</i>	FT
Snowy plover	<i>Charadrius nivosus</i>	ST
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Tricolored heron	<i>Egretta tricolor</i>	ST
Mammals		
Atlantic spotted dolphin*	<i>Stenella frontalis</i>	MMPA
Beaked whales*	<i>Mesoplodon spp.</i>	MMPA
Blue whale*	<i>Balaenoptera musculus</i>	E/MMPA
Bottlenose dolphin*	<i>Tursiops truncatus</i>	MMPA
Bryde's whale*	<i>Balaenoptera edeni</i>	MMPA
Clymene dolphin*	<i>Stenella clymene</i>	MMPA
Dwarf/pygmy sperm whale*	<i>Kogia spp.</i>	MMPA
False killer whale*	<i>Pseudorca crassidens</i>	MMPA
Finback whale*	<i>Balaenoptera physalus</i>	E/MMPA
Florida black bear	<i>Ursus americanus floridanus</i>	BBCR
Fraser's dolphin*	<i>Lagenodelphis hosei</i>	MMPA
Humpback whale*	<i>Megaptera novaeangliae</i>	E/MMPA
Killer whale*	<i>Orcinus</i>	MMPA
Melon-headed whale*	<i>Peponocephala electra</i>	MMPA
Pantropical spotted dolphin*	<i>Stenella attenuata</i>	MMPA
Pygmy killer whale*	<i>Feresa attenuate</i>	MMPA
Rice's whale*	<i>Balaenoptera ricei</i>	E/MMPA
Risso's dolphin*	<i>Grampus griseus</i>	MMPA
Rough-toothed dolphin*	<i>Steno bredanensis</i>	MMPA
Sei whale*	<i>Balaenoptera borealis</i>	E/MMPA
Short-finned pilot whale*	<i>Globicephalus spp.</i>	MMPA
Spinner dolphin*	<i>Stenella longirostris</i>	MMPA
Sperm Whale*	<i>Physeter macrocephalus</i>	E/ MMPA
Striped dolphin*	<i>Stenella coeruleoalba</i>	MMPA

Common Name	Species Name	Status
West Indian manatee	<i>Trichechus manatus</i>	T/MMPA
Reptiles		
Alligator snapping turtle	<i>Macrolemys temmincki</i>	FT
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)
Atlantic green sea turtle*	<i>Chelonia mydas</i>	FT
Eastern diamondback rattlesnake	<i>Crotalus adamanteus</i>	FP
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Escambia Map Turtle	<i>Graptemys ernsti</i>	FP
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	ST, FP
Gopher Tortoise	<i>Gopherus polyphyemus</i>	FT, ST
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	FE
Leatherback sea turtle	<i>Dermochelys coriacea</i>	FE
Loggerhead sea turtle	<i>Caretta caretta</i>	FT
Southern hognose snake	<i>Heterodon simus</i>	FP
Amphibians		
Florida bog frog	<i>Lithobates okaloosae</i>	ST
Gopher frog	<i>Lithobates capito</i>	FP
One-toed Amphiuma	<i>Amphiuma pholeter</i>	FP
Reticulated flatwoods salamander	<i>Ambystoma bishopi</i>	FE
Fishes		
Blackmouth shiner	<i>Notropis melanostomus</i>	ST
Bluenose shiner	<i>Pteronotropis welaka</i>	ST
Giant manta ray*	<i>Manta birostris</i>	FT
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	FT
Oceanic whitetip shark*	<i>Carcharhinus longimanus</i>	FT
Okaloosa darter	<i>Etheostoma okaloosae</i>	FT
Saltmarsh topminnow	<i>Fundulus jenkinsi</i>	ST
Insects		
Monarch Butterfly	<i>Danaus plexippus</i>	FC
Plants		
Alabama spiney pod	<i>Matela alabamensis</i>	SE
Arkansas oak	<i>Quercus arkansana</i>	ST
Ashe's magnolia	<i>Magnolia ashei</i>	SE
Baltzell's sedge	<i>Carex baltzellii</i>	ST
Beaked spikerush	<i>Eleocharis rostellata</i>	SE
Bog spice bush	<i>Lindera subcoriacea</i>	SE
Carolina lily	<i>Lilium michauxii</i>	SE
Chaffseed	<i>Schwalbea americana</i>	SE
Coville's rush	<i>Juncus gymnocarpus</i>	SE
Cruise's golden-aster	<i>Chrysopsis cruiseana</i>	SE
Curtiss' sand grass	<i>Calamovilfa curtissii</i>	ST
Dwarf witch-alder	<i>Fothergilla gardenii</i>	SE
Eared coneflower	<i>Rudbeckia auriculata</i>	SE
Florida perforate lichen	<i>Cladonia perforata</i>	FE
Green adder's-mouth	<i>Malaxis unifolia</i>	SE
Godfrey's golden aster	<i>Chrysopsis godfreyi</i>	SE
Gulf coast lupine	<i>Lupinus westianus</i>	ST
Hairy-peduncled beakrush	<i>Rhynchospora crinipes</i>	SE

