Final Environmental Assessment
Combat Air Forces Contracted Adversary Air
Temporary Operations From Tyndall AFB, Florida

September 2020

United States Air Force

325th Fighter Wing
Tyndall Air Force Base, Florida

<u>PRIVACY ADVISORY</u>

This Environmental Assessment (EA) is provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality (CEQ) NEPA Regulations (40 CFR Parts 1500 to 1508), and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*.

The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.

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COVER SHEET

ENVIRONMENTAL ASSESSMENT (EA) FOR COMBAT AIR FORCES CONTRACTED ADVERSARY AIR FROM TYNDALL AIR FORCE BASE

a. *Responsible Agency*: United States Air Force (Air Force)

b. *Cooperating Agency*: None

c. *Proposals and Actions:* The environmental assessment (EA) analyzes a Proposed Action to provide dedicated contract adversary air (ADAIR) sorties for Combat Air Forces training on a temporary basis from Tyndall Air Force Base (AFB) in support of the pilots of the 33rd Fighter Wing and 325th Fighter Wing operating from Eglin AFB, Florida. The Air Force proposes to temporarily operate contract ADAIR from Tyndall AFB, FL for up to 24 months. The Proposed Action would include the addition of 78 contracted maintainers and 15 contracted pilots. Approximately 2,320 contracted sorties would be added to perform training activities within Warning Areas W-151 and W-470, the Rose Hill Military Operations Area (MOA)/Air Traffic Control Assigned Airspace (ATCAA), the Eglin E MOA/ATCAA, and the Tyndall B, C/H and E MOAs, the Compass Lake and Carrabelle ATCAAs. The existing facilities at Tyndall AFB would include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action. The Proposed Action in addition to the No Action Alternative was evaluated in the EA.

d. *For Additional Information: 325 CES/CEIEC, Attn: Draft Environmental Assessment for Combat Air Forces Contracted Adversary Air From Tyndall Air Force Base, Florida. 540 Mississippi Ave Building 36270 Tyndall AFB, FL 32403*

e. *Designation:* Draft EA

f. *Abstract:* This EA has been prepared pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code Sections 4321 to 4347, implemented by Council on Environmental Quality Regulations, Title 40, Code of Federal Regulations (CFR) Parts 1500 to 1508, and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; cultural resources; and hazardous waste and material.

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness for pilots of the 33rd Fighter Wing located at Eglin AFB, Florida and the 325th Fighter Wing, temporarily located at Eglin AFB. By providing a dedicated contract ADAIR capability, F-35 and F-22 pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force units that are tasked to provide ADAIR training support at Eglin AFB could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

Contract ADAIR training scenarios would include the use of combat tactics and procedures that differ from Combat Air Forces tactics to simulate an opposing force. The elements affecting Tyndall AFB would be contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. Elements affecting the airspace would be airspace use and defensive countermeasures. The Proposed Action at Tyndall AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft. Six aircraft types (MiG-29, F-5, Dassault Mirage, F-16, Eurofighter Typhoon, JAS-39 Gripen) have been identified as capable of providing contract ADAIR support for Eglin AFB based on performance capabilities of the aircraft and how those capabilities best meet mission training requirements at the installation. Contract ADAIR service providers may ultimately choose another type of aircraft to support Air Force ADAIR needs for Eglin AFB; however, any aircraft selected would need to operate within the parameters and impact levels evaluated within this EA or supplemental NEPA analysis would be required. The facilities proposed to support contract ADAIR at Tyndall AFB are available for use and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action.

The analysis of the affected environment and environmental consequences of implementing the Proposed Action and alternatives concluded that by implementing standing environmental protection measures and Best Management Practices, there would be no significant adverse impacts from contract ADAIR operations at Tyndall AFB or in the special use airspace on the following resources: airspace management and use; noise; safety; air quality; biological resources; land use; socioeconomics – income and employment; environmental justice and protection of children; cultural resources; and hazardous materials and wastes, contaminated sites, and toxic substances. Tyndall AFB is an active installation with demolition and new construction actions currently underway as well as future development currently in the planning phase; however, significant cumulative impacts are not anticipated from activities associated with the Proposed Action when considered with past, present, or reasonably foreseeable future actions.

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FINDING OF NO SIGNIFICANT IMPACT (FONSI)

COMBAT AIR FORCES CONTRACTED ADVERSARY AIR IN SUPPORT OF EGLIN AIR FORCE BASE, FLORIDA FROM TYNDALL AIR FORCE BASE, FLORIDA

Pursuant to provisions of the National Environmental Policy Act, 42 United States Code (U.S.C.) §§ 4321 to 4370h; Council on Environmental Quality Regulations, 40 Code of Federal Regulations (CFR) Parts 1500 to 1508; and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP),* the United States Air Force (Air Force) prepared the attached Draft Environmental Assessment (EA) to address the potential environmental consequences associated with providing contract adversary air (ADAIR) sorties for improving training and readiness of pilots at Eglin Air Force Base (AFB), Florida from Tyndall AFB.

Purpose and Need

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of 33rd Fighter Wing (33 FW) pilots located at Eglin AFB, Florida and 325th Fighter Wing (325 FW) pilots temporarily located at Eglin AFB. Contract ADAIR would operate from Tyndall AFB, Florida in support of Eglin AFB for up to 24 months while the AF determines a proposed permanent location for contract ADAIR to operate from. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. By providing a dedicated contract ADAIR capability, Combat Air Forces (CAF) fighter pilots would gain more realistic air-to-air training during their training syllabus tasks. Dedicated contract ADAIR would also allow the unit to free up resources used to self-generate ADAIR and more effectively use those available flying hours. Additionally, other Air Force units tasked to provide ADAIR training support for Eglin AFB could recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

The need for the action is to provide better and more realistic training for the flight training program at Eglin AFB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ CAF tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multi-aircraft air combat required by the training syllabus. Eglin AFB does not have the existing capacity to host the ADAIR mission from its flightline. Due to the near-term need for ADAIR training, a suitable temporary location with existing facilities and access to the Eglin Gulf Test and Training Range is required for ADAIR operations to support the 33rd and 325th Fighter Wings.

Description of Proposed Action and Alternatives

The Proposed Action would provide dedicated contract ADAIR sorties for CAF training to support the 33rd Fighter Wing and 325th Fighter Wing at Eglin AFB. Contract ADAIR would operate from Tyndall AFB for up to 24 months while the AF determines a permanent location. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The elements affecting Tyndall AFB include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

The Proposed Action at Tyndall AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft. Six aircraft types (MiG-29, F-5, Dassault Mirage, F-16, Eurofighter Typhoon, and JAS-39 Gripen) have been identified as capable of providing contract ADAIR support to CAF aircrews stationed at Eglin AFB. One or a combination of these aircraft types may be operated by a contractor at Tyndall AFB in support of ADAIR training. Contract ADAIR operations are proposed to occur in Building 503. Aircraft Maintenance Unit activities, including hangar space for aircraft maintenance, are proposed to be conducted in a temporary clamshell-like structure to be erected on existing pavement in the flightline area. Following training sorties, contract ADAIR pilots would land and park their aircraft at Tyndall AFB on the ramp area. The facilities proposed for use at Tyndall AFB are available and include the required ramp space; maintenance space; operational space; petroleum, oil and lubricant storage; runway access; and associated parking to support the Proposed Action.

Contract ADAIR capabilities would be established using an estimated 12 aircraft providing 2,400 annual sorties in support of Eglin AFB. Of the 2,400 annual sorties, approximately 2,320 sorties annually would support training activities within nearby special use airspace including the Eglin E Military Operations Area (MOA)/Air Traffic Control Assigned Airspace (ATCAA), the Rose Hill MOA/ATCAA, Warning Areas W-151 and W-470, the Tyndall B, C/H and E MOAs and the Compass lake and Carrabelle ATCAAs. The remaining 80 annual sorties encompasses contractor aircraft fleet sustainment sorties. Contract ADAIR aircraft would employ chaff and flares in all the special use airspace with the exception of Rose Hill MOA where only flares would be employed and the Tyndall C MOA, where no chaff or flares would be employed.

No Action Alternative

No action means that an action would not take place, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. Under the No Action Alternative, contract ADAIR would not operate from Tyndall AFB. No action for this EA reflects no contract ADAIR support for Eglin AFB would occur.

Summary of Findings

Potentially affected environmental resources were identified through communications with state and federal agencies and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include airspace management and use; noise; safety; air quality; biological resources; cultural resources; and hazardous waste and material.

The baseline conditions at Tyndall AFB have substantially changed since Hurricane Michael struck the base in October 2018. The pre-hurricane conditions of 2018 are presented for resource areas where it would be useful as a point of comparison to provide context to the environmental impacts for the local public and decision makers. The 2018 baseline conditions included the 43rd Fighter Squadron F-22 formal training unit (FTU) and supporting 2nd Fighter Training Squadron T-38s, and the 95th Fighter Squadron F-22 operational squadron. The environmental consequences of contract ADAIR are assessed against these conditions and current operations for purpose of comparison. The 43rd Fighter Squadron and 2nd Fighter Training Squadron have been temporarily assigned to Eglin AFB, FL and the 95th Fighter Squadron aircraft were distributed to other Air Force F-22 squadrons. The Air Force is not proposing to return F-22s to Tyndall AFB. The AF has proposed beddowns of F-35A aircraft and an MQ-9 wing at Tyndall AFB. This contract ADAIR proposal at Tyndall AFB would arrive and depart in a 24 month period prior to arrival of any F-35A and MQ-9 aircraft, and would not conflict with any required construction for that proposed basing action. Under the Proposed Action, flight operations and sorties numbers at Tyndall AFB would increase from post-hurricane levels, but would represent a considerable reduction compared to 2018 pre-hurricane operational conditions.

Under the Proposed Action, the annual number of sorties at Tyndall AFB would be 50 percent lower than 2018 pre-hurricane conditions. F-22As at Eglin still do a portion of their airfield operations at Tyndall AFB. The ADAIR mission would not impact the operational capacity or necessitate changes to the locations or dimensions of the special use airspace. Potential impacts on the airspace around the airfield from the Proposed Action would be negligible. Contract ADAIR would include an estimated 2,320 sorties in the special use airspace. The special use airspace proposed for use has the capacity and dimensions necessary to support contracted sorties; therefore, potential negligible impacts on airspace are anticipated from the Proposed Action.

Under the Proposed Action High Noise Scenario, the area within noise contours around the Tyndall AFB airfield would be less than the baseline due to the departure of the F-22 FTU and T-38s. In addition, noise levels at representative points of interest (POIs) identified would decrease at all POIs. Changes to the noise environment in the special use airspace would be negligible.

Safety zones around the airfield are not expected to change. Existing buildings that would be utilized by contract ADAIR are located outside of identified quantity-distance arcs; therefore, no impacts on explosives safety are anticipated. With an established Crash-Damaged or Disabled Aircraft Recovery program and implementation of all applicable Air Force Occupational Safety and Health and Occupational Safety and Health Administration requirements, no significant impacts on ground safety are expected to occur. No significant impacts are expected to flight safety under the implementation of contractor flight safety rules and bird/wildlife-aircraft strike hazard (BASH) procedures.

Air emissions resulting from contract ADAIR operations at Tyndall AFB would also be less than pre-hurricane baseline conditions. The proposed project would not interfere with the region's ability to maintain compliance with National Ambient Air Quality Standards for attainment area pollutants and would not interfere with the ability to achieve compliance for pollutants that contribute to ozone nonattainment. None of the criteria pollutants emission rates would exceed the 100-tons-per-year *de minimis* threshold; therefore, no significant short-term or long-term impacts on air quality are expected from contract ADAIR operations in the airspace proposed for use.

Airfield management and risk reduction implementation measures associated with the BASH program would continue to reduce BASH potentially resulting in a minor impact on birds and other wildlife. Under the Proposed Action, there would be a substantial decrease in noise on Tyndall AFB and no substantial change within the special use airspace, therefore noise would potentially have a negligible, short- and long-term effect on wildlife. In addition, sonic booms from supersonic flights are expected during training activities; however, potential impacts on wildlife in the airspace associated with sonic booms are not expected. Aircraft movement at low altitudes in the Eglin E MOA, the Tyndall MOAs, W-151 and W-470 could have a startle effect on some bird species although training is proposed for daytime and is not expected to impact birds that generally migrate during the night and would potentially have negligible impacts.

Low-flying contract ADAIR aircraft could startle the federally listed red-cockaded woodpecker (RCW), piping plover, and red knot during training operations in the Eglin E MOA. Aircraft movement at low altitudes in the Tyndall MOAs could have a startle effect on bird species including the federally listed red-cockaded woodpecker and wood stork. Although unlikely due to the large training space within the Warning Areas, federally listed sea turtles, marine mammals, Western Indian manatee, Gulf sturgeon, giant manta ray, and oceanic whitetip shark could ingest residual plastic chaff and flare components. The Air Force has made a may affect but not likely to adversely affect determination for the RCW, wood stork, piping plover, red knot, federally listed mammals, listed sea turtles, giant manta ray, Gulf sturgeon, smalltooth sawfish, and oceanic whitetip shark. Letters requesting concurrence with this determination have been sent to the National Marine Fisheries Service and United States Fish and Wildlife Service.

No long-term changes to the existing land use, noise environment at Tyndall AFB, or land uses under the MOAs would occur due to the Proposed Action. Contract ADAIR sorties would only occur in the special use airspace where military aircraft training already occurs. No impacts on coastal zones would occur.

Since there is no new construction proposed at Tyndall AFB, potential interior upgrades to facilities for contract ADAIR operations would require only a small amount of supplies and labor and therefore, would not impact the existing socioeconomic environment. The 93 contracted ADAIR maintenance personnel and pilots would represent a small increase in the over 5,600 military and civilian personnel employed at Tyndall AFB prior to the hurricane.

No disproportionate impacts from increased noise on minority or youth populations or low-income communities surrounding Tyndall AFB or in the Eglin MOAs are expected.

Building 503 is planned to be demolished under the Tyndall recovery plan, but would be retained for the time period required to accommodate contract ADAIR. Building 503 was constructed in 1987 and is not a historic building or located in a historic district. The Proposed Action would therefore have no effect, and consequently no impact, on historic properties. No known traditional cultural properties or sacred sites have been identified at Tyndall AFB nor have any been identified as part of ongoing consultation on the Proposed Action. The Proposed Action would therefore have no effect, and consequently no impact, on traditional cultural properties or sacred sites. The Proposed Action would therefore have no effect, and consequently no impact, on archaeological resources under the special use airspace.

Hazardous waste generated as a result of contract ADAIR operations would be stored and disposed in accordance with the Tyndall AFB *Hazardous Waste Management Plan*; therefore, no impacts from managing hazardous waste are expected. The proposed action would not affect Tyndall AFB ERP/IRP sites. No impacts are expected from asbestos-containing materials and lead-based paint from interior renovations of facilities proposed for use with implementation of requirements described in existing management plans. Lighting fixtures containing polychlorinated biphenyls would be disposed in accordance with federal, state, and local laws, which would potentially result in a long-term, minor, beneficial impact. There is a low potential for radon to pose a health hazard at Tyndall AFB. As such, no impacts from radon are anticipated. There is no environmental contamination known to occur within the project area.

Cumulative Impacts

Recovery and rebuilding efforts following Hurricane Michael, which is expected to be ongoing for several years, were considered along with other proposals. Potential short-term, negligible to minor, less than significant cumulative impacts were identified for biological resources and land use at Tyndall AFB. No potentially significant cumulative impacts were identified for the special use airspace. Increased air emissions at the installation from the Proposed Action, when considered with ongoing construction projects at Tyndall AFB, could increase particulates equal to or less than 10 microns in diameter, but those increases in emissions would be short in duration, and the potential incremental impact on air quality would be negligible. Construction and demolition projects as part of the recovery effort would continue to occur during the same period as the proposed contract ADAIR implementation. In addition, following recovery, routine construction projects would take place as part of the installation's evolving mission. Since construction noise is localized to the construction sites and would be short term, no cumulative noise impacts are anticipated. Local expenditures for post-Michael demolition and reconstruction activities on Tyndall AFB and regionally to rebuild after the devastating impacts of Hurricane Michael would contribute to the local economy over at least the next 5 years. These activities in combination with contract ADAIR would have a potential major, short-term cumulative beneficial impact on income and employment in the region; however, the demand for housing during this period of time when increased local employment to support planning and construction services is required and much of the region's housing is still damaged in combination with additional personnel to support contract ADAIR at Tyndall AFB would have a potential short-term, cumulative, minor, adverse impact on housing in the region.

Mitigation

The EA analysis concluded that the Proposed Action would not result in significant environmental impacts; therefore, no mitigation measures are required.

Best Management Practices are described and recommended in the EA where applicable.

Conclusion

Finding of No Significant Impact. After review of the EA prepared in accordance with the requirements of National Environmental Policy Act; Council on Environmental Quality Regulations; and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP),* and which is hereby incorporated by reference, I have determined that the proposed activities to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 33 FW and the 325 FW located at Eglin AFB, Florida, would not have a significant impact on the quality of the human or natural environment. Accordingly, an Environmental Impact Statement will not be prepared. This decision has been made after considering all submitted information, including a review of public and agency comments submitted during the 30-day public comment period, and considering a full range of practical alternatives that meet project requirements and are within the legal authority of the United States Air Force.