Common Name	Species Name	Status
Harper's yellow-eyed grass	<i>Xyris scabrifolia</i>	ST
Heartleaf	<i>Hexastylis arifolia</i>	ST
Hummingbird flower	<i>Macranthera flammea</i>	SE
Indian cucumber-root	<i>Medeola virginiana</i>	SE
Karst pond yellow-eyed grass	<i>Xyris longisepala</i>	SE
Large-leaved jointweed	<i>Polygonella macrophylla</i>	ST
Little club-spur orchid	<i>Platanthera clavellata</i>	SE
Many-flowered grass-pink	<i>Calopogon multiflorus</i>	SE
Mountain laurel	<i>Kalmia latifolia</i>	ST
Mrs. Henry's spider lily	<i>Hymenocallis henryae</i>	SE
Naked-stemmed panic grass	<i>Panicum nudicaule</i>	ST
Yellow fringeless orchid	<i>Platanthera integra</i>	SE
Orange azalea	<i>Rhododendron austrinum</i>	SE
Panhandle bogbuttons	<i>Lachnocaulon digynum</i>	ST
Panhandle lily	<i>Lilium iridollae</i>	SE
Panhandle meadow-beauty	<i>Rhexia salicifolia</i>	ST
Piedmont jointgrass	<i>Coelorachis tuberculosa</i>	ST
Pine barren false-foxglove	<i>Agalinis georgiana</i>	SE
Pine-woods bluestem	<i>Andropogon arctatus</i>	ST
Pineland hoary-pea	<i>Tephrosia mohrii</i>	ST
Pineland wild indigo	<i>Baptisia calycosa var villosa</i>	ST
Pine sap	<i>Monotropa hypopithys</i>	SE
Pondspice	<i>Litsea aestivalis</i>	SE
Primrose-flowered butterwort	<i>Pinguicula primuliflora</i>	SE
Pyramid magnolia	<i>Magnolia pyramidata</i>	SE
Serviceberry holly	<i>Ilex amelanchar</i>	ST
Silky camellia	<i>Stewartia malacodendron</i>	SE
Small-flowered meadow beauty	<i>Rhexia parviflora</i>	SE
Southern milkweed	<i>Asclepias viridula</i>	ST
Sweet pitcherplant	<i>Sarracenia rubra</i>	ST
Sweet shrub	<i>Calycanthus floridus var floridus</i>	SE
Thorne's buckthorn	<i>Sideroxylon thornei</i>	SE
Toothed savory	<i>Calamintha dentata</i>	ST
Trailing arbutus	<i>Epigaea repens</i>	SE
Umbrella magnolia	<i>Magnolia tripetala</i>	SE
West's flax	<i>Linum westii</i>	SE
Wild pink	<i>Silene caroliniana</i>	SE
Yellow-root	<i>Xanthorhiza simplicissima</i>	SE

Key: * – Species present in the EGTR; AFB – Air Force Base; BCCR – Black Bear Conservation Rule; BGEPA – Bald Golden Eagle Protection Act; C – candidate for listing (federal designation); F – Federal; E – endangered; MMPA – Marine Mammal Protection Act; P – species petitioned for federal listing; S – State; T – threatened; T (S/A) – Threatened due to similarity of appearance

Sources:

U.S. Fish and Wildlife Service (USFWS). 2022. *Information for Planning and Consultation Official Species List for Eglin AFB*. U.S. Department of the Interior. September 2022.

Eglin AFB. 2022. *Integrated Natural Resources Management Plan (INRMP)*, Eglin Air Force Base, Florida. August 2017 to July 2022.

Eglin AFB. 2020. *Final Threatened and Endangered Species Component Plan Update*. June 2020.

Table G-2. Protected Species That May Occur Under ETTC Airspace

Common Name	Species Name	Status
Mammals		
Alabama beach mouse	<i>Peromyscus polionotus ammobates</i>	FE
Carolina northern flying squirrel	<i>Glaucomys sabrinus coloratus</i>	FE
Gray bat	<i>Myotis grisescens</i>	FE
Indiana bat	<i>Myotis sodalis</i>	FE
Perdido Key beach mouse	<i>Peromyscus polionotus trissyllepsis</i>	FE
Virginia big-eared bat	<i>Corynorhinus townsendii virginianus</i>	FE
Insects		
Saint Francis' satyr butterfly	<i>Neonympha mitchellii fransisci</i>	FE

Key: F – Federal; E – endangered; ETTR – Eglin Test and Training Range

Source: Eglin AFB. 2022. *Integrated Natural Resources Management Plan (INRMP)*, Eglin Air Force Base, Florida. October 2022.

Table G-3. Protected Species List for Tyndall AFB

Common Name	Species Name	Status
Birds		
American oystercatcher	<i>Haematopus palliatus</i>	SSC
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA
Black skimmer	<i>Rhychops niger</i>	ST
Brown pelican	<i>Pelecanus occidentalis</i>	SSC
Eastern black rail	<i>Laterallus jamaicensis ssp. jamaicensis</i>	FT
Least tern	<i>Sterna antillarum</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Marian's marsh wren	<i>Cistothorus palustris marianae</i>	ST
Piping plover	<i>Charadrius melodus</i>	FT
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Rufa red knot	<i>Calidris canutus rufa</i>	FT
Reddish egret	<i>Egretta rufescens</i>	ST
Snowy egret	<i>Egretta thula</i>	SSC
Snowy plover	<i>Charadrius alexandrinus tenuirostris</i>	ST
Southeastern American kestrel	<i>Falco sparverius paulus</i>	ST
Tricolor heron	<i>Egretta tricolor</i>	ST
White ibis	<i>Eudocimus albus</i>	SSC
Wood stork	<i>Mycteria americana</i>	FT
Mammals		
Atlantic spotted dolphin	<i>Stenella frontalis</i>	MMPA
Beaked whales	<i>Mesoplodon spp.</i>	MMPA
Bottlenose dolphin	<i>Tursiops truncatus</i>	MMPA
Bryde's whale	<i>Balaenoptera edeni</i>	MMPA
Choctawhatchee beach mouse	<i>Peromyscus polionotus allophrys</i>	FE
Clymene dolphin	<i>Stenella clymene</i>	MMPA
Dwarf/pygmy sperm whale	<i>Kogia spp.</i>	MMPA
False killer whale	<i>Pseudorca crassidens</i>	MMPA
Florida black bear	<i>Ursus americanus floridanus</i>	BBCR
Florida manatee	<i>Trichechus manatus latirostris</i>	FE
Fraser's dolphin	<i>Lagenodelphis hosei</i>	MMPA
Killer whale	<i>Orcinus</i>	MMPA
Melon-headed whale	<i>Peponocephala electra</i>	MMPA