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10 Sep 2020

DEE JAY KATZER, Colonel, USAF
Chief, Civil Engineer Division (HQ ACC/A4C)

DATE

ENVIRONMENTAL ASSESSMENT (EA)

FOR

COMBAT AIR FORCES CONTRACTED ADVERSARY AIR TEMPORARY OPERATIONS FROM TYNDALL AFB, FLORIDA

PREPARED FOR:

Department of the Air Force

September 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

°F	degree(s) Fahrenheit
μg/m^3	microgram(s) per cubic meter
325 FW	325th Fighter Wing
33 FW	33rd Fighter Wing
96 CEG/CEIEC	96th Civil Engineer Group/Environmental Compliance
96 LRS	96th Logistics Readiness Squadron
96 MXS	96th Maintenance Squadron
96 TW	96th Test Wing
ac	acre(s)
ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACM	asbestos-containing materials
ADAIR	adversary air
AETC	Air Education and Training Command
AFB	Air Force Base
AFCEC	Air Force Civil Engineer Center
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AFPD	Air Force Policy Directive
AGE	Aerospace Ground Equipment
AGL	above ground level
AGRS	aggressor squadron
AICUZ	Air Installation Compatible Use Zone
Air Force	United States Air Force
AMU	Aircraft Maintenance Unit
AOC	area of concern
APE	Area of Potential Effects
APZ	Accident Potential Zone
AQCR	Air Quality Control Region
AST	aboveground storage tank
ATC	Air Traffic Control
ATCAA	Air Traffic Control Assigned Airspace
BASH	bird/wildlife-aircraft strike hazard
BRAC	Base Realignment and Closure
CAA	Clean Air Act
CAD	cartridge-actuated device
CAF	Combat Air Forces
CDDAR	Crash Damaged or Disabled Aircraft Recovery
CDNL	C-weighted Day-Night Average Sound Level
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CSEL	C-Weighted Sound Exposure Level
CZ	clear zone
CZMA	Coastal Zone Management Act
dB	decibel(s)
dBA	A-weighted decibel(s)
DNL	Day-Night Average Sound Level
DOD	Department of Defense
DPS	distinct population segment
E	endangered

LIST OF ACRONYMS AND ABBREVIATIONS

EA	Environmental Assessment
EGTTR	Eglin Gulf Test and Training Range
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EMR	electromagnetic radiation
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ESOHC	Environmental Safety and Occupational Health Council
EUL	Enhanced Use Lease
FAA	Federal Aviation Administration
FDEP	Florida Department of Environmental Protection
FL	Flight Level
FONSI	Finding of No Significant Impact
ft	foot(feet)
ft^2	square foot(feet)
FTU	formal training unit
FWC	Florida Fish and Wildlife Conservation Commission
GHG	greenhouse gas
GWP	global warming potential
HAZMAT	hazardous material(s)
IDP	Installation Development Plan
IFR	Instrument Flight Rules
in.	inch(es)
INRMP	Integrated Natural Resources Management Plan
IRP	Installation Restoration Program
LBP	lead-based paint
L_{dn}	Day-Night Average Sound Level
L_{dnmr}	Onset-Rate Adjusted Monthly Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
L_{max}	Maximum Sound Level
LTO	landing and takeoff
MBTA	Migratory Bird Treaty Act
mg/m^3	milligram(s) per cubic meter
mi	mile(s)
mi^2	square mile(s)
MMPA	Marine Mammal Protection Act
MOA	Military Operations Area
MOU	Memorandum of Understanding
mph	mile(s) per hour
MSL	mean sea level
N/A	not applicable
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NASA	National Aeronautics and Space Administration
NEPA	National Environmental Policy Act
NH_3	ammonia
NHPA	National Historic Preservation Act
NM	nautical mile(s)
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides

LIST OF ACRONYMS AND ABBREVIATIONS

NRHP	National Register of Historic Places
O_3	ozone
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PAD	propellant-actuated device
Pb	lead
PCB	polychlorinated biphenyl
pCi/L	picocurie(s) per liter
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
POI	point of interest
ppb	part(s) per billion
ppm	part(s) per million
PSD	Prevention of Significant Deterioration
psf	pound(s) per square foot
PWS	*Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)*
Q-D	quantity-distance
RCW	red-cockaded woodpecker
ROD	Record of Decision
ROI	Region of Influence
RONA	Record of Nonapplicability
SAC	Strategic Air Command
SCH	State Clearinghouse
SEIS	Supplemental Environmental Impact Statement
SEL	Sound Exposure Level
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	sulfur dioxide
SO_x	sulfur oxides
SVE	Soil Vapor Extraction
T	threatened
T&E	threatened and endangered
TCE	trichloroethene
TGO	touch and go
tpy	ton(s) per year
TSCA	Toxic Substances Control Act
U.S.C.	United States Code
US	United States
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USSG	United States Surgeon General
UST	underground storage tank
VFR	Visual Flight Rules
VOC	volatile organic compound
yd^2	square yard(s)

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CHAPTER 1 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

The United States Air Force (Air Force) is tasked with the defense of the United States (US) and fulfillment of its Title 10 United States Code (U.S.C.) mission. The Air Force's mission is to fly, fight, and win - in air, space, and cyberspace. In order to accomplish this mission, it is critical that combat pilots, and the Airmen supporting them, adequately train to attain proficiency on tasks they must execute during times of war and further to sustain this proficiency as they serve in the Air Force. Increasingly, fighter pilots of the Combat Air Forces (CAF) have been operating at degraded levels of proficiency and training readiness due to diminishing fiscal resources. For the purpose of this effort, the CAF includes all active duty, Air National Guard, and Air Force Reserve units in both operational units and formal training units (FTUs).

Ideally, CAF fighter pilots would be able to maintain their proficiency by flying 200 or more hours per year, practicing training syllabus tasks, tactics, and procedures. Unfortunately, for much of the last decade, pilots of advanced weapons platforms have been falling 25 to 40 percent short of the flying hours recommended to build and sustain their proficiency on required training tasks (Venable, 2016). At the same time, increasingly complex aircraft and technologies require more time to master the full range of skills required to become proficient combat-ready pilots. Along with insufficient budgets to support the flying hours/training requirements needed by CAF pilots, they have also had to support adversary air (ADAIR) flying missions that have minimal training value to the CAF pilots themselves. ADAIR missions simulate an opposing force that provides a necessary and realistic combat environment during CAF training missions. Flying these ADAIR sorties requires the use of potential adversaries' tactics and procedures that may differ significantly from CAF tactics and procedures and therefore provides minimal CAF training while taking up valuable flying hours that could otherwise be spent on core training tasks. In many cases, minimal ADAIR, or none at all, has been available to support pilot training and has resulted in degraded readiness for CAF pilots who are expected to operate some of the most sophisticated weapons platforms in the world.

A SORTIE IS DEFINED AS A SINGLE MILITARY AIRCRAFT FLIGHT FROM INITIAL TAKEOFF THROUGH FINAL LANDING.

During his confirmation hearing, Chief of Staff of the Air Force, General David Goldfein, identified a growing crisis in the readiness of CAF pilots (Venable, 2016):

> *Less than half of Air Force combat units are ready for "full-spectrum" (high threat, high intensity) combat. This lack of readiness could jeopardize the lives of aircrews and other service members who depend upon them in combat and put mission-essential tasks at great risk.*

1.1.1 *Background*

Air Force readiness is currently affected by several issues including training, weapon system sustainment, and facilities. While all are critical, training in particular has become an increasing concern as worldwide commitments, high operations tempo, and fiscal and manpower limitations detract from available training resources. As an example, the Budget Control Act of 2011, as implemented in 2013, reduced flying hours by 18 percent and temporarily stood down 17 of 40 combat-coded squadrons (The Heritage Foundation, 2015). The Air Force prioritized readiness in 2014, but shortfalls in readiness were not eliminated and have persisted through the present day as indicated by the Chief of Staff of the Air Force's acknowledgement of the lack of readiness in more than half of the service's combat units. In the training arena, readiness issues are manifested by multiple issues such as 1) an inability to internally support ADAIR without a corresponding sacrifice in scarce flying hours and normal training objectives; 2) a lack of advanced threat aircraft to provide representative ADAIR for realistic training; 3) a fighter pilot manning crisis, necessitating increased pilot production beyond sustainable levels; and 4) granting excessive syllabus waivers to graduates of the Air Force Weapons School due to inadequate ADAIR support during final training phases.

Lack of available ADAIR is degrading levels of pilot readiness and contributing to the overall decline in availability of proficient CAF pilots. The arrangement in which CAF ADAIR sorties are currently organized is depicted on **Figure 1-1**. At present, the current approach meets less than 50 percent of the total ADAIR requirement across the Air Force.

Self-generated ADAIR can either be "in-house" supporting daily flying schedules or via a dedicated tasking to support an external unit, both referred to as "Red Air." In both the "in-house" and "dedicated" options, performing self-generated ADAIR is at the expense of the tasked units' normal Air Force training objectives. These two options still result in an ADAIR capacity of less than 50 percent of the Air Force-wide requirement and reduce the availability and proficiency of combat qualified pilots at a time when the Air Force is experiencing a shortfall of more than 750 CAF pilots (Venable, 2016). Furthermore, current dedicated ADAIR units in the Air Force consist of two F-16 aggressor squadrons (AGRSs) and two T-38 fighter training squadrons. The F-16 aircraft used for aggressor missions is an advanced weapons platform, but there are not enough to meet the ADAIR requirements to maintain proficiency of the CAF's pilots. The T-38 is used for ADAIR but is a basic platform with no advanced electronics (radar and avionics) or weapons capabilities and does not adequately replicate realistic threat capabilities. In both the F-16 AGRS and T-38 ADAIR cases, the number of available aircraft and pilots are insufficient to meet the requirement.

As depicted on **Figure 1-1**, contract ADAIR would provide a fourth avenue to fill ADAIR sorties and improve the quality of training and readiness of CAF pilots and allow the Air Force to recapitalize other valuable assets and training time.

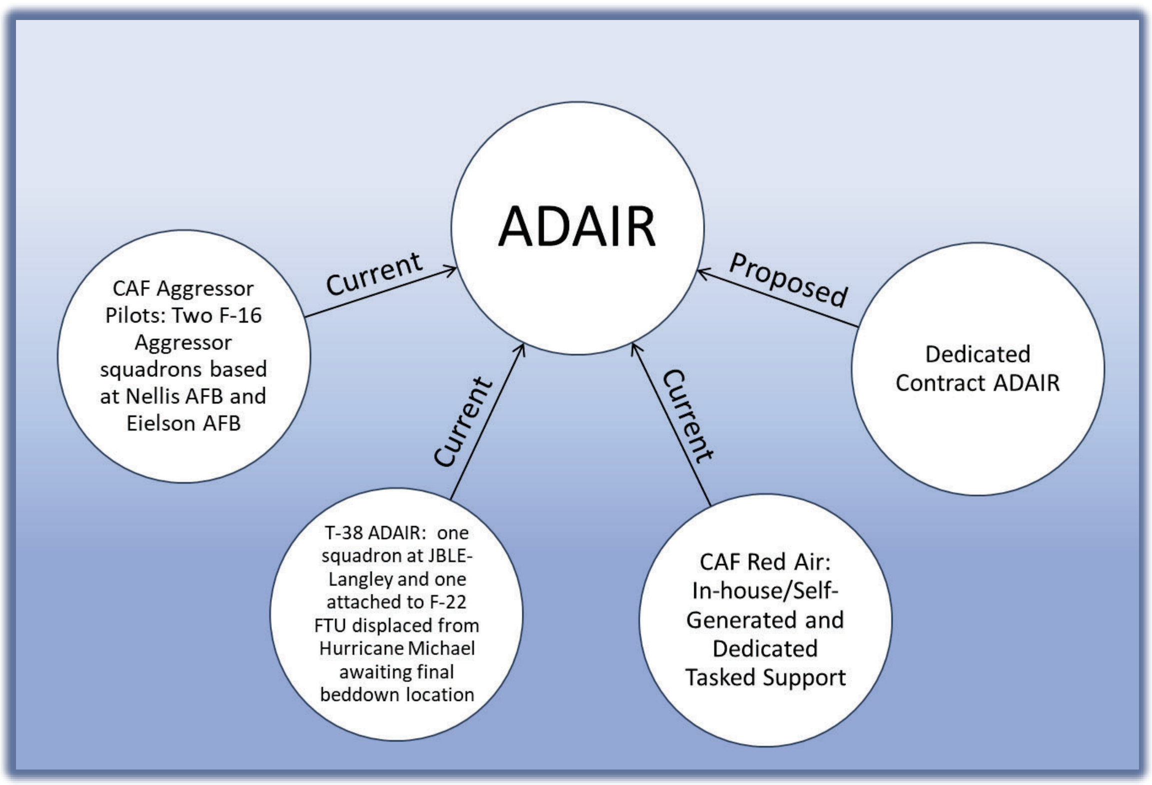


Figure 1-1. Current and Proposed Adversary Air Sortie Generation.

The contract ADAIR requirement is roughly 30,000 annual sorties. The Air Force would implement contract ADAIR in support of installations that host specific critical air-to-air training missions. Installations requiring contract ADAIR support include those bases hosting Air Force 5th generation fighter units (e.g., F-22 or F-35 aircraft), fighter FTUs, or those that support advanced fighter training. Air Force requirements for contract ADAIR exist currently at multiple locations within the continental United States and Joint Base Pearl Harbor-Hickam, Hawaii.

As discussed in **Section 1.3**, the scope of this analysis will evaluate the proposal to implement contract ADAIR in support of Eglin Air Force Base (AFB) from Tyndall AFB. The contract ADAIR operation would be bedded down temporarily (up to 24 months) at Tyndall AFB. Separate NEPA analyses will be completed at all locations identified by the Air Force that require contract ADAIR support and have sufficient existing facilities. This analysis will evaluate the use of Tyndall AFB and the airspace that would be utilized in support of Eglin AFB.

1.1.2 *Location*

Tyndall AFB is located in the Florida panhandle in Bay County on a peninsula between the St. Andrew Bay system and the Gulf of Mexico (**Figure 1-2**). The base is about 13 miles (mi) southeast of Panama City and is divided by US Highway 98 (**Figure 1-3**).

Tyndall AFB is home to the 325th Fighter Wing (325 FW) and falls under the Air Combat Command (ACC). The 325 FW supports operations of advanced 5th generation aircraft. Prior to the landfall of Hurricane Michael (see Section 1.1.3) on 10 October 2018, the 325 FW included the 43d Fighter Squadron (43 FS), which trained F-22 pilots, and the 95th Fighter Squadron (95 FS), which was an operational F-22 unit. The 2d Fighter Training Squadron provides ADAIR training using the T-38. Tyndall AFB also hosts multiple other units including the 1st Air Force, Air Force Civil Engineer Center (AFCEC), and 53d Weapons Evaluation Group.

CAF training activities utilize special use airspace proximate to Eglin and Tyndall AFB. Special use airspace includes Warning Areas, Military Operations Areas (MOAs), and Air Traffic Control Assigned Airspace (ATCAA), which provide airspace for military aircraft training and serve to warn nonparticipating aircraft of potential danger. Eglin AFB manages and controls Warning Areas W-151 and W-470, the Rose Hill MOA, the Eglin E MOA, and the associated ATCAAs which are within the same lateral confines as the MOAs proposed for contract ADAIR use (**Figure 1-4**). Tyndall AFB manages and controls Tyndall B, C/H, and E MOAs and the Compass Lake and Carrabelle ATCAAs located within the same lateral confines as the Tyndall MOAs (**Figure 1-5**).

Tyndall AFB and the surrounding military airspace provide a critical venue for the Air Force to train pilots

A MILITARY OPERATIONS AREA (MOA) IS DESIGNATED AIRSPACE OUTSIDE OF CLASS A AIRSPACE TO SEPARATE OR SEGREGATE CERTAIN NONHAZARDOUS MILITARY ACTIVITIES FROM INSTRUMENT FLIGHT RULES (IFR) TRAFFIC. ACTIVITIES IN MOAS INCLUDE, BUT ARE NOT LIMITED TO, AIR COMBAT MANEUVERS, AIR INTERCEPTS, AND LOW ALTITUDE TACTICS. THE DEFINED VERTICAL AND LATERAL LIMITS VARY FOR EACH MOA. WHILE MOAS GENERALLY EXTEND FROM 1,200 FEET (FT) ABOVE GROUND LEVEL (AGL) TO 18,000 FT ABOVE MEAN SEA LEVEL (MSL), THE FLOOR MAY EXTEND BELOW 1,200 FT AGL IF THERE IS A MISSION REQUIREMENT AND THERE IS MINIMAL ADVERSE AERONAUTICAL EFFECT.

CLASS A AIRSPACE IS CONTROLLED AIRSPACE OF DEFINED DIMENSIONS WITHIN WHICH AIR TRAFFIC CONTROL SERVICE IS PROVIDED AND ALL OPERATIONS MUST OCCUR UNDER IFR. CLASS A AIRSPACE IS GENERALLY FROM 18,000 FT MSL UP TO AND INCLUDING 60,000 FT MSL AND INCLUDES AIRSPACE OVERLYING WATERS WITHIN 12 NAUTICAL MILES (NM) OF THE COAST OF THE 48 CONTIGUOUS UNITED STATES (US) AND ALASKA.

AIR TRAFFIC CONTROL ASSIGNED AIRSPACE (ATCAA) IS ASSIGNED TO AIR TRAFFIC CONTROL TO SEGREGATE AIR TRAFFIC BETWEEN SPECIFIED ACTIVITIES BEING CONDUCTED WITHIN THE ASSIGNED AIRSPACE AND OTHER IFR TRAFFIC. ATCAA IS THE EQUIVALENT OF A MOA AT 18,000 FT MSL AND ABOVE. THIS AIRSPACE IS NOT DEPICTED ON ANY CHART BUT IS OFTEN AN EXTENSION OF A MOA TO HIGHER ALTITUDES AND USUALLY REFERRED TO BY THE SAME NAME. THIS AIRSPACE REMAINS UNDER CONTROL OF THE FEDERAL AVIATION ADMINISTRATION (FAA) WHEN NOT IN USE TO SUPPORT GENERAL AVIATION ACTIVITIES.

A WARNING AREA IS AN AIRSPACE OF DEFINED DIMENSIONS THAT EXTENDS FROM 3 NM OUTWARD FROM THE COAST OF THE UNITED STATES AND MAY BE OVER US WATERS, INTERNATIONAL WATERS, OR BOTH. THE PURPOSE OF WARNING AREAS IS TO WARN NONPARTICIPATING PILOTS OF POTENTIALLY HAZARDOUS ACTIVITY. WARNING AREAS MAY BE USED FOR OTHER PURPOSES IF RELEASED TO THE FAA DURING PERIODS WHEN NOT REQUIRED FOR THEIR INTENDED PURPOSE AND ARE WITHIN AREAS IN WHICH THE FAA HAS AIR TRAFFIC CONTROL AUTHORITY.

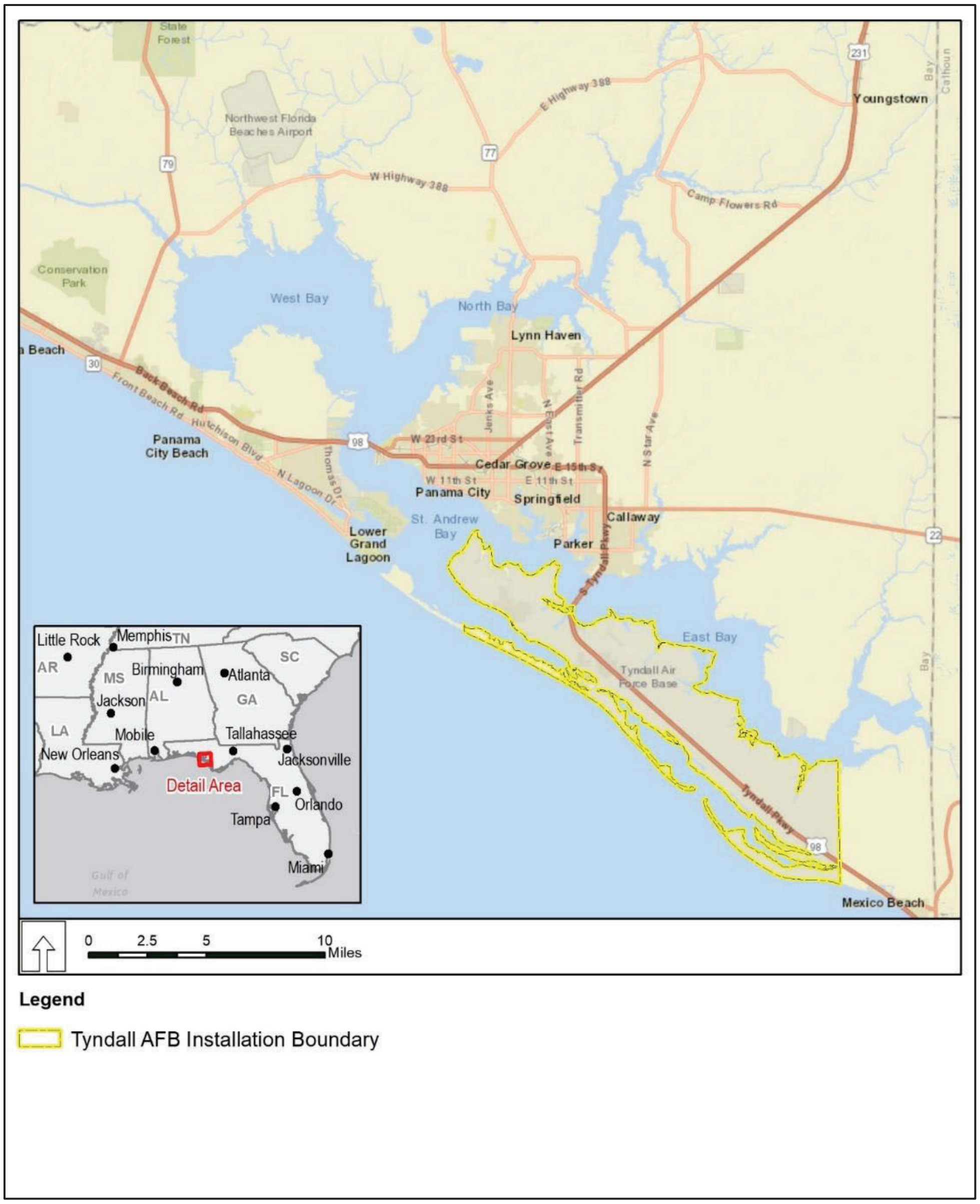


Figure 1-2. Regional Location of Tyndall Air Force Base.

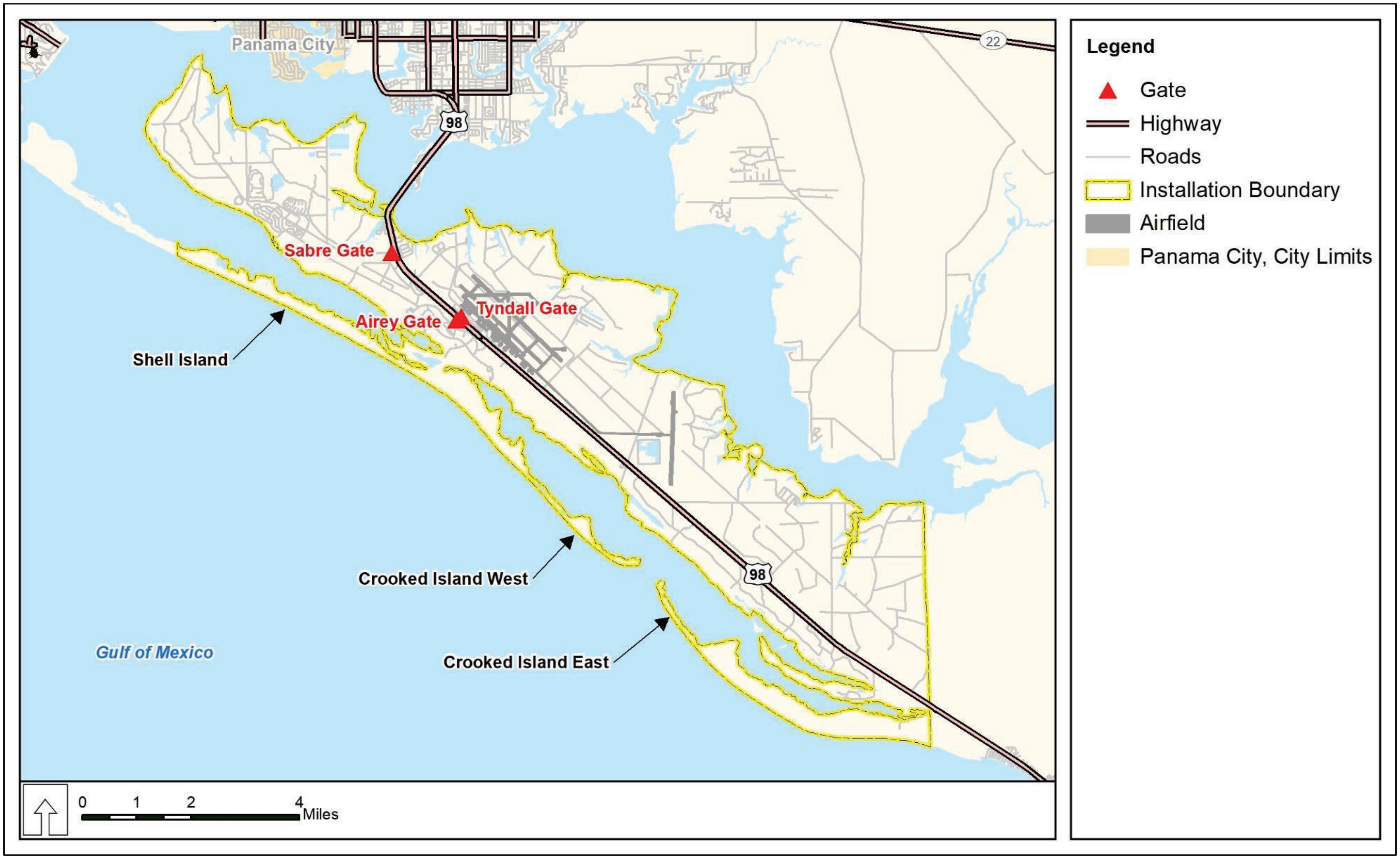


Figure 1-3. Location of Tyndall Air Force Base.

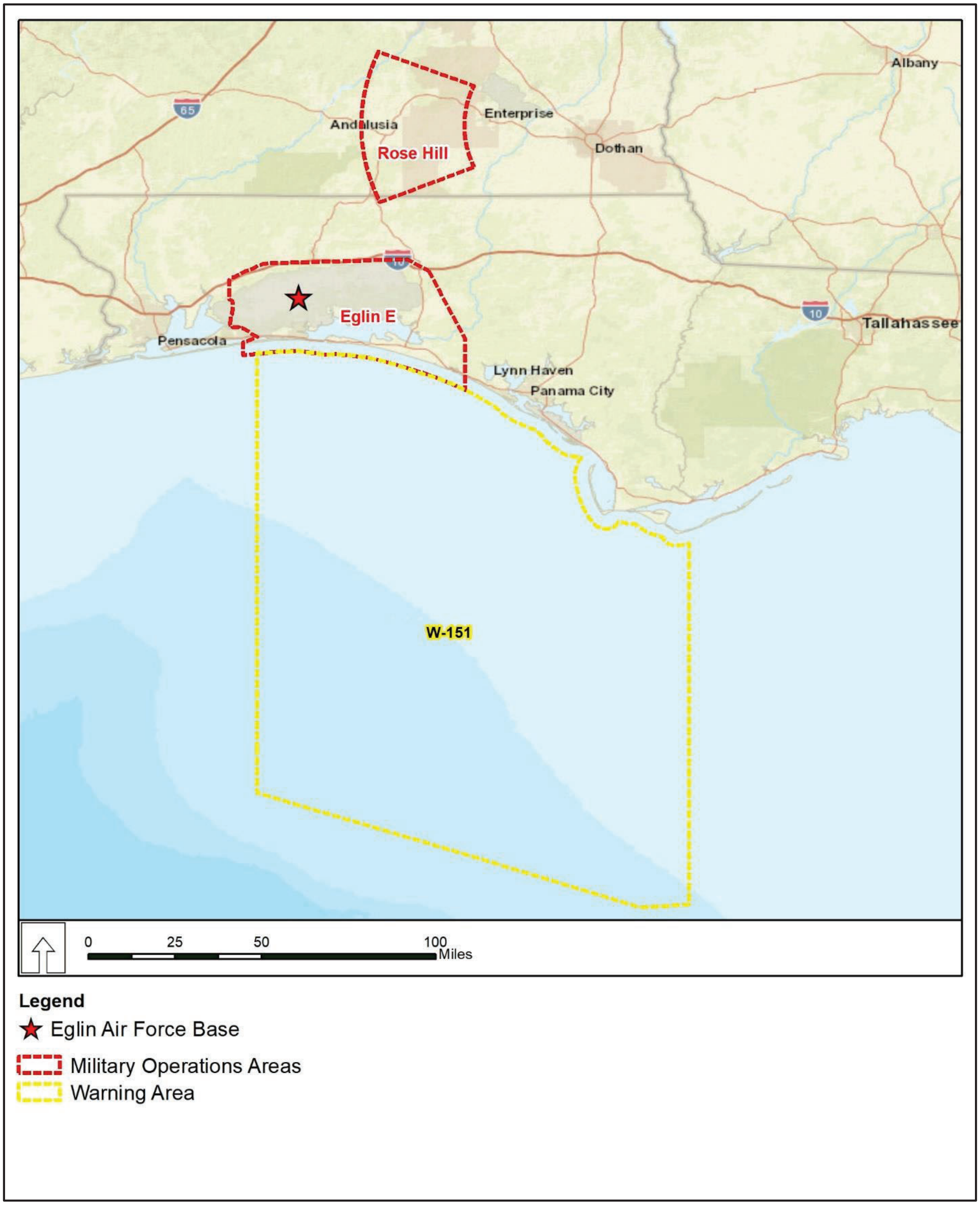
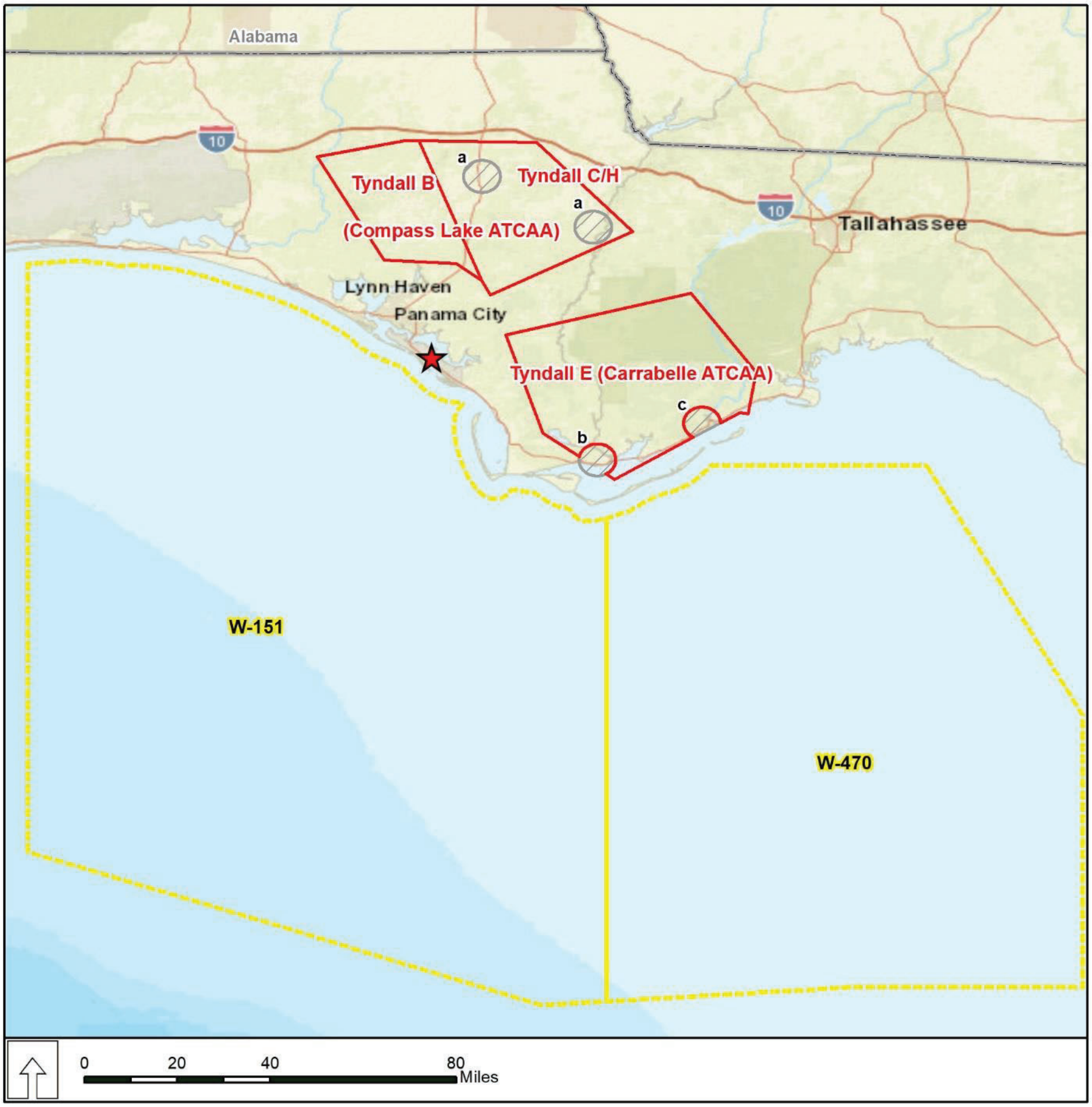


Figure 1-4. Warning Area and Military Operations Areas Proposed for Contract Adversary Air Sorties Promixate to Eglin AFB. The Rose Hill and Eglin E ATCAAs are Within the Same Lateral Confines as the Military Operations Areas Proposed for Contract Adversary Air Use.



Legend
Tyndall Air Force Base
State Boundary
Warning Areas
Military Operations Areas
Avoidance Areas

Avoidance Areas		
Area	MOA	Avoidance Rules
a	Tyndall C/H	Avoid by 3 NM and 1,500 ft AGL
b	Tyndall E	Avoid by 3 NM and 3,000 ft AGL
c	Tyndall E	Avoid by 3 NM and 3,000 ft AGL

Figure 1-5 Warning Area and Military Operations Areas Proposed for Contract Adversary Air Sorties Promixate to Tyndall AFB. The Lake and Carrabelle ATCAAs are Within the Same Lateral Confines as the Military Operations Areas Proposed for Contract Adversary Air Use

1.1.3 *Effects of Hurricane Michael*

1.1.3.1 Storm Description

Hurricane Michael formed as a weak Caribbean tropical system on 6 October 2018 (National Weather Service, 2019). When it entered the Gulf of Mexico, it rapidly gained strength, and within 48 hours, it had intensified to a Category 5 hurricane. Hurricane Michael made landfall in the Florida Panhandle between Tyndall AFB and Mexico Beach on 10 October 2018 at 1:00 p.m. Hurricane Michael was the third most intense hurricane to make landfall in the contiguous United States based on pressure and the fourth most intense based on wind speed (National Centers for Environmental Information, 2019). After making landfall, the hurricane tracked northeast into southwestern Georgia and dissipated across the east coast on 11 October 2018 (National Weather Service, 2019).