Common Name	Species Name	Status
Pantropical spotted dolphin	<i>Stenella attenuata</i>	MMPA
Pygmy killer whale	<i>Feresa attenuate</i>	MMPA
Risso's dolphin	<i>Grampus griseus</i>	MMPA
Rough-toothed dolphin	<i>Steno bredanensis</i>	MMPA
Short-finned pilot whale	<i>Globicephalus spp.</i>	MMPA
Southeastern fox squirrel	<i>Sciurus niger</i>	SSC(S/A)
Spinner dolphin	<i>Stenella longirostris</i>	MMPA
Sperm whale	<i>Physeter macrocephalus</i>	FE/MMPA
St. Andrew beach mouse	<i>Peromyscus polionotus peninsularis</i>	FE
Striped dolphin	<i>Stenella coeruleoalba</i>	MMPA
West Indian manatee	<i>Trichechus manatus</i>	FT
Reptiles		
Alligator snapping turtle	<i>Macroclmys temminckii</i>	PT
American alligator	<i>Alligator mississippiensis</i>	T(S/A)
Eastern indigo snake	<i>Drymarchon couperi</i>	FT
Florida pine snake	<i>Pituophis melanoleucus mugitus</i>	SSC
Gopher tortoise	<i>Gopherus polyphemus</i>	FT/ST
Green sea turtle	<i>Chelonia mydas</i>	FE
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	FE
Leatherback sea turtle	<i>Dermochelys coriacea</i>	FE
Loggerhead sea turtle	<i>Caretta caretta</i>	FT
Amphibians		
Gopher frog	<i>Rana capito</i>	SSC
Fishes		
Gulf sturgeon	<i>Acipenser oxyrinchus desotoi</i>	FT
Smalltooth sawfish	<i>Pristis pectinata</i>	FE
Insects		
Monarch butterfly	<i>Danaus plexippus</i>	FC
Plants		
Apalachicola aster	<i>Eurybia spinulosa</i>	SE
Apalachicola dragonhead	<i>Physotegia godfreyi</i>	ST
Chapman's crownbeard	<i>Verbesina chapmanii</i>	ST
Chapman's butterwort	<i>Pinguicula planifolia</i>	ST
Dew thread sundew	<i>Drosera filiformis</i>	SE
Giant water dropwort	<i>Oxypolis greenmanii</i>	SE
Godfrey's butterwort	<i>Pinguicula ionantha</i>	FT
Godfrey's golden aster	<i>Chrysopsis godfreyi</i>	SE
Gulf coast lupine	<i>Lupinus westianus</i>	ST
Harper's yellow-eyed grass	<i>Xyris scabrifolia</i>	ST
Henry's spider lily	<i>Hymenocallis henryae</i>	UR
Karst pond yellow-eyed grass	<i>Xyris longisepala</i>	SE
Large-leaved jointweed	<i>Polygonella macrophylla</i>	ST
Purple pitcher plant	<i>Sarracenia rosea</i>	ST
Parrot pitcher plant	<i>Sarracenia psittacina</i>	ST
Quillwort yellow-eyed grass	<i>Xyris isoetifolia</i>	SE
Small spreading pogonia	<i>Pogonia bifaria</i>	SE
Snakemouth orchid	<i>Pogonia ophioglossoides</i>	ST
Southern milkweed	<i>Asclepias viridula</i>	ST

Common Name	Species Name	Status
Southern red lily	<i>Lilium catesbaei</i>	ST
Spoon-leafed sundew	<i>Drosera intermedia</i>	ST
Telephus spurge	<i>Euphorbia telephioides</i>	FT/SE
Thick-leaved water willow	<i>Justicia crassifolia</i>	SE
White-flowered wild petunia	<i>Ruellia noctiflora</i>	SE
Wiregrass gentian	<i>Gentiana pennelliana</i>	SE
Yellow-flowered butterwort	<i>Gentiana pennelliana</i>	ST

Key: AFB – Air Force Base; BBCR – Black Bear Conservation Rule; BGEPA – Bald Golden Eagle Protection Act; C – candidate for listing; F – Federal; E – endangered; MMPA – Marine Mammal Protection Act; P – Proposed (federal designation); S – State; SSC – Species of Special Concern (state designation); T – threatened; T (S/A) – Threatened due to similarity of appearance; UR – Under Review (federal designation)

Sources:

USFWS. 2022. *Information for Planning and Consultation Official Species List for Tyndall AFB*. U.S. Department of the Interior. September 2022.

Tyndall AFB. 2020. U.S. Air Force Integrated Natural Resources Management Plan, Tyndall AFB. 2020. USAF Integrated Natural Resources Management Plan, Tyndall AFB. 2020. Available online: <https://www.tyndall.af.mil/Portals/107/documents/2020_Tyndall_AFB_INRMP.pdf?ver=2020-06-04-172116-880>. Accessed June 15, 2023.