1.1.3.2 Conditions Experienced at Tyndall Air Force Base

Hurricane Michael was the most powerful recorded storm to impact the Florida Panhandle. The eye of the hurricane passed directly over Tyndall AFB, which is located near Panama City, Florida, approximately 85 miles (mi) east of Eglin AFB. Wind gusts on Tyndall AFB of up to 139 miles per hour (mph) were recorded before the transmission tower toppled while the maximum sustained winds recorded in surrounding areas reached 155 mph. Total rainfall for Tyndall AFB was 2.5 to 3.0 inches, and the reported storm surge southeast of Tyndall AFB, from Mexico Beach to Indian Pass, reached 9 to 14 feet (ft).

1.1.3.3 Impact on Tyndall Air Force Base

All 484 structures on Tyndall AFB sustained roof or other structural damages. Water, power, and sewer services were unavailable for several weeks (Holton, 2019). Flightline and support facilities, the drone runway, elementary school, and multiple other buildings sustained severe to catastrophic damage (Dickstein and Kenney, 2018). Recovery and rebuilding efforts are expected to take several years and will include demolition, repair, and construction of new facilities. Tyndall AFB is expected to return to full operational status and as facilities become available, aircraft are expected to be assigned to the 325th Fighter Wing (325 FW) as directed by the Secretary of the Air Force.

1.1.3.4 Implications for Tyndall Air Force Base and Eglin Air Force Base

As a result of the catastrophic damage done to Tyndall AFB, operational units have been temporarily relocated to other Air Force bases. The F-22s assigned to the 95th Fighter Squadron have all been reassigned to other operational F-22 units. The F-22 FTU (43rd Fighter Squadron) and its supporting T-38s of the 2nd Fighter Training Squadron are now temporarily located at Eglin AFB and began limited F-22 training in December 2018. A Special Environmental Assessment (EA) was completed for the interim beddown of the F-22 FTU and T-38s at Eglin AFB in order to resume the F-22 pilot training course (Air Force, 2019). The Air Force intends to prepare an Environmental Impact Statement (EIS) for the F-22 FTU and supporting T-38 permanent beddown that will include the assessment of reasonable alternatives (84 Federal Register 11289).

1.2 Purpose of the Action

The purpose of the Proposed Action is to provide dedicated contract ADAIR sorties to improve the quality of training and readiness of pilots of the 33 FW and 325 FW at Eglin AFB, Florida. As a shared resource, other units assigned to Eglin AFB such as the 96 TW and 53rd Wing may use contract ADAIR to support activities provided they are legitimate training requirements (e.g., a large force exercise undertaken to allow aircrews to train alongside other aircraft, providing realistic training scenarios involving multi-aircraft operations). The contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions. The objective of the Proposed Action for Eglin AFB is to increase the quality of training for 5th generation F-35 and F-22 fighter pilots by filling the "near peer" capacity and capability gap currently present in the 5th generation training enterprise. Additionally, other Air Force (4th generation) units that may have been tasked to provide ADAIR training support at Eglin AFB may now recapitalize valuable flying hours to focus on increasing their own levels of proficiency and readiness.

> FIFTH (5TH) GENERATION IS A TERM APPLIED TO THE NEWEST WEAPONS SYSTEMS SUCH AS THE F-22 AND F-35 FIGHTERS THAT CONTAIN NEW AND ENHANCED LEVELS OF STEALTH PROFILES, SPEED, MANEUVERABILITY, AND ADVANCED AVIONICS AND ATTACK CAPABILITIES. FOURTH (4TH) GENERATION AIRCRAFT ARE THE PREVIOUS SUITE OF FIGHTERS SUCH AS F-15, F-16, AND F/A-18.

1.3 NEED FOR THE ACTION

The need for the action is to provide better and more realistic training for the F-35 and F-22 flight training programs at Eglin AFB. Dedicated contract ADAIR is critical to improving pilot readiness as it provides realistic training opportunities to employ CAF tactics and procedures that optimize the training value of every mission. Contract ADAIR can be used in basic building block syllabus sorties or the very advanced and fluid environment of multiaircraft air combat required by the training syllabus. Eglin AFB does not have the existing capacity to host the ADAIR mission from its flightline. Due to the near-term need for ADAIR training, a suitable location with existing facilities and access to the Eglin Gulf Test and Training Range is required for ADAIR operations to support the 33rd and 325th Fighter Wings.

1.4 SCOPE OF THE ENVIRONMENTAL ANALYSIS

This EA analyzes the potential environmental consequences associated with temporarily establishing dedicated contract ADAIR support at Tyndall AFB. The Air Force proposes to locate contract ADAIR at Tyndall AFB temporarily for up to 24 months to support the 33rd and 325th Fighter Wings. Contract ADAIR support would employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced, simulated, combat training missions in order to increase the quality of training for F-35 and F-22 fighter pilots.

This EA has been prepared in accordance with the National Environmental Policy Act (NEPA) (42 U.S.C. §§ 4321 through 4347), the Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] Part 1500 to 1508), and 32 CFR Part 989 et seq., *Environmental Impact Analysis Process (EIAP)*. NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA 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.

Consistent with the CEQ regulations, the EA is organized into the following sections:

- Chapter 1, Purpose and Need for Action, includes an introduction, background description, location, purpose and need statement, scope of environmental analysis, decision to be made, interagency and intergovernmental coordination and consultations, applicable laws and environmental regulations, and a description of public and agency review of the EA.
- Chapter 2, Description of the Proposed Action and Alternatives, includes a description of the Proposed Action, alternative selection standards, screening of alternatives, alternatives eliminated from further consideration, a description of the selected alternatives, and summary of potential environmental consequences.
- Chapter 3, Affected Environment, includes a description of the natural and man-made environments within and surrounding Eglin AFB and the airspace that may be affected by the Proposed Action and alternatives.
- Chapter 4, Environmental Consequences, includes definitions and discussions of direct and indirect impacts and best management practices, if applicable.
- Chapter 5, Cumulative Effects, considers the potential cumulative impacts on the environment that may result from the incremental impact of the Proposed Action when added to other past, present, and reasonably foreseeable future actions.

- Chapter 6, List of Preparers, provides a list of the preparers of this EA.
- Chapter 7, References, contains references for studies, data, and other resources used in the preparation of the EA.
- Appendices, as required, provide relevant correspondence, studies, modeling results, and public review information. **Appendix A** includes all interagency and intergovernmental coordination and consultations; **Appendix B** provides noise metrics and noise models; **Appendix C** outlines methodologies, emission factors, and assumptions used for air quality emission estimates for each scenario and related activities; and **Appendix D** summarizes the listed species potentially occurring in the action area.

NEPA, which is implemented through the CEQ regulations, requires federal agencies to consider alternatives to the Proposed Action and to analyze potential impacts of alternative actions. Potential impacts of the Proposed Action and its alternatives described in this document will be assessed in accordance with the Air Force EIAP (32 CFR Part 989), which requires that impacts on resources be analyzed in terms of their context, duration, and intensity. To help the public and decision makers understand the implications of impacts, they will be described in the short and long term, cumulatively, and within context. Environmental resources and the Region of Influence (ROI) analyzed in the EA are summarized in **Table 1-1**. The expected geographic scope of any potential consequences is identified as the ROI. Tyndall AFB and its environs, as well as the area under the proposed airspace are considered in determining the ROI for each resource. As indicated in **Table 1-1**, Socioeconomics – Income and Employment; Environmental Justice and Protection of Children; and Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites are not described in the airspace ROI for baseline in **Chapter 3** or considered for detailed analysis in **Chapter 4**. No construction or development is proposed under the airspace, so no impacts on these resources would occur under the airspace

Table 1-1. Environmental Resources Analyzed in the Environmental Assessment

Resource	Region of Influence: Tyndall AFB and environs	Region of Influence: Warning Areas W-151 and W-470; Rose Hill, Eglin E, Tyndall B, C/H and E MOAs
Airspace Management and Use	✓	✓
Noise	✓	✓
Safety	✓	✓
Air Quality	✓	✓
Biological Resources (Threatened and Endangered Species, Marine Resources)	✓	✓
Cultural Resources (Archeological, Architectural, Traditional)	✓	✓
Hazardous Materials and Wastes, Toxic Substances, and Contaminated Sites	✓	

Notes:
AFB = Air Force Base; MOA = Military Operating Area

1.4.1 *Resource Areas Eliminated from Detailed Analysis*

No public or agency concerns were raised as a result of Interagency/Intergovernmental Coordination for Environmental Planning, and the Proposed Action is not expected to affect the following resources; therefore, they are not carried forward for detailed analysis.

1.4.1.1 Infrastructure, Transportation, and Utilities

During site selection, the support for contract ADAIR operations was determined to be adequate for facilities and communication infrastructure at Tyndall AFB. No new construction or infrastructure changes would occur under the Proposed Action. The level of service for utilities needed to support the contract personnel is assumed to be the same under all alternatives and would be adequate to support the Proposed Action. Because there would only be an additional 93 contract personnel working at Tyndall AFB to support the contract ADAIR operations and adequate infrastructure, transportation network, and base access gate capacity exist on base to support these personnel and contract ADAIR aircraft operations, there would be no impacts on infrastructure, transportation, and utilities at Tyndall AFB; therefore, these resources are not carried forward for further detailed analysis in this EA.

1.4.1.2 Socioeconomics

The requirement for an estimated 93 contract personnel and their families supporting the contract ADAIR sorties in the Panama City, Florida, region was considered as the population and housing in the region has been greatly impacted by Hurricane Michael; however, the additional personnel would have no impact on the region's population. Even assuming all 93 contract personnel relocated with family members to Bay County, this would be a potentially negligible increase in the County's population of nearly 169,000 people. Following Hurricane Michael, housing availability in the region is limited both due to the infrastructure damage as well as the high demand on housing from construction workers and contract ADAIR would be implemented prior to the full reconstruction of Tyndall AFB. Regionally damaged housing and schools continue to be rebuilt ; therefore, there would be short-term, minor impacts of the Proposed Action on the local or regional population, housing, or schools.

Since there is no new construction proposed at Tyndall AFB, potential interior upgrades to facilities for contract ADAIR operations would require only a small amount of supplies and labor and therefore, would not impact the existing socioeconomic environment. The 93 contracted ADAIR maintenance personnel and pilots would represent a small increase in the over 4,200 military and civilian personnel currently employed at Tyndall AFB; therefore, no adverse impact on socioeconomics – income and employment would occur. An estimated annual increase in expenditures of approximately $51 million for contract ADAIR at Tyndall AFB would have a potential major, beneficial, long-term impact.

1.4.1.3 Land Use

There would be no short-term changes to the existing land use or noise environment at Tyndall AFB or land uses under the MOAs. Contract ADAIR sorties would only occur in the special use airspace where military aircraft training already occurs. Therefore, contract ADAIR operations would not impact Land Use.

1.4.1.4 Environmental Justice and Protection of Children

Under the Proposed Action, the increase in the number of personnel at Tyndall AFB supporting the contract ADAIR would be temporary and would not result in a disproportionate impact on minorities, low-income populations, and protection of children. The 93 additional personnel and their families supporting the contract ADAIR requirement would not disproportionately affect the availability of housing resources to minorities, low-income populations, or children under the Proposed Action.

The noise increase associated with contract ADAIR training is actually a decrease from pre-hurricane conditions and would not impact POIs or residential communities; therefore, there would be no disproportionate impacts from minor increase in noise on minority populations, low-income communities, or children under the Proposed Action.

1.4.1.5 Soil Resources

Protection of soils was considered when evaluating potential impacts of the Proposed Action in terms of alteration of soil composition, structure, or function and any accumulation of chaff material. Effects on soils would be adverse if they alter the soil composition, structure, or function within the environment or accumulate in the soil. Under the Proposed Action, there would be no ground-disturbing activities to affect soil resources. Under the airspace, the use of defensive countermeasures (i.e., chaff and flares) has been found to be nontoxic and would not adversely affect soil resources; therefore, soil resources are not carried forward for detailed analysis.

1.4.1.6 Visual Resources

There would be no potential impacts on visual resources from the proposed contract ADAIR activities because no new construction would occur, and aircraft would utilize the existing airfield; therefore, contract ADAIR activities in the areas adjacent to the proposed facilities and aircraft parking ramp would not change the existing visual setting. Likewise, the Proposed Action would not affect the aesthetic qualities of the lands and Gulf of Mexico beneath the MOAs and Warning Areas; therefore, this resource is not carried forward for further detailed analysis in this EA.

1.4.1.7 Water Resources

Under the Proposed Action, there would be no ground-disturbing activities, including no dredging or filling of wetlands. The proposed additional contract ADAIR aircraft and personnel and associated operational and maintenance activities would not affect water quality or quantity, or wetlands. Under the airspace, the use of defensive countermeasures has been found to be nontoxic. Due to the rare and infrequent nature of fuel dumps as well as in-place safety precautions, these emergency procedures are not likely to adversely affect water resources, including wetlands; therefore, water resources are not carried forward for detailed analysis.

1.5 Decision To Be Made

This EA evaluates the potential environmental consequences of implementing the proposed or alternative actions to provide dedicated contract ADAIR sorties temporarily from Tyndall AFB to improve the readiness and proficiency of pilots of the 33 FW and 325 FW, other supported units, and the CAF at large. Based on the analysis in this EA, the Air Force will make one of three decisions regarding the Proposed Action: 1) choose the alternative action that best meets the purpose of and need for this project and sign a Finding of No Significant Impact (FONSI), allowing implementation of the selected alternative; 2) initiate preparation of an EIS if it is determined that significant impacts would occur through implementation of the proposed or alternative actions; or 3) select the No Action Alternative, whereby the Proposed Action would not be implemented. As required by NEPA and its implementing regulations, preparation of an environmental document must precede final decisions regarding the proposed project and be available to inform decision-makers of the potential environmental impacts.

1.6 Interagency and Intergovernmental Coordination and Consultations

1.6.1 *Interagency and Intergovernmental Coordination and Consultation*

The environmental analysis process, in compliance with NEPA guidance, includes public and agency review of information pertinent to the proposed and alternative actions. Scoping is an early and open process for developing the breadth of issues to be addressed in an EA and for identifying significant concerns related to an action. Per the requirements of Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416, federal, state, and local agencies with jurisdiction that could potentially be affected by the proposed and alternative actions were notified during the development of this EA. Those Interagency and Intergovernmental Coordination for Environmental Planning letters and responses are included in **Appendix A**.

1.6.2 *Agency Consultations*

Implementation of the Proposed Action involves coordination with several organizations and agencies. Compliance with Section 7 of the Endangered Species Act (ESA), and implementing regulations (50 CFR Part 402), requires communication with the US Fish and Wildlife Service (USFWS) and/or the National Marine Fisheries Service (NMFS) in cases where a federal action could affect listed threatened or endangered species, species proposed for listing, or candidates for listing. The Eglin Natural Resources Office would determine whether any of these species occur in the Proposed Action area. If any of these species are present, the Eglin Natural Resources Office would determine if the Proposed Action would have a potential negative effect on the species and if Section 7 consultation is required. Should no species protected by the ESA be affected by the proposed or alternative actions, no additional consultation is required. In addition, the Marine Mammal Protection Act (MMPA) (16 U.S.C. § 1371 et seq.) makes it illegal for a person to take a marine mammal, which includes significantly disturbing the habitat, unless it is done in accordance with regulations or a permit. The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801) requires federal agencies to consult with the NMFS when activities may have adverse impacts on designated Essential Fish Habitat.

Within Florida, the Office of Intergovernmental Programs, under the State Clearinghouse (SCH), is the State's single point-of-contact for the review of federal projects and federally funded activities (Florida Department of Environmental Protection [FDEP], 2017). The SCH determines if the applicant is subject to review under EO 12372; Florida Statutes, § 403.061(42); or other federal or state laws. Applications must be submitted to the SCH for any activities that may affect Florida's environment or water quality or pertains to one or more of the following state and federal laws:

- Section 216.212, Florida Statutes
- Florida Coastal Management Program
- Coastal Zone Management Act (CZMA)
- National Historic Preservation Act (NHPA)
- NEPA
- Outer Continental Shelf Lands Act

The application is logged and assigned a State Application Identifier, which is sent to the applicant. The SCH distributes the application to the appropriate state agencies, water management districts, regional planning councils, local governments and the Governor's Office of Planning and Budgeting for review. Once review is complete, the SCH compiles the reviewing agencies' comments and issues a clearance letter or a state process recommendation letter. All agency correspondence is included in **Appendix A**.

1.6.3 *Government-to-Government Consultation*

The NHPA and its regulations at 36 CFR Part 800 direct federal agencies to consult with Indian tribes when a proposed or alternative action may have an effect on tribal lands or on properties of religious and cultural significance to a tribe. Consistent with the NHPA, Department of Defense (DOD) Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, and Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, federally recognized tribes that are historically affiliated with lands in the vicinity of the Proposed Action have been invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Tyndall AFB point of contact for Native American tribes is the Base Commander. The point-of-contact for consultation with the Tribal Historic Preservation Officer and the

Advisory Council on Historic Preservation is the Tyndall AFB Cultural Resources Manager. Government-to-government consultation is included in **Appendix A.**

1.7 Applicable Laws and Environmental Regulations

Implementation of the Proposed Action would involve coordination with several organizations and agencies. Adherence to the requirements of specific laws, regulations, best management practices, and necessary permits are described in detail in each resource section in **Chapter 3**.