Table G-4. Protected Species That May Occur Under GRASI Airspace

Common Name	Species Name	Status
Birds		
American oystercatcher	<i>Haematopus palliatus</i>	ST
Audubon's crested caracara	<i>Polyborus plancus audubonii</i>	FT
Bachman's sparrow	<i>Peucaea aestivalis</i>	GR
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGEPA
Black skimmer	<i>Rhychops niger</i>	ST
Brown pelican	<i>Pelecanus occidentalis</i>	SSC
Eastern black rail	<i>Laterallus jamaicensis</i> spp. <i>Jamaicensis</i>	PT
Everglade snail kite	<i>Rostrhamus sociabilis plumbeus</i>	FE
Florida grasshopper sparrow	<i>Ammodramus savannarum floridanus</i>	FE
Florida scrub-jay	<i>Aphelocoma coerulescens</i>	FT
Florida burrowing owl	<i>Athene cunicularia floridana</i>	ST
Florida sandhill crane	<i>Antigone canadensis pratensis</i>	ST
Henslow's sparrow	<i>Ammodramus henslowii</i>	GR
Ivory-billed woodpecker	<i>Cempephilus principalis</i>	FE
Least tern	<i>Sternula antillarum</i>	ST
Little blue heron	<i>Egretta caerulea</i>	ST
Limpkin	<i>Aramus guarauna</i>	SCC
Piping plover	<i>Charadrius melodus</i>	FT
Red-cockaded woodpecker	<i>Picoides borealis</i>	FE
Red knot	<i>Calidris canutus rufa</i>	FT
Reddish egret	<i>Egretta rufescens</i>	ST
Roseate spoonbill	<i>Ajaia ajaja</i>	ST
Snail kite	<i>Rostrhamus sociabilis plumbeus</i>	ST
Snowy egret	<i>Egretta thula</i>	ST
Snowy plover	<i>Charadrius alexandrinus tenuirostris</i>	ST
Southeastern American kestrel	<i>Falco sparverius Paulus</i>	ST
Swallowed tail kite	<i>Elanoides forficatus</i>	GR
Tricolored heron	<i>Egretta tricolor</i>	ST
White ibis	<i>Eudocimus albus</i>	SSC
Whooping crane	<i>Grus americana</i>	EXPN
Wood stork	<i>Mycteria americana</i>	FT
Mammals		
Choctawatchee beach mouse	<i>Peromyscus polionotus allophrys</i>	FE
Florida bonneted bat	<i>Eumops floridanus</i>	FE
Florida panther	<i>Puma concolor coryi</i>	FE
Gray bat	<i>Myotis grisescens</i>	FE
Puma	<i>Puma concolor</i>	FT (S/A)
Florida black bear	<i>Ursus americanus floridanus</i>	BBRC
St. Andrew beach mouse	<i>Peromyscus polionotus peninsularis</i>	ST
Southeastern beach mouse	<i>Peromyscus polionotus niveiventris</i>	GT
Sherman's fox squirrel	<i>Sciurus niger shermani</i>	SSGC
West Indian manatee	<i>Trichechus manatus</i>	FE
Reptiles		
Alligator snapping turtle	<i>Macrochelys temminckii</i>	GT
American alligator	<i>Alligator mississippiensis</i>	FT (S/A)