1.7.1 *National Environmental Policy Act*

NEPA requires that federal agencies consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed federal decisions. The CEQ was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to this process. In 1978, the CEQ issued *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 CFR Parts 1500 through 1508). These regulations specify that an EA be prepared to

- briefly provide sufficient analysis and evidence for determining whether to prepare an EIS or a FONSI;
- aid in an agency's compliance with NEPA when no EIS is necessary; and
- facilitate preparation of an EIS when one is necessary.

Further, to comply with other relevant environmental requirements (e.g., the ESA and NHPA) in addition to NEPA and to assess potential environmental impacts, the EIAP and decision-making process for the proposed and alternative actions involves a thorough examination of environmental issues potentially affected by government actions subject to NEPA.

1.7.2 *The Environmental Impact Analysis Process*

The EIAP is the process by which the Air Force facilitates compliance with environmental regulations (32 CFR Part 989), including NEPA, which is primary legislation affecting the agency's decision-making process.

1.8 Public and Agency Review of Environmental Assessment

A Notice of Availability of the Draft EA and FONSI was published in the *Panama City News Herald* announcing the availability of the EA for public review and comment on 2-3 August 2020.

The public and agency review period ended on 1 September 2020. The public and agency comments are provided in **Appendix A**.

The Draft EA and proposed FONSI were available for review on the Tyndall AFB Environmental website at

- Draft EA and FONSI: https://www.tyndall.af.mil/Portals/107/documents/Environmental Impact Assessments/Atch 1 Temp ADAIR at Tyndal Draft EA.pdf?ver=2020-07-01-101219-853
- Draft Appendices: https://www.tyndall.af.mil/Portals/107/documents/Environmental Impact Assessments/Atch 2 Temp ADAIR at Tyndall Draft EA Appendices.pdf?ver=2020-07-01-101305-010

Copies of the Draft EA and FONSI were also made available for review at the following locations:

- Bay County Public Library, 898 West 11th Street, Panama City, Florida 32401

Those who were unable to access these documents online were asked to call Tyndall AFB Public Affairs at 850-283-2126 or email Mr. Edwin Wallace at edwin.wallace.1@us.af.mil to arrange alternate access.

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CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The Air Force is proposing to temporarily provide dedicated contract ADAIR sorties for CAF training in support of the 33rd and 325th Fighter Wings to address shortfalls in F-35/F-22 pilot training and production capability and provide the necessary capability and capacity to employ adversary tactics across the training spectrum from basic fighter maneuvers to higher-end, advanced combat training missions. Training scenarios would include the use of combat tactics and procedures that differ from CAF tactics to simulate an opposing force. The Proposed Action includes elements affecting the base and military training airspace. The elements affecting Tyndall AFB include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures.

Numbers of contract ADAIR aircraft, maintenance personnel, and pilots were estimated and informed through multiple meetings with active duty and civilian Air Force functional area experts and were based on sortie requirements developed by the end user at the base. Numbers of aircraft and personnel were then used to define facility requirements, which were estimated using planning factors from Air Force Manual (AFMAN) 32-1084, *Facility Requirements*. These numbers are an estimate based on the current and proposed approximate baseline for the units, aircraft, and flying rates at Eglin AFB.

2.1.1 *Contract Adversary Air Aircraft*

Contract ADAIR would have multiple aircraft available with acceptable capabilities to support training requirements. Contract ADAIR proposed aircraft specifications are described in **Table 2-1**; all aircraft listed are capable of providing contract ADAIR support to F-35 and F-22 CAF aircrews stationed at Eglin AFB. One or a combination of these aircraft types may be operated by a contractor at Tyndall AFB in support of ADAIR training. The Proposed Action at Tyndall AFB would include the establishment of an estimated 78 contracted maintainers and 15 contracted pilots who would operate an estimated 12 aircraft.

Table 2-1. Contract Adversary Air Potential Aircraft Specifications

Aircraft	Wingspan (feet)	Length (feet)	Height (feet)	Number of Engines
MiG-29	38	57	16	2
F-5	27	48	14	2
Dassault Mirage	27	51	15	1
F-16	33	50	17	1
Eurofighter Typhoon	35	48	13	2
JAS-39 Gripen	27	47	16	1

2.1.2 *Facilities*

Tyndall AFB has existing facilities to support the Proposed Action. The proposed facilities are available for use and require minimal modification. They are located around the existing airfield and runway and include the necessary ramp space; maintenance space; operational space; petroleum, oil, and lubricants storage; runway access; and associated parking to support the contract ADAIR mission. In addition, the Munitions Storage Area has sufficient facilities to store the necessary increase in training countermeasure allocations (chaff/flares; discussed further in **Section 2.1.7**). A summary of estimated facilities requirements needed to satisfy the Proposed Action is provided in **Table 2-2**.

Table 2-2. Tyndall Air Force Base Facilities Requirements

Ramp Required (yd^2)	Number Maintenance Personnel*	Number Pilots*	Aircraft Maintenance Unit Space (ft^2)	Stand-Alone Operations Space (ft^2)	Integrated Operations Space (ft^2)
8,400	78	15	3,100	2,000	1,200

Notes:
* The number of personnel is estimated, and the final number may be slightly higher or lower depending on operational needs.
Ft^2 = square feet; yd^2 = square yards

THE AIRCRAFT MAINTENANCE UNIT (AMU) IS THE SUPPORT FUNCTION RESPONSIBLE FOR THE DIRECT SUPPORT AND MAINTENANCE OF AIRCRAFT TO ENSURE THEY ARE MISSION CAPABLE. AMU SPACE INCLUDES DEDICATED FACILITIES FOR CONTRACT MAINTENANCE PERSONNEL AND OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR A TOOL CRIB, PARTS STORAGE, AND SECURE STORAGE. THE CONTRACT ADVERSARY AIR (ADAIR) AMU IS INTENDED, FOR ACCOUNTABILITY PURPOSES, TO REMAIN PHYSICALLY SEPARATED FROM ANY AIR FORCE MAINTENANCE ORGANIZATION. CONVERSELY, CONTRACT ADAIR OPERATIONS SPACE MAY, AT THE DISCRETION OF THE HOST UNIT, BE A SEPARATE STAND-ALONE FACILITY OR BE INTEGRATED INTO AN EXISTING AIR FORCE OPERATIONS FACILITY. STAND-ALONE OPERATIONS SPACE INCLUDES OFFICE AND ADMINISTRATIVE SPACE, PLUS SPECIAL USE SPACE FOR AIRCREW FLIGHT EQUIPMENT, MISSION PLANNING, AND SECURE STORAGE. INTEGRATED OPERATIONS SPACE INCLUDES REDUCED AMOUNTS OF OFFICE, ADMINISTRATIVE, AND SPECIAL USE SPACE BECAUSE OF ANTICIPATED ECONOMIES OF SCALE REALIZED WHEN FACILITIES ARE SHARED WITH ANOTHER ORGANIZATION.

Contract ADAIR operations at Tyndall AFB would initially occur from Building 503. Contract ADAIR pilots would participate in pre-flight crew briefs and post-flight debriefs with Air Force pilots of the 33 FW, the 325 FW and other units as required. Briefs and debriefs would occur telephonically or via video teleconference. Following training sorties, contract ADAIR pilots would land and park their aircraft at Tyndall AFB on the fighter ramp area. As Tyndall AFB rebuilds, operations may be relocated to another suitable facility along the flightline to ensure ADAIR operations and Tyndall reconstruction can occur simultaneously. Contract ADAIR maintenance operations would be located in a temporary clamshell-like structure that would be erected on existing pavement on the flightline. No new construction would be completed during the temporary period to support ADAIR.

Contract ADAIR aircraft would use Defense Logistics Agency's Jet A aircraft fuel that would be delivered in fuel trucks owned and operated by the 325th Logistics Readiness Squadron (325 LRS). Contract ADAIR personnel would be responsible for all aircraft fuel and defuel operations. No additional personnel in the 325 LRS would be needed to support the additional deliveries.

Contract ADAIR aircraft would use chaff and flares (also refer to **Section 2.1.7** for additional information on defensive countermeasures). The contract ADAIR aircraft may employ chaff and flares that are in the Air Force inventory or chaff and flares that are contractor-provided external to the Air Force inventory. For the purpose of this EA, all aircraft are modeled with Air Force provided RR-188 chaff and M206 flares. The ADAIR contractor would receive an allocation for chaff and flares through the 325th Maintenance Squadron (325 MXS), Munitions Flight. 325 MXS munitions personnel would store, account for, inspect, maintain, assemble, and deliver chaff and flares to contract ADAIR aircraft; contract personnel would be responsible for loading, unloading, and accountability of chaff and flares provided to their aircraft.

If contract ADAIR aircraft utilize chaff and flares not in the government's inventory, then additional NEPA compliance review would be required. All work to account for, inspect, maintain, assemble, deliver, load, and unload chaff/flare to contract ADAIR aircraft would be the responsibility of the contractor. Government storage of contractor-provided chaff and flare may be considered after appropriate authority is granted.

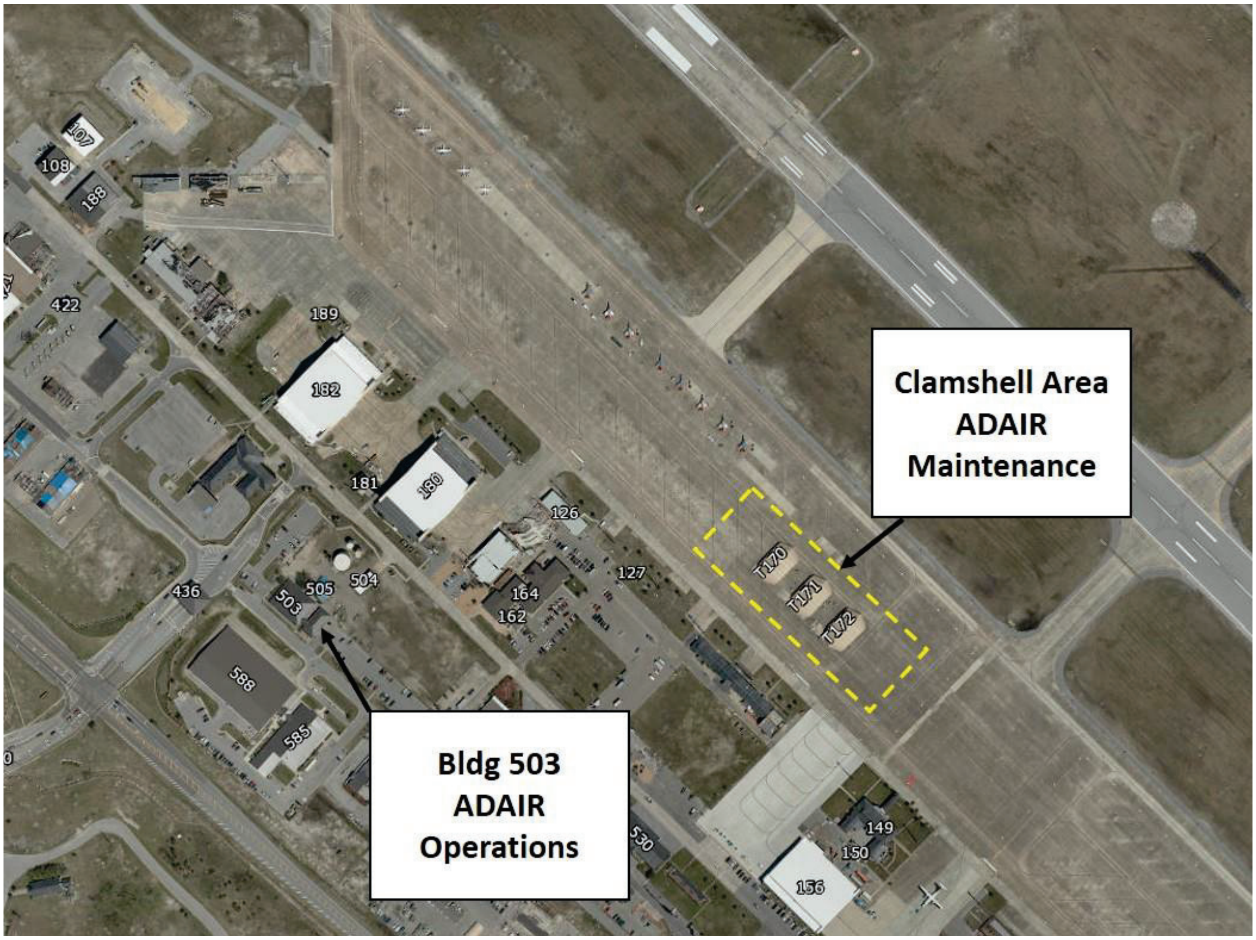

Figure 2-1 Proposed Location for ADAIR Operations, Aircraft Maintenance Unit and Hangar Space

The additional munitions functions would not require additional munitions personnel. Contractor maintenance personnel would be responsible for the inspection and maintenance of all external stores (e.g., captive air training missiles, electronic countermeasure pods). The ejector cartridges required for external stores would be considered contractor-furnished equipment. Some minor support from 325 MXS for egress system munitions (i.e., cartridge-actuated devices [CADs] and propellant-actuated devices [PADs]) may be necessary; however, the level of support is expected to be extremely minor and very infrequent. All required Aerospace Ground Equipment (AGE) would be owned and maintained by the contractor. Fuel for AGE would be obtained by contract ADAIR personnel from the base Defense Logistics Agency fuel station through an account established with 325 LRS.

> AEROSPACE GROUND EQUIPMENT IS SUPPORT EQUIPMENT REQUIRED FOR AIRCRAFT MAINTENANCE AND SORTIE GENERATION AND IS COMPOSED OF EQUIPMENT SUCH AS GENERATORS, AIR COMPRESSORS, PORTABLE LIGHT SOURCES, TOW BARS, AND MOBILE LIQUID OXYGEN AND NITROGEN SOURCES.

2.1.3 *Maintenance*

Maintenance would use hangar space and AMU facilities in a temporary clamshell-like structure to perform limited maintenance operations on contract ADAIR aircraft. Contract ADAIR aircraft maintenance would include routine inspections and minor unscheduled repairs on the flightline. Aircraft requiring major scheduled (depot level maintenance) or unscheduled maintenance would be expected to be flown back to the contractor's home base for repairs. For the rare occasions when an aircraft is not flyable, the contractor would dispatch a temporary field repair team to Tyndall AFB to repair the aircraft. Any additional maintenance support requirements (e.g., aircraft fuel cell, defueling, aircraft structural assets, nondestructive inspection Joint Oil Analysis Program tests) would be coordinated with 325th Maintenance Group and 325 LRS, as appropriate on a noninterference basis.

2.1.4 *Personnel*

Tyndall AFB would be staffed by an estimated 78 additional contracted maintenance personnel who would primarily operate out of the temporary structure. Implementation of the Proposed Action would also employ an estimated 15 contracted pilots that would primarily operate out of Building 503. It is expected that the initial personnel would arrive about 90 days after a contractor is selected and the estimated arrival on Tyndall AFB is between 2020 and 2021.

2.1.5 *Sorties*

The Proposed Action would contract for an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW, the 325 FW and other units at Eglin AFB. The number of sorties expected to support other units would be small and would not significantly increase the number of expected sorties. This number of sorties includes sorties expected for contractor training activities (refer to **Section 2.1.6**) and aircraft leaving for or returning from either maintenance or other deployments.

Air Force convention is to describe daily flying schedules in terms of total sorties and a "flight turn pattern." A flight turn pattern allows the Air Force to fly available aircraft multiple times per day to maximize available flying opportunities for assigned pilots. Flight turn patterns are designed to allow aircraft to fly, land, complete appropriate post flight inspections, refuel, and fly again. The maximum flight turn pattern that would be flown by contract ADAIR support would be an 8 x 6.

> A TURN PATTERN OF 8 X 6 DOES NOT REQUIRE 14 AIRCRAFT TO EXECUTE BUT RATHER COULD BE FILLED WITH ONLY 8 AIRCRAFT (NOTWITHSTANDING IMPACTS OF BROKEN AIRCRAFT AND AIRSPACE SCHEDULES). THE TURN PATTERN AND TOTAL DAILY SORTIES ARE THE SAME FOR ENVIRONMENTAL PURPOSES, BECAUSE THEY BOTH INDICATE THE NUMBER OF TAKEOFFS AND LANDINGS FOR ANY GIVEN DAY. AN 8 X 6 REPRESENTS 14 TOTAL SORTIES FOR THE DAY EVEN THOUGH THOSE SORTIES MAY HAVE BEEN FLOWN WITH ONLY EIGHT TOTAL AIRCRAFT.

Contract ADAIR pilots may fly very few additional traffic patterns at Tyndall AFB to maintain their currency and proficiency as required. Additional traffic patterns would be anticipated on no more than 14 percent of the annual daytime sortie total, about 324 sorties of the total training sorties.

The baseline used for comparison is the pre-hurricane operations level. The "current" or "during base reconstruction" state would not be a useful baseline since it reflects no active assigned flying mission for the 325 FW. After implementation of the Proposed Action, total airfield operations at Tyndall AFB would be an estimated 50 percent less than baseline conditions due to the F-22 FTU and associated T-38 aircraft being temporarily based at Eglin AFB and the inactivation of the 95th Fighter Squadron. Airfield operations would decrease even more after the F-22 FTU and associated T-38s are relocated to their permanent location. Refer to **Section 2.1.6** for more information on training operations. Contract ADAIR aircraft would not normally fly during environmental night hours (10:00 p.m. to 7:00 a.m. local time; refer to Air Force Handbook 32-7084, *AICUZ Program Manager's Guide*) but may support local requirements as approved by Tyndall AFB authorities.

2.1.6 *Airspace Use*

The locations of the airspace that would be used for contract ADAIR are depicted on **Figure 1-4** and **Figure 1-5** (**Section 1.1.2**). Current and projected annual training activities in the airspace are summarized in **Table 2-3**. The baseline airspace training sorties utilizes operations data for Eglin AFB, including the F-22 FTU and T-38 aircraft from Tyndall AFB and excluding the Navy F-35C aircraft as analyzed in the Special EA (Air Force, 2019). Proposed contract ADAIR sorties would generally consist of the following five steps: depart from Tyndall AFB runway, transit from Tyndall AFB airfield to airspace, perform ADAIR training, transit back to Tyndall AFB, and

> MEAN SEA LEVEL (MSL) IS ALTITUDE IN FEET ABOVE THE MEAN SEA LEVEL. AND ABOVE GROUND LEVEL (AGL) IS ALTITUDE EXPRESSED IN FEET MEASURED ABOVE THE SURFACE OF THE GROUND. WHEN FLYING OVER LAND, BOTH MSL AND AGL ARE USED TO DELINEATE AIRSPACE STRUCTURE. FLIGHT LEVEL (FL) IS VERTICAL ALTITUDE EXPRESSED IN HUNDREDS OF FEET.

land at Tyndall AFB. Contract ADAIR aircraft would spend 5 to 20 minutes in transit each way between the airfield and airspace. Time spent within the airspace (W-151, W-470, Rose Hill MOA/ATCAA, Eglin E MOA/ATCAA, Tyndall B, C/H and E MOA/ATCAA) would depend upon the specific training mission performed but would typically last 45 to 60 minutes. Supersonic operations are currently allowed in the MOAs at altitudes greater than 30,000 ft above mean sea level (MSL). Contractor operations would occur in these special use airspaces concurrent to the 33 FW, the 325 FW or other supported Air Force units. No airspace modifications would be required for contract ADAIR as part of the Proposed Action.

Table 2-3. Current and Projected Annual Training Activities in Support of Eglin Air Force Base

<table>
<tr><th>Airspace</th><th>Current Altitude[1]</th><th>Baseline Training Sorties[2]</th><th>Projected Contract ADAIR Training Sorties[3]</th><th>Projected Total Sorties</th></tr>
<tr><td>W-151</td><td>Surface to Unlimited</td><td rowspan="2">12,191</td><td>947</td><td rowspan="2">13,479</td></tr>
<tr><td>W-470</td><td>Surface to Unlimited (or as assigned); floor restricted to 5,000 ft MSL in ACMI East and West</td><td>341</td></tr>
<tr><td>Rose Hill MOA/ ATCAA</td><td>8,000 ft MSL to FL230</td><td>744</td><td>183</td><td>927</td></tr>
<tr><td>Eglin E MOA / ATCAA</td><td>Surface to Unlimited</td><td>3,416</td><td>825</td><td>4,241</td></tr>
<tr><td>R-2419A / R-2519A</td><td>Surface to Unlimited</td><td>180</td><td>0</td><td>180</td></tr>
<tr><td>Tyndall E MOA (Carrabelle ATCAA)</td><td>300 ft AGL to 17,999 ft MSL (FL180 to FL230 or as assigned)</td><td>9,307</td><td>12</td><td>9,319</td></tr>
<tr><td>Tyndall B and H MOAs (Compass Lake ATCAA)</td><td>9,000 ft MSL to 17,999 ft MSL (FL180 to FL230 or as assigned)</td><td>2,628</td><td>3</td><td>2,631</td></tr>
<tr><td>Tyndall C MOA (Compass Lake ATCAA)</td><td>300 ft AGL to 6,000 ft MSL (FL180 to FL230 or as assigned)</td><td>6,711</td><td>9</td><td>6,720</td></tr>
<tr><td colspan="2">Total Proposed Airspace Sorties</td><td>35,177</td><td>2,320</td><td>37,497</td></tr>
</table>

Source: 96 CEG/CEIEA (96th Civil Engineer Group/Environmental Assets), personal communication, 19 April 2018

Notes:

[1] No change to current minimum flight altitude is proposed.

[2] Based on 33rd Fighter Wing, 325 FW, 85th Test Squadron, 53rd Wing, 96th Test Wing. The baseline includes the F-22 and T-38 aircraft from Tyndall AFB analyzed in the Special Environmental Assessment and excludes the Navy F-35C aircraft expected to depart Eglin Air Force Base in July 2019.

[3] A total of 80 of the 2,400 contractor sorties would not be traveling from Tyndall AFB to the airspace; they would return to contractor's base for maintenance or pilot proficiency training.

ADAIR = adversary air; AFB = Air Force Base; ATCAA= Air Traffic Control Assigned Airspace; FL = flight level (vertical altitude expressed in hundreds of feet); ft = feet; MOA = Military Operations Area; MSL = mean sea level; W = Warning Area

2.1.7 *Defensive Countermeasures*

While contract ADAIR aircraft would not carry or employ live or inert munitions, aircraft would operate with advanced radar and electronic targeting systems during engagements. Contract ADAIR aircraft would employ chaff and flares (RR-188 chaff and M206 flares or similar) during 100 percent of their training sortie operations. Chaff and flares are the principal defensive countermeasures dispensed by military aircraft to avoid detection or attack by enemy air defense systems.

Chaff is an electronic countermeasure designed to reflect radar waves and obscure aircraft, ships, and other equipment from radar tracking sources. Chaff bundles consist of millions of fibers of nonhazardous aluminum-coated glass fibers. When ejected from the aircraft, these fibers disperse widely in the air, forming an electromagnetic screen that temporarily hides the aircraft from radar and forms a radar decoy, allowing the aircraft to defensively maneuver or leave the area. Flares are magnesium pellets ejected from military aircraft and provide high-temperature heat sources that act as decoys for heat-seeking weapons targeting the aircraft. These defensive countermeasures are utilized to keep aircraft from being successfully targeted by or escape from weapons such as surface-to-air missiles, air-to-air missiles, anti-aircraft artillery, and in the case of the Proposed Action, other aircraft.

The existing and estimated additional chaff and flare use are presented in **Table 2-4**. Frequent training in use of chaff and flares by aircrews to master the timing of deployment and the capabilities of the devices is a critical component of ADAIR training. Chaff and flares (types similar to RR-188 chaff and M206 flares) are proposed for annual use in contract ADAIR training. While 100 percent of the requirement may not be allocated or expended, this amount is carried forward to determine potential impact associated with defensive countermeasures.

Table 2-4. Existing and Proposed Defensive Countermeasure Use

Special Use Airspace	Countermeasure Type	Current Baseline Use[1]	Total Estimated Future Use[2]
Warning Area W-151[3]	Chaff Bundles	9,110	10,553
	Flares	16,783	21,516
Warning Area W-470[3]	Chaff Bundles	11,291	12,239
	Flares	26,282	27,987
Rose Hill MOA	Chaff Bundles[4]	0	0
	Flares[5]	1,644	2,257
Eglin E MOA	Chaff Bundles	5,077	6,451
	Flares	7,387	10,182
R-2419A / R-2519A	Chaff Bundles	1,800	1,800
	Flares	720	720
Tyndall E MOA (Carrabelle ATCAA)[6]	Chaff Bundles	403	436
	Flares	939	999
Tyndall B and H MOAs (Compass Lake ATCAA)[6]	Chaff Bundles	403	411
	Flares	939	953
Tyndall C MOA (Compass Lake ATCAA)[7]	--	--	--

Notes:

[1.] Current baseline use includes Fiscal Year 2018 33rd Fighter Wing use added to F-22 FTU baseline numbers while it was operating at Tyndall Air Force Base. Of the airspace identified for contract ADAIR use, the F-22 expendables only apply to W-151 and W-470 since the F-22 FTU does not use the Rose Hill and Eglin E MOAs.

[2] This reflects contract ADAIR estimated defensive countermeasure use added to the baseline use. With the addition of contract ADAIR, there would be an estimated 25 percent savings in the amount of chaff and flares used by the CAF due to no longer being tasked to fly CAF self-generated Red Air support. These quantities do not include the F-22 FTU aircraft expenditures since it is expected the FTU would be repositioned prior to the arrival of contract ADAIR aircraft.

[3] Countermeasures are authorized for use above 1,000 ft above sea level

[4] Chaff is not authorized for use in the Rose Hill MOA

[5] Flares are authorized for use above 8,500 feet above mean sea level.

[6] Countermeasure use is only authorized above 9,000 ft MSL within lateral confines of the MOA.

[7] Due to altitude restrictions, the use of countermeasures is not authorized below 9,000 ft MSL and would not be used in the Tyndall C MOA.

ADAIR = adversary air; CAF = Combat Air Forces; FTU = formal training unit; MOA = Military Operations Area

2.2 SELECTION STANDARDS

As discussed in Chapter 1, the need for the proposed action is to temporarily implement contract ADAIR at Tyndall AFB because Eglin AFB does not currently have facilities or capacity to accomodate ADAIR operations. In order to assess viable alternatives for the contract ADAIR implementation at Tyndall AFB, the following selection standards were applied:

1. Mission: In addition to supporting Air Force-prioritized missions as described in **Section 1.1.1**, contract ADAIR alternatives must not displace, interfere with, detract from, or reduce other Air Force missions or combat operations worldwide.
2. Airspace Capacity: Alternatives must have the airspace capacity to support force-on-force training engagements and must be able to safely support the contract ADAIR sorties in the airspace. Airspace must be large enough to effectively support realistic air-to-air training. Viable alternatives should not require establishing new military airspace but should occur within existing surrounding military airspace.
3. Facilities: Alternatives must leverage existing facilities that support the contract ADAIR requirements with minimal short duration, low-cost renovations, if any are needed. Alternatives must have existing
   a. operations work/office space;
   b. aircraft parking and hangar space;
   c. maintenance work/office space;
   d. munitions storage space;
   e. fuel storage capacity and delivery capability; and
   f. a runway of sufficient length for takeoff and landing of applicable aircraft, with appropriate safety features, infrastructure, and clear zones (CZs) to ensure safe operations.
4. Cost and Time: Contract ADAIR locations would need to support costs of facilities renovations from within their existing Operations and Maintenance budgets. Viable alternatives must not require major renovations or funding to implement. Furthermore, as CAF pilot readiness is currently an urgent need, viable ADAIR alternatives must be able to support ADAIR activities in the near term. Solutions that cannot be implemented within the next six months, therefore, do not meet the purpose and need for the initiative.

2.3 SCREENING OF ALTERNATIVES

The following potential alternatives were considered:

- Alternative 1 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 2,400 annual sorties at Tyndall AFB for support in W-151, W-470, the Rose Hill, Eglin E, Tyndall E, Tyndall B and H, Tynall C MOAs, and R-2419A/F-2519A. ADAIR operations would be located in Building 503 and maintenance functions and hanger space would occur in a temporary clamshell-like structure on the flightline.
- Alternative 2 – Establish an additional Air Force AGRS of military pilots to fly CAF ADAIR aircraft (an estimated 12 aircraft) providing 2,400 annual sorties at Tyndall AFB for support in W-151, W-470, the Rose Hill, Eglin E, Tyndall E, Tyndall B and H, Tynall C MOAs, and R-2419A/F-2519A.
- Alternative 3 – Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 2,400 annual sorties at Tyndall AFB for support in W-151, W-470, the Rose Hill, Eglin E, Tyndall E, Tyndall B and H, Tynall C MOAs, and R-2419A/F-2519A. New hangars and operations and maintenance facilities would be constructed.
- Alternative 4 – Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability.

The selection standards described in **Section 2.2** were applied to these alternatives to determine which could support contract ADAIR requirements and fulfill the purpose and need for the Proposed Action. The four alternatives considered above are compared in **Table 2-5**, **Comparison of Alternatives**.

Table 2-5. Comparison of Alternatives

Alternative Actions	Selection Standard				Meets Purpose and Need
	1. Mission	2. Airspace	3. Facilities	4. Cost and Time	
Alternative 1	Yes	Yes	Yes	Yes	**YES**
Alternative 2	No	Yes	Yes	No	**NO**
Alternative 3	Yes	Yes	No	No	**NO**
Alternative 4	No	Yes	Yes	Yes	**NO**

2.4 Alternative Actions Eliminated From Further Consideration

Three alternatives were considered and eliminated from further consideration because they would not meet the purpose and need for the action or the selection standards (refer to **Section 2.3**). These alternatives included the following:

- Alternative 2: Establish an additional Air Force AGRS of military pilots to fly CAF ADAIR aircraft (an estimated 12 aircraft) providing 2,400 annual sorties at Tyndall AFB. Establishing a new Air Force AGRS of 4th generation aircraft would meet many of the selection standards; however, it would take a large amount of time to implement. It takes more than a decade to train an Air Force pilot. Establishing another organic AGRS would require intensive planning, budgeting, and training of Air Force pilots before they would be ready to execute their mission. Rapid stand-up and manning of additional AGRS squadrons would be possible but not without reducing both manpower and combat platforms available to support combat operations. Due to the timeframe and/or reductions in combat mission capacity involved, this alternative fails to meet Selection Standards 1 and 4 and does not meet the purpose and need for the Proposed Action.
- Alternative 3: Establish contract ADAIR capabilities (an estimated 12 aircraft) providing 2,400 annual sorties at Tyndall AFB and constructing new hangars and operations and maintenance facilities. Establishing the contract ADAIR mission with new facilities construction was considered but not carried forward, as the alternative requires the construction of new facilities and does not provide support in the timely manner needed to address the pilot readiness crisis, and as such does not meet Selection Standards 3 and 4. It would take 4 to 5 years to plan, program, budget, appropriate, design, and construct new facilities. This would not support the purpose and need for the Proposed Action.
- Alternative 4: Establish dedicated CAF ADAIR by tasking organic CAF units to provide the capability. Tasking organic 4th generation assets to provide dedicated ADAIR support to Eglin AFB would result in both a reduction of combat power applied worldwide as well as continued degradation of the unit's own readiness. The units employing 4th generation aircraft, such as the F-16, are heavily engaged in deployments and overseas missions. Under this alternative, these units would continue to struggle with providing for their own proficiency, while maintaining support for both combat operations and CAF ADAIR. Such an alternative does not meet Selection Standard 1 or the overarching purpose and need for the Proposed Action.

2.5 Detailed Description of the Selected Alternatives

NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to the Proposed Action. "Reasonable alternatives" are those that also could be utilized to meet the purpose of and need for the Proposed Action. The NEPA process is intended to support flexible, informed decision-making; the analysis provided by this EA and feedback from the public and other agencies will inform decisions made about whether, when, and how to execute the Proposed Action. One alternative action meets the purpose of and need for the action, satisfies the criteria set forth in the selection standards, and was carried forward for further detailed analysis in this EA. The No Action Alternative provides a benchmark used to compare potential impacts of the Proposed Action. Alternatives carried forward for evaluation are described below in **Sections 2.5.1** and **2.5.2**.

2.5.1 *Proposed Action: Contract Adversary Air Operating Out of Building 503 and Temporary Structure*

Under the Proposed Action, the Air Force would establish contract ADAIR capabilities (an estimated 12 aircraft) providing 2,400 sorties at Tyndall AFB annually. Operations would be located in Building 503 and the AMU would be in a temporary clamshell-like structure on the flightline, which would also have hangar space available for aircraft maintenance. The contract ADAIR Operations would participate in crew briefs and debriefs via video teleconference. The contract ADAIR aircraft, maintenance, personnel, sorties, airspace use, and defensive countermeasures would be as described under Proposed Action.

2.5.2 *No Action Alternative*

Analysis of the No Action Alternative provides a benchmark, enabling decision-makers to compare the magnitude of the potential environmental effects of the Proposed Action. NEPA requires an EA to analyze the No Action Alternative. No action means that an action would not take place at this time, and the resulting environmental effects from taking no action would be compared with the effects of allowing the proposed activity to go forward. No action for this EA reflects no contract ADAIR assets would be established in support of Eglin AFB at Tyndall AFB. Organic Eglin AFB support would result in further reduction in pilot proficiency and combat readiness. Eglin AFB self-generated ADAIR support, the status quo following calendar year 2017 fighter pilot production increase goals, has produced a decline in fighter pilot training quality resulting in unsustainable operations which pose an unacceptable risk to national security. Aircraft tasked to support CAF ADAIR missions organically from within the Air Force would continue to experience their own readiness and proficiency challenges.

Tyndall AFB airfield operations have varied over the years due to aircraft realignments, pre/post-hurricane aircraft relocations, and other factors discussed in this chapter, which have affected this airfield’s annual usage. A 2016 Air Installations Compatible Use Zones (AICUZ) Study noted that Tyndall AFB airfield operations over a 6-year period generally ranged from about 22,000 to 61,000; this study projected 66,000 operations by 2018 (USAF, 2016a) which was the approximate actual rate prior to the hurricane. During the post hurricane period there are still ongoing airfield operations at Tyndall AFB, but these operations are significantly reduced from the pre hurricane level.

2.6 Summary of Potential Environmental Consequences

The potential impacts associated with the Proposed Action and the No Action Alternative are summarized in **Table 2-6**. The summary is based on information discussed in detail in **Chapter 4** (**Environmental Consequences**) of the EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with the proposal.