Common Name	Species Name	Status
Atlantic salt marsh snake	<i>Nerodia clarkii taeniata</i>	ST
Barbour's map turtles	<i>Graptemys barbouri</i>	GT
Bluetail mole skink	<i>Eumeces egregious lividus</i>	FT
Eastern indigo snake	<i>Drymarcon corais couperi</i>	FT
Florida pine snake	<i>Pituophis melanoleucus mungitus</i>	ST
Gopher tortoise	<i>Gopherus polyhemus</i>	FT, ST
Green Sea Turtle	<i>Chelonia mydas</i>	FE
Hawksbill sea turtle	<i>Eretmochelys imbricata</i>	FE
Kemp's Ridley sea turtle	<i>Lepidochelys kempii</i>	FE
Leatherback sea turtle	<i>Dermochelys coriacea</i>	FE
Loggerhead sea turtle	<i>Caretta caretta</i>	FT
Mimic glass lizard	<i>Ophisaurus mimicus</i>	GR
Sand skink	<i>Neoseps reynoldsi</i>	FT
Short-tailed snake	<i>Stilosoma extenuatum</i>	ST
Southern hognose snake	<i>Heterodon simus</i>	GT
Suwannee cooter	<i>Pseudemys concinna suwanniensis</i>	SSC
Amphibians		
Frosted flatwoods salamander	<i>Ambystoma cingulatum</i>	FT
Georgia blind salamander	<i>Eurycea wallacei</i>	GT
Gopher frog	<i>Rana capito</i>	SSC
Striped newt	<i>Notophthalmus perstriatus</i>	GT
Reticulated flatwoods salamander	<i>Ambystoma bishop</i>	FE
One-toed amphiuma	<i>Amphiuma pholeter</i>	GR
Fishes		
Alabama shad	<i>Alosa alabamae</i>	GT
Atlantic sturgeon	<i>Acipenser ocinchnus</i>	FT
Blackbanded sunfish	<i>Enneacanthus chaetodon</i>	GE
Bluenose shiner	<i>Pteronotropis welaka</i>	ST
Bluefin killifish	<i>Lucania goodie</i>	GR
Bluestripe shiner	<i>Cypinella callitaenia</i>	GR
Broadstriped shiner	<i>Pteronopropis euryzonus</i>	GR
Goldstripe darter	<i>Etheostoma parvipinne</i>	GR
Halloween darter	<i>Percian crypta</i>	GR
Highscale chines	<i>Notropis hysilepis</i>	GR
Robust redhorse	<i>Moxostoma robustum</i>	GE
Tessellated darter	<i>Etheostoma olmstedii</i>	SSC
Spotten bullhead	<i>Ameiurus serracanthus</i>	GR
Suwannee bass	<i>Micropterus notius</i>	GR
Crustaceans		
Dougherty borrowing crayfish	<i>Cambarus doughertyensis</i>	GE
Muckalee crayfish	<i>Procambarus gibbus</i>	GT
Oconee borrowing crayfish	<i>Cambarus truncates</i>	GT
Panama City crayfish	<i>Procambarus econfinae</i>	PT
Sly crayfish	<i>Procambarus versutus</i>	GR
Clams		
Altamaha arc mussel	<i>Alasmidonta arcula</i>	GT
Apalachicola floaterr	<i>Utterbackiana herdi</i>	GR
Chipola slabshell	<i>Elliptio chiolaensis</i>	FT

Common Name	Species Name	Status
Choctaw bean	<i>Villosa choctawensis</i>	FE
Delicate spike	<i>Elliptio arcata</i>	GE
Fate threeridge	<i>Amblema neislerii</i>	FE
Fuzzy pigtoe	<i>Pleurobema strodeanum</i>	FT
Gulf moccasinshell	<i>Midionidus penicillatus</i>	FE
Inflated spike	<i>Elliptio purpurella</i>	GT
Ochlockonee moccasinshell	<i>Medionidus simpsonianus</i>	FE
Oval pigtoe	<i>Pleurobema pyriforme</i>	FE
Purple bankclimber	<i>Elliptioideus sloatianus</i>	FT
Rayed creekshell	<i>Strophitus radiatus</i>	GT
Shinyrayed pocketbook	<i>Lampsilis subangulata</i>	FE
Southern kidneyshell	<i>Hamiota australis</i>	FT
Southern sandshell	<i>Hamiota australis</i>	FT
Suwannee miccasinshell	<i>Medionidus walker</i>	FT
Tapered pigtoe	<i>Fusconaia burkei</i>	FT

Key: BCCR – Black Bear Conservation Rule; BGEPA – Bald Golden Eagle Protection Act; C – candidate for listing; E – endangered; EXPN – Experimental population; F – Federal; G – Georgia; GRASI – Gulf Regional Airspace Strategic Initiative; R – Rare; S – State; SSC – Species of Special Concern (state designation); SSGN – Species of Greatest Need; T – threatened; T (S/A) – Threatened due to similarity of appearance

Source:

Tyndall AFB. 2020. U.S. Air Force Integrated Natural Resources Management Plan, Tyndall AFB. 2020. USAF Integrated Natural Resources Management Plan, Tyndall AFB. 2020. Available online:
https://www.tyndall.af.mil/Portals/107/documents/2020_Tyndall_AFB_INRMP.pdf?ver=2020-06-04-172116-880.
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