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Table 2-6
Comparison of Potential Environmental Consequences of the Proposed Action

Alternative	Resource						
	Airspace Management and Use	**Noise**	**Safety**	**Air Quality**	**Biological Resources**	**Cultural Resources**	**Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances**
Proposed Action: **Contract ADAIR operations with 2,400 contracted sorties** **Operations and maintenance activities in Bldg 503 and temporary flightline structure.**	(green) **Tyndall AFB** **Eglin AFB** Negligible impacts **Special Use Airspace** Negligible impacts	(green) **Tyndall AFB** Overall noise levels would be much lower than pre-hurricane levels. Tyndall would experience some minor noise impacts associated with temporary ADAIR operations including slightly noticeable increases at 11 POIs and negligible to minor impacts at local elementary schools (refer to Section 4.2.2.1). **Special Use Airspace** Impacts associated with sonic booms would be negligible	(green) **Tyndall AFB** No impacts on ground, explosive, or flight safety **Special Use Airspace** No impacts on ground, explosive, or flight safety	(green) **Tyndall AFB** Criteria pollutant emissions would be lower than the baseline environment due to the departure of the F-22 ops squadron, F-22 FTU and supporting T-38 aircraft prior to the arrival of contract ADAIR. No impact on the region's ability to comply with the NAAQS for regulated pollutants Will not hamper efforts to maintain compliance with ozone NAAQS **Special Use Airspace** No impact from criteria pollutant emissions No impact on the region's ability to meet NAAQS for all regulated pollutants	(green) **Tyndall AFB** Overall, less impact than the baseline environment on and surrounding Tyndall AFB due to the departure of the F-22 ops squadron, F-22 FTU and supporting T-38 aircraft prior to the arrival of contract ADAIR No impacts on vegetation communities or habitat. Negligible, short- and long-term impacts on wildlife, including birds Minor impacts on birds from potential aircraft/bird collisions No impacts on federally listed species **Special Use Airspace** Neglible impacts on marine wildlife Minor impacts on birds and terrestrial mammals from low altitude training operations Minor impacts on the black skimmer from use of chaff and flares May affect but not likely to adversely affect federally listed red-cockaded woodpecker, piping plover, red knot, marine mammals, sea turtles, giant manta ray, Gulf sturgeon and whitetip oceanic shark No impact on Essential Fish Habitat No impacts from noise, including sonic booms	(green) **Tyndall AFB** No impact on historic properties or archaeological resources No known traditional cultural resources or sacred sites are present **Special Use Airspace** No impact on potential submerged archaeological resources.	(green) **Tyndall AFB** No impacts on hazardous waste management No impacts on asbestos-containing materials and lead-based paint management Long-term, minor, beneficial impact on managing and disposal of polychlorinated biphenyls No impacts from radon No environmental contamination **Special Use Airspace** N/A
No Action Alternative*	(green) No change to airspace management and use at Tyndall AFB or in the special use airspace	(green) Noise levels would be lower than those of the Proposed Action due to the departure of the F-22 FTU and associated T-38 aircraft	(green) No change to ground, flight, or explosive safety at Tyndall AFB or in the special use airspace	(green) No change to air quality at Tyndall AFB or in the special use airspace	(green) No change to biological resources at Tyndall AFB or in the special use airspace	(green) No change to cultural resources at Tyndall AFB or in the special use airspace	(green) No change to hazardous materials and wastes, contaminated sites, and toxic substances at Tyndall AFB

Notes:
* Under the No Action Alternative, contract ADAIR to support Eglin AFB would not be temporarily located at Tyndall AFB.

(green) No, minor, or negligible impact (yellow) Moderate impact but not significant (red) Major, significant impact

ADAIR = adversary air; AFB = Air Force Base; FTU = formal training unit; N/A = not applicable; NAAQS = National Ambient Air Quality Standard

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CHAPTER 3 AFFECTED ENVIRONMENT

3.1 SCOPE OF THE ANALYSIS

Existing environmental conditions could be affected by the Proposed Action and No Action Alternative. The existing conditions for relevant resources are defined to provide a meaningful baseline from which to compare potential future effects. In this chapter, each resource is defined, the geographic scope is identified, followed by a description of the existing conditions for that resource. The expected geographic scope of potential consequences is referred to as the ROI. The ROI boundaries will vary depending on the nature of each resource. For example, the ROI for some resources, such as socioeconomics – income and employment and air quality, extend over a larger jurisdiction unique to the resource. In addition, some resources discuss the available baseline data, installation (base) and airspace, in the same section and some discuss these elements separately, depending on the complexity of the ROI and the relationship of the base to the airspace.

3.1.1 *Resources Analyzed*

Based on the components of the Proposed Action, the Air Force determined that there would be temporary effects due to the nature of this flying mission and use of the Tyndall airfield and Special Use Airspace. As a result of this review, resource categories evaluated are: airspace management and use, noise, safety and occupational health, air quality, biological resources, cultural resources, hazardous materials and wastes, toxic substances, and contaminated sites.

3.2 AIRSPACE MANAGEMENT AND USE

3.2.1 *Definition of the Resource*

Airspace management involves the direction, control, and handling of flight operations in the airspace that overlies the borders of the United States and its territories. Under Title 49, U.S.C. § 40103, *Sovereignty and Use of Airspace*, and Public Law No. 103-272, the US government has exclusive sovereignty over the nation's airspace. The FAA has the responsibility to plan, manage, and control the structure and use of all airspace over the United States. FAA rules govern the national airspace system, and FAA regulations establish how and where aircraft may fly. Collectively, the FAA uses these rules and regulations to make airspace use as safe, effective, and compatible as possible for all types of aircraft, from private propeller-driven planes to large, high-speed commercial and military jets.

Aircraft use different kinds of airspace according to the specific rules and procedures defined by the FAA for each type of airspace. For the Proposed Action, the airspace used are MOAs, ATCAAs, and Warning Areas. A MOA is designated airspace outside of Class A airspace used to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted (14 CFR § 1.1). Activities in MOAs include, but are not limited to, air combat maneuvers, air intercepts, and low-altitude tactics. The defined vertical and lateral limits vary for each MOA. While MOAs generally extend from 1,200 ft above ground level (AGL) to 18,000 ft MSL, the floor may extend below 1,200 ft AGL if there is a mission requirement and minimal adverse aeronautical effect. MOAs allow military aircraft to practice maneuvers and tactical flight training at airspeeds in excess of 250 knots indicated airspeed (approximately 285 mph). The FAA requires publication of the hours of operation for any MOA so that all pilots, both military and civilian, are aware of when other aircraft could be in the airspace. ATCAAs are assigned to Air Traffic Control (ATC) to segregate air traffic between specified activities being conducted within the assigned airspace and other IFR traffic. ATCAA is the equivalent of a MOA at 18,000 ft MSL and above. This airspace is not depicted on any chart but is often an extension of a MOA to higher altitudes and usually referred to by the same name. This airspace remains under control of the FAA when not in use to support general aviation activities. A Warning Area is airspace of defined dimensions that extends from 3 nautical miles (NM) outward from the coast of the United States and may be over US waters, international waters, or both. The purpose of Warning Areas is to warn nonparticipating pilots of potentially hazardous activity. Warning Areas may be used for other purposes if released to the FAA during periods when not required for their intended purpose and are within areas in which the FAA has ATC authority.

Each military organization responsible for a MOA develops a daily use schedule. Although the FAA designates MOAs for military use, other pilots may transit the airspace under VFR. MOAs and Warning Areas exist to notify civil pilots under VFR where heavy volumes of military training exist which increases the chance of conflict and are generally avoided by VFR traffic. MOAs and Warning Areas in the vicinity of busy airports may have specific avoidance procedures that also apply to small private and municipal airfields. Such avoidance procedures are maintained for each MOA or Warning Area, and both civil and military aircrews build them into daily flight plans.

In addition to the lower limits of charted airspace, all aircrews adhere to FAA avoidance rules. Aircraft must avoid congested areas of a city, town, settlement, or any open-air assembly of persons by 1,000 ft above the highest obstacle within a horizontal radius of 2,000 ft of the aircraft. Outside of congested areas, aircraft must avoid any person, vessel, vehicle, or structure by 500 ft. Operational commanders may establish additional avoidance restrictions under MOAs.

The ROI for airspace use and management includes the Tyndall AFB airfield and environs as well as the special use airspace depicted on **Figures 1-4** and **1-5**.

3.2.2 *Existing Conditions – Tyndall Air Force Base*

Tyndall AFB airfield operations are controlled and managed by the control tower within the tailored Class D airspace that extends from the airfield surface to 2,500 feet MSL within a 5.4-NM radius of the airfield. This area reverts to Class E airspace during weekend, holiday, and other advanced notice times when the tower is closed. This airfield has two 10,000-foot runways (14R/L and 32R/L) with an Instrument Landing System and Tactical Air Navigation System that provide a means for pilots to navigate to the assigned runway during marginal weather conditions and as required for pilot training. There is also a separate 7,000-foot runway that is used for drone operations, which are managed by ATC so as not to conflict with the parallel runway operations and other airspace uses. The tower and RAPCON coordinate the sequencing and separation of airfield arrivals and departures while transitioning between the Class D and terminal airspace areas.

Tyndall AFB airfield operations have varied over the years due to aircraft realignments, pre/post-hurricane aircraft relocations, and other factors discussed in Chapter 2, which have affected this airfield's annual usage. A 2016 Air Installations Compatible Use Zones (AICUZ) Study noted that Tyndall AFB airfield operations over a 6-year period generally ranged from about 22,000 to 61,000 operations as shown in **Table 3-1**; this study projected 66,000 operations by 2018 (USAF, 2016a). Actual operations prior to the hurricane were approximately 66,000.

Table 3-1. Tyndall AFB Airfield Operations over Six-Year Period

Calendar Year	Based Operations	Transient Operations	Total
2015	56,706	3,954	60,660
2014	45,795	3,286	49,081
2013	41,084	4,664	45,748
2012	19,141	2,656	21,797
2011	35,186	5,558	40,744
2010	48,555	6,513	55,068

Source: (USAF, 2016a)

3.2.3 *Existing Conditions – Airspace*

The affected environment for airspace management includes the MOAs, ATCAAs, and Warning Areas where aircraft based at Eglin AFB perform training operations. Fighter aircraft assigned to Eglin AFB primarily train in the Eglin E MOA/ATCAA, the Rose Hill MOA/ATCAA, the Tyndall E MOA/ATCAA, the Tyndall B and H MOA/ATCAA, the Tyndall C MOA/ATCAA, Warning Areas W-151 and W-470, and Restricted Areas R-2419A and R-2519A (see **Figure 1-4** and **Figure 1-5**). The special use airspace is described in **Chapters 1** and **2**.

3.3 NOISE

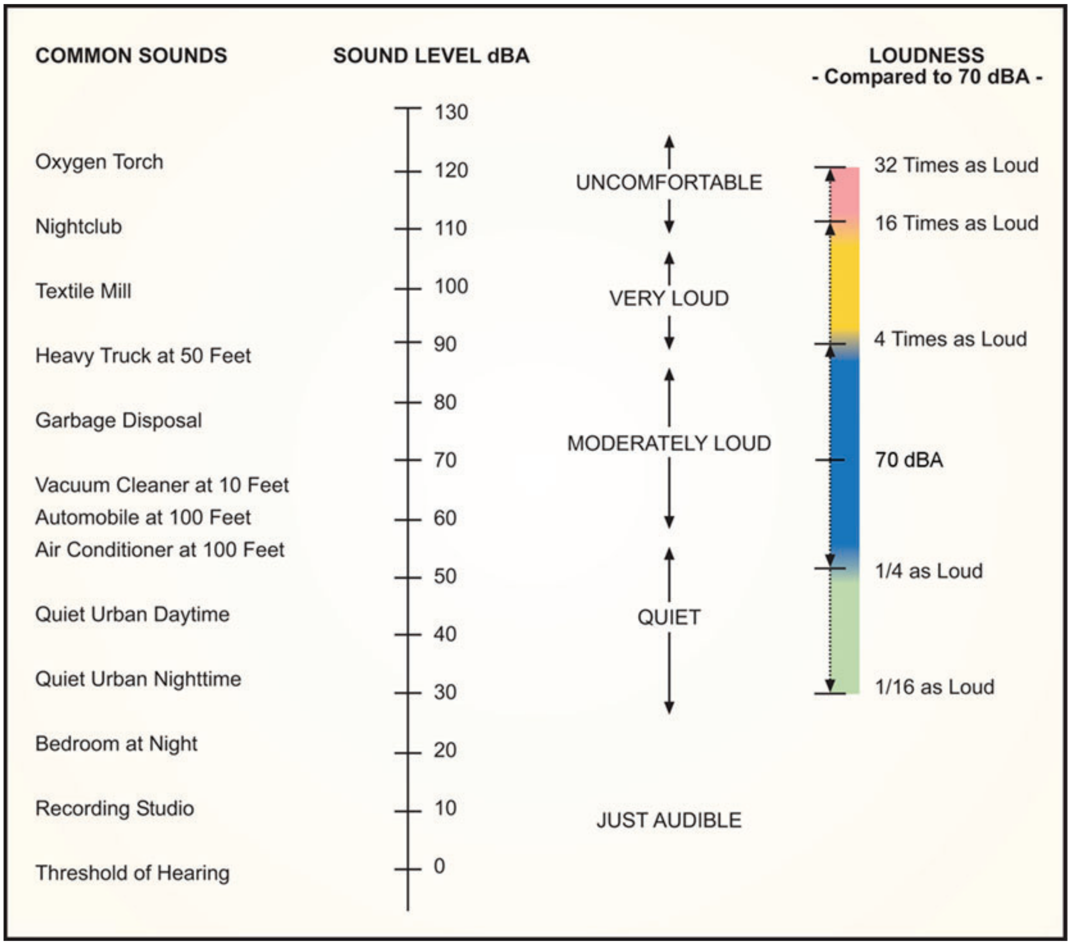
3.3.1 *Definition of the Resource*

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air or water, and are sensed by the human ear. Sound becomes noise when it is unwelcome and interferes with normal activities, such as sleep or conversation. Noise is generally described as unwanted sound. Unwanted sound can be based on objective effects (such as hearing loss or damage to structures) or subjective judgments (community annoyance). The response of different individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual. Noise also may affect wildlife through disruption of nesting, foraging, migration, and other life-cycle activities.

Measured in decibels, sound intensity levels measures the relative magnitude of a sound. The decibel is a logarithmic unit of measurement that expresses the magnitude of a physical quantity, like sound, relative to a specified or implied reference level based on atmospheric pressure. Because decibel expresses a ratio of two quantities with the same unit, it is a dimensionless unit.

All sounds have a spectral content, which means their magnitude or level changes with frequency, where frequency is measured in cycles per second, or hertz. To mimic the human ear's nonlinear sensitivity and perception of different frequencies of sound, the spectral content is weighted. For example, environmental noise measurements usually employ an "A-weighted" scale that filters out very low and very high frequencies to replicate human sensitivity. It is common to add the "A" to the measurement unit to identify that the measurement was made with this filtering process, for instance dBA. In this document, the dB unit refers to A-weighted sound levels unless otherwise noted.

A-weighted sound levels from common sources are given on **Figure 3-1**. Some sources, like the air conditioner and vacuum cleaner, are continuous sounds whose levels are constant for some time. Some sources, like the automobile and heavy truck, are the maximum sound during an intermittent event like a vehicle pass-by. Some sources like "urban daytime" and "urban nighttime" are averages over extended periods. A variety of noise metrics have been developed to describe noise over different time periods.



Source: Harris, 1979.

Figure 3-1. Typical A-weighted Sound Levels of Common Sounds.

A sound level of 0 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB; sound levels above 120 dB begin to be felt inside the human ear as discomfort. Sound levels between 130 to 140 dB are felt as pain (Berglund and Lindvall 1995). The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. On average, a person perceives a doubling (or halving) of a sound's loudness when there is a 10 dB change in sound level.

Military aircraft generate two types of sound. One is subsonic noise, which is continuous sound generated by the aircraft's engines and also by air flowing over the aircraft itself. Subsonic noise occurs at the airfields and in the airspace. The other type is supersonic noise consisting of sonic booms. Sonic booms are transient, impulsive sounds generated during supersonic flight. Supersonic flight must occur only within authorized airspace. These two types of noise differ in terms of characteristics.

Aircraft subsonic noise consists of two major types of sound events: flight events (including takeoffs, landings, and flyovers) and stationary events, such as engine maintenance run-ups. Noise from aircraft overflights typically occurs beneath main approach and departure paths and in local air traffic patterns around the airfield. Noise from stationary events typically occurs in areas near aircraft parking ramps and staging areas. As aircraft climb, the noise received on the ground drops to lower levels, eventually fading into the background or ambient levels.

Aircraft in supersonic flight (i.e., exceeding the speed of sound, Mach 1) cause sonic booms. A sonic boom is characterized by a rapid increase in pressure, followed by a decrease before a second rapid return to normal atmospheric levels. This change occurs very quickly, usually within a few tenths of a second. It is usually perceived as a "bang-bang" sound. The amplitude of a sonic boom is measured by its peak overpressure, in pounds per square foot (psf). The amplitude depends on the aircraft's size, weight, geometry, Mach number, and flight altitude. Altitude is usually the biggest single factor. Maneuvers (turns, dives, etc.) also affect the amplitude of particular booms.

Not all supersonic flights cause sonic booms that are heard at ground level. As altitude increases, air temperature and sound speed decrease. These sound speed changes cause booms to be turned upward as they travel toward the ground. Depending on the altitude of the aircraft and the Mach number, many sonic booms can be bent upward such that they never reach the ground. This phenomenon, referred to as "cutoff," also acts to limit the width (area covered) of the sonic booms that do reach the ground. The overpressures of booms that reach the ground are well below those that would begin to cause physical injury to humans or animals (see **Appendix B-1**). They can, however, be annoying and can cause startle reaction in humans and animals. On occasion, sonic booms can cause physical damage (e.g., to a window) if the overpressure is of sufficient magnitude. The condition of the structure is a major factor when damage occurs, the probability of which, tends to be low. For example, the probability of a 1-psf boom (average pressure in the airspace) cracking plaster or breaking a window falls in the range of 1 in 10,000 to 1 in 10 million.

3.3.1.1 Noise Metrics

Noise metrics quantify sounds, so they can be compared with each other, and with their effects, in a standard way. There are a number of metrics that can be used to describe a range of situations, from a particular individual event to the cumulative effect of all noise events over a long time. This section summarizes the metrics relevant to environmental noise analysis. Noise metrics and noise models are described in **Appendix B-1**.

Single Event Metrics

Maximum Sound Level

The highest A-weighted sound level measured during a single event in which the sound changes with time is called the maximum A-weighted sound level or Maximum Sound Level and is abbreviated L_{max}. The L_{max} is depicted for a sample event on **Figure 3-2**.

L_{max} is the maximum level that occurs over a fraction of a second. For aircraft noise, the "fraction of a second" is one-eighth of a second, denoted as "fast" response on a sound level measuring meter (American National Standards Institute 1988). Slowly varying or steady sounds are generally measured over 1 second, denoted "slow" response. L_{max} is important in judging if a noise event will interfere with conversation, television or radio listening, or other common activities. Although it provides some measure of the event, it does not fully describe the noise, because it does not account for how long the sound is heard.

Sound Exposure Level

Sound Exposure Level (SEL) combines both the intensity of a sound and its duration. For an aircraft flyover, SEL includes the maximum and all lower noise levels produced as part of the overflight, together with how long each part lasts. It represents the total sound energy in the event. **Figure 3-2** indicates the SEL for an example event, representing it as if all the sound energy were contained within 1 second.

Because aircraft noise events last more than a few seconds, the SEL value is larger than L_{max}. It does not directly represent the sound level heard at any given time, but rather the entire event. SEL provides a much better measure of aircraft flyover noise exposure than L_{max} alone.

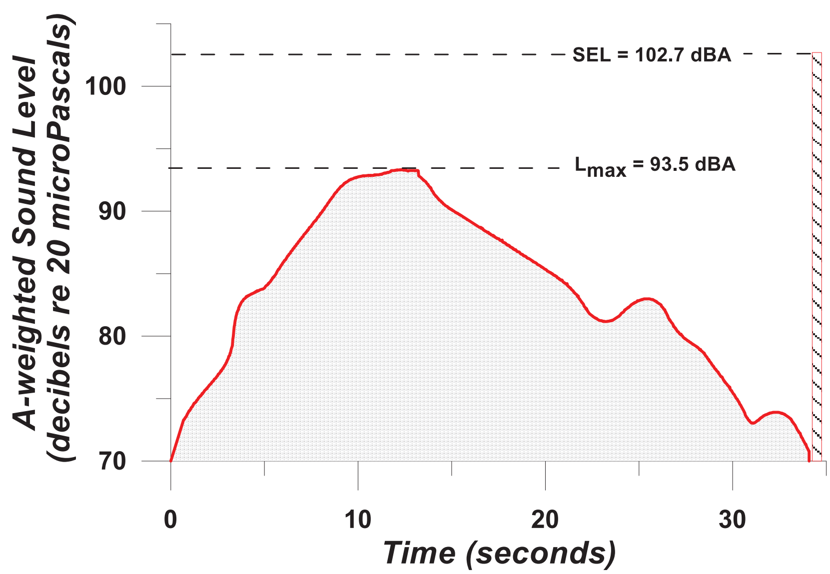


Figure 3-2. Example of Maximum Sound Level and Sound Exposure Level from an Individual Event.

Overpressure

The single event metrics commonly used to assess supersonic noise are overpressure in psf and C-Weighted Sound Exposure Level (CSEL). Overpressure is the peak pressure at any location within the sonic boom footprint.

C-Weighted Sound Exposure Level

CSEL is SEL computed with C frequency weighting, which is similar to A-Weighting (discussed in **Section 3.2.1**) except that C weighting places more emphasis on low frequencies below 1,000 hertz.

Cumulative Metrics

Equivalent Sound Level

Equivalent Sound Level (L_{eq}) is a "cumulative" metric that combines a series of noise events over a period of time. L_{eq} is the sound level that represents the decibel average SEL of all sounds in the time period. Just as SEL has proven to be a good measure of a single event, L_{eq} has proven to be a good measure of series of events during a given time period.

The time period of an L_{eq} measurement is usually related to some activity and is given along with the value. The time period is often shown in parenthesis (e.g., $L_{eq[24]}$ for 24 hours). The L_{eq} from 7:00 a.m. to 3:00 p.m. may give noise exposure for a school day.

An example of $L_{eq(24)}$ using notional hourly average noise levels ($L_{eq[h]}$) for each hour of the day is given on **Figure 3-3**. The $L_{eq(24)}$ for this example is 61 dB.

Day-Night Average Sound Level

Day-Night Average Sound Level *(*DNL) is a cumulative metric that accounts for all noise events in a 24-hour period; however, unlike $L_{eq(24)}$, DNL contains a nighttime noise penalty. To account for our increased sensitivity to noise at night, DNL applies a 10-dB penalty to events during the nighttime period, defined as 10:00 p.m. to 7:00 a.m. The notations DNL and L_{dn} are both used for Day-Night Average Sound Level and are equivalent. For airports and military airfields, DNL represents the average sound level for annual average daily aircraft events.

An example of DNL using notional hourly average noise levels ($L_{eq[h]}$) for each hour of the day is given on **Figure 3-3**. Note the $L_{eq(h)}$ for the hours between 10:00 p.m. and 7:00 a.m. have a 10-dB penalty assigned. DNL for the example noise distribution shown on **Figure 3-3** is 65 dBA.

DNL does not represent a noise level heard at any given time but represents long-term exposure. Scientific studies have found good correlation between the percentages of groups of people highly annoyed and the level of average noise exposure measured in DNL (Schultz, 1978; US Environmental Protection Agency [USEPA], 1978).

Onset-Rate Adjusted Monthly Day-Night Average Sound Level

Military aircraft utilizing special use airspace such as military training routes, MOAs, and restricted areas/ranges generate a noise environment that is somewhat different from that around airfields. Rather than regularly occurring operations like at airfields, activity in special use airspace is highly sporadic. It is often seasonal, ranging from 10 per hour to less than 1 per week. Individual military overflight events also differ from typical community noise events in that noise from a low-altitude, high-airspeed flyover can have a rather sudden onset, with rates of up to 150 dB per second.

The cumulative daily noise metric devised to account for the "surprise" effect of the sudden onset of aircraft noise events on humans and the sporadic nature of special use airspace activity is the Onset-Rate Adjusted Monthly Day-Night Average Sound Level (L_{dnmr}). Onset rates between 15 and 150 dB per second require an adjustment of 0 to 11 dB to the event's SEL, while onset rates below 15 dB per second require no adjustment to the event's SEL (Stusnick et al., 1992). The term 'monthly' in L_{dnmr} refers to the noise assessment being conducted for the month with the most operations or sorties, the busiest month.

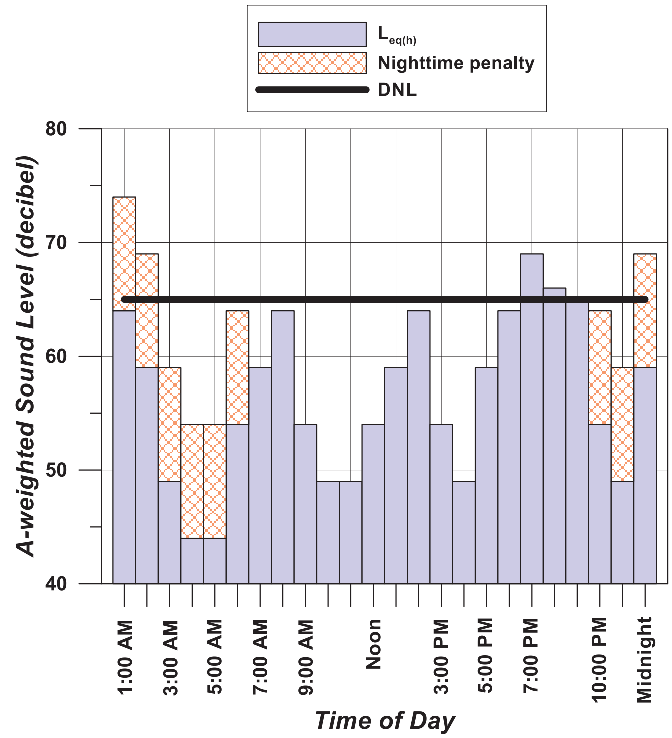


Figure 3-3. Example of Day-Night Average Sound Level Computed from Hourly Average Sound Levels.

3.3.1.2 Noise Models

This section summarizes the analysis tools used to calculate the noise levels for the EIAP.

NOISEMAP

Analyses of aircraft noise exposure and compatible land uses around DOD airfield-like facilities are normally accomplished using a group of computer-based programs, collectively called NOISEMAP (Czech and Plotkin, 1998; Wasmer and Maunsell, 2006a, 2006b). The core computational program of the NOISEMAP suite is NMAP. In this report NMAP Version 7.3 was used to analyze aircraft operations and to generate noise contours.

MR_NMAP

When the aircraft flight tracks are not well defined and are distributed over a wide area, such as in military training routes with wide corridors or MOAs, the Air Force uses the DOD-approved MR_NMAP program (Lucas and Calamia, 1997). In this report, MR_NMAP Version 3.0 was used to model subsonic aircraft noise in special use airspace. For airspace environments where noise levels are calculated to be less than 45 dB, the noise levels are stated as "<45 dB."

PCBoom

Environmental analysis of supersonic aircraft operations requires calculation of sonic boom amplitudes. For the purposes of this study, the Air Force and DOD-approved PCBoom program was used to assess sonic boom exposure due to military aircraft operations in supersonic airspace. In this report, PCBoom Version 4 was used to calculate sonic boom overpressure footprints and ground signatures from supersonic vehicles performing steady, level flight operations (Plotkin, 2002).

BooMap

For cumulative sonic boom exposure under supersonic air combat training arenas, the Air Force and DOD-approved BooMap program was used. In this report, BooMap96 was used to calculate cumulative C-weighted DNL (CDNL) exposure based on long-term measurements in a number of airspaces (Plotkin, 1993).

The ROI for noise incudes the Tyndall AFB airfield and environs as well as the MOAs and Warning Areas depicted on **Figures 1-4 and 1-5**. Noise analysis at Tyndall AFB was conducted to update the airfield noise contours and the MOAs and Warning Areas described in **Section 3.1.2**, in order to reflect the most recent and accurate aircraft operations and flying conditions.

3.3.2 *Existing Conditions – Tyndall Air Force Base*

The discussion of the acoustic affected environment is divided into sections, each covering: aircraft operations before the 2018 hurricane for context and comparison purposes only and existing aircraft operations, which are the basis of the No Action Alternative for the Proposed Action at Tyndall AFB.

3.2.2.1 Conditions Prior to Hurricane Michael in 2018

Noise levels prior to Hurricane Michael were presented in the 2016 AICUZ study and represent operations predominated by the F-22A aircraft (Air Force, 2016c). They are presented here to serve as a comparison to existing noise levels, or those levels without a majority of the F-22 aircraft. Annual aircraft operations at Tyndall AFB prior to the 2018 hurricane totaled 66,360 operations, as summarized in **Table 3-2**. An operation is defined as a single takeoff or landing. Closed patterns consist of two operations, one departure and one arrival (e.g., two closed pattern circuits consist of four total operations). The table pattern numbers are operation counts, not pattern circuit counts. Tyndall AFB's runways 14L, 14R, 32L, 32R, 01, and 19 are used for military aircraft operations. Runways 01 and 19 are used exclusively by 53d Weapons Evaluation Group QF-16 aircraft. The majority of aircraft operations at Tyndall AFB were and continue to be performed on runway 14L and 32R. A more detailed annual aircraft operations table can be found in **Appendix B-2**.

Table 3-2. Pre-Hurricane Annual Aircraft Operations Summary at Tyndall Air Force Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-22A	7,769	39	7,769	39	22,190	112	37,728	190	37,918
T-38A	5,314	54	5,314	54	1,063	11	11,691	119	11,810
Other Based	2,902	20	2,896	26	1,127	7	6,925	53	6,978
Transient F-35A	35	0	35	0	6,830	0	6,900	0	6,900
Other Transients	1,209	24	1,209	24	277	11	2,695	59	2,754
Grand Total	**17,229**	**137**	**17,223**	**143**	**31,487**	**141**	**65,939**	**421**	**66,360**

Pre-hurricane, the resultant 65- to 85-dBA DNL contours in 5-dBA increments are shown on **Figure 3-4**. In accordance with AFI 32-7084, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. It should be emphasized that these noise levels, which are often shown graphically as contours on maps, are not discrete lines that sharply divide louder areas from land largely unaffected by noise. Instead, they are part of a planning tool that depicts the general noise environment around the installation based on typical aviation activities. Areas beyond 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. Static run-up operations, such as maintenance and pre/post flight run-ups, were also modeled. A more detailed discussion of run-up operations at Tyndall AFB can be found in **Appendix B-2**.

Prior to the hurricane, the prominent features from **Figure 3-4** are the extents of the DNL contours off the East Peninsula. The only portions of the 65-dBA DNL contour to touch the mainland are just south of Panama City and the Highway 98 bridge. The 65-dBA contour extends beyond the base boundary, approximately 5.9 mi to the southeast from the end of runway 14L and 5.0 mi to the northwest from the end of runway 32L. The 75-dBA DNL contour extends approximately 2 and 3 mi from runways 14L and 32L, respectively. The area within each DNL noise contour for the conditions prior to the hurricane are identified on **Figure 3-4** and shown in **Table 3-3**.

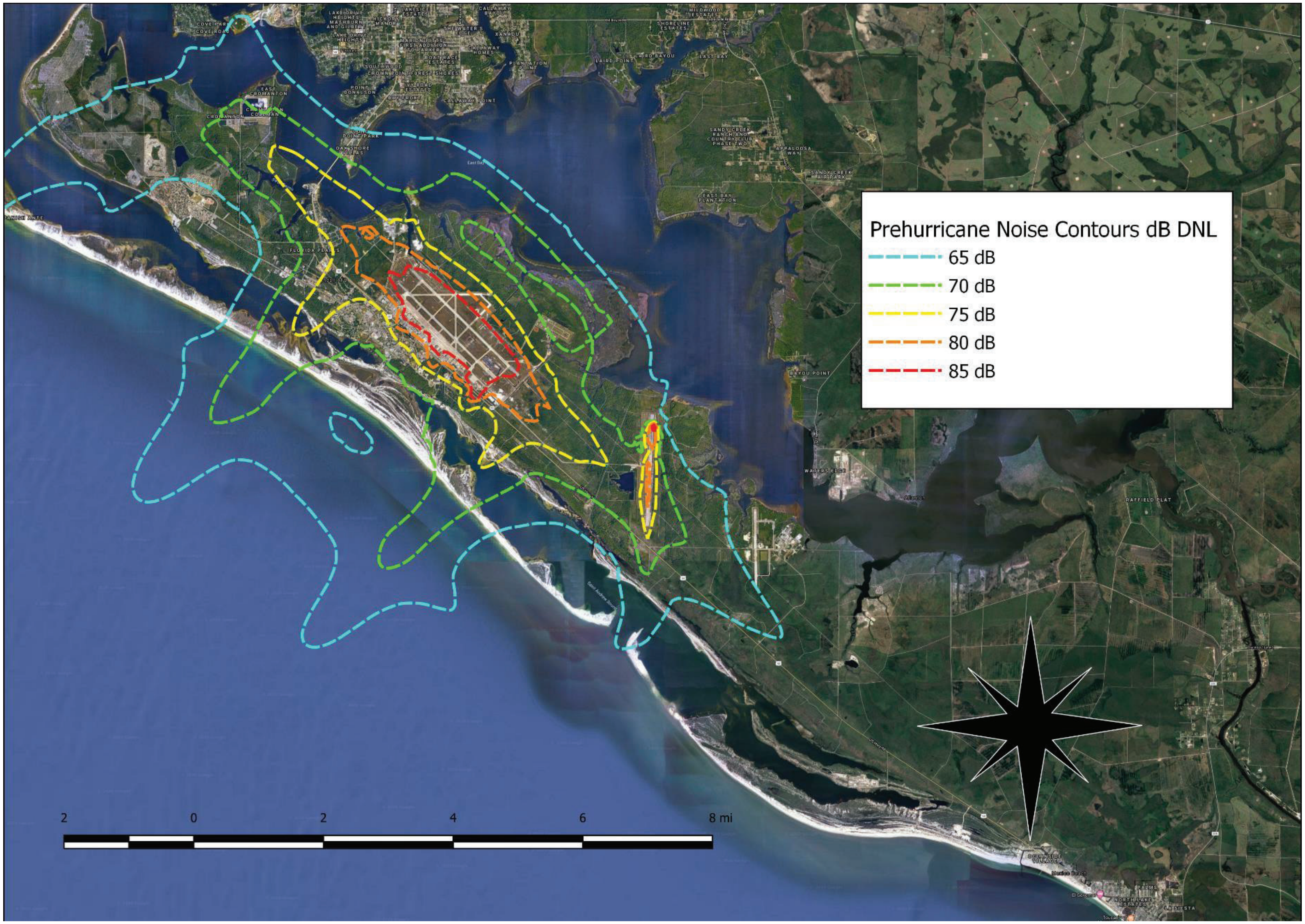
Table 3-3. Day-Night Average Sound Level Area Affected at Tyndall Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)	
	Pre-Hurricane	Existing
65-70	18,382	10,031
70-75	8,566	2,297
75-80	3,018	1,066
80-85	1,114	442
>85	797	723

Notes:
Area (on- and off-base) was based off NOISEMAP modeled noise contours and used to calculate the amount of land within each noise contour..
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level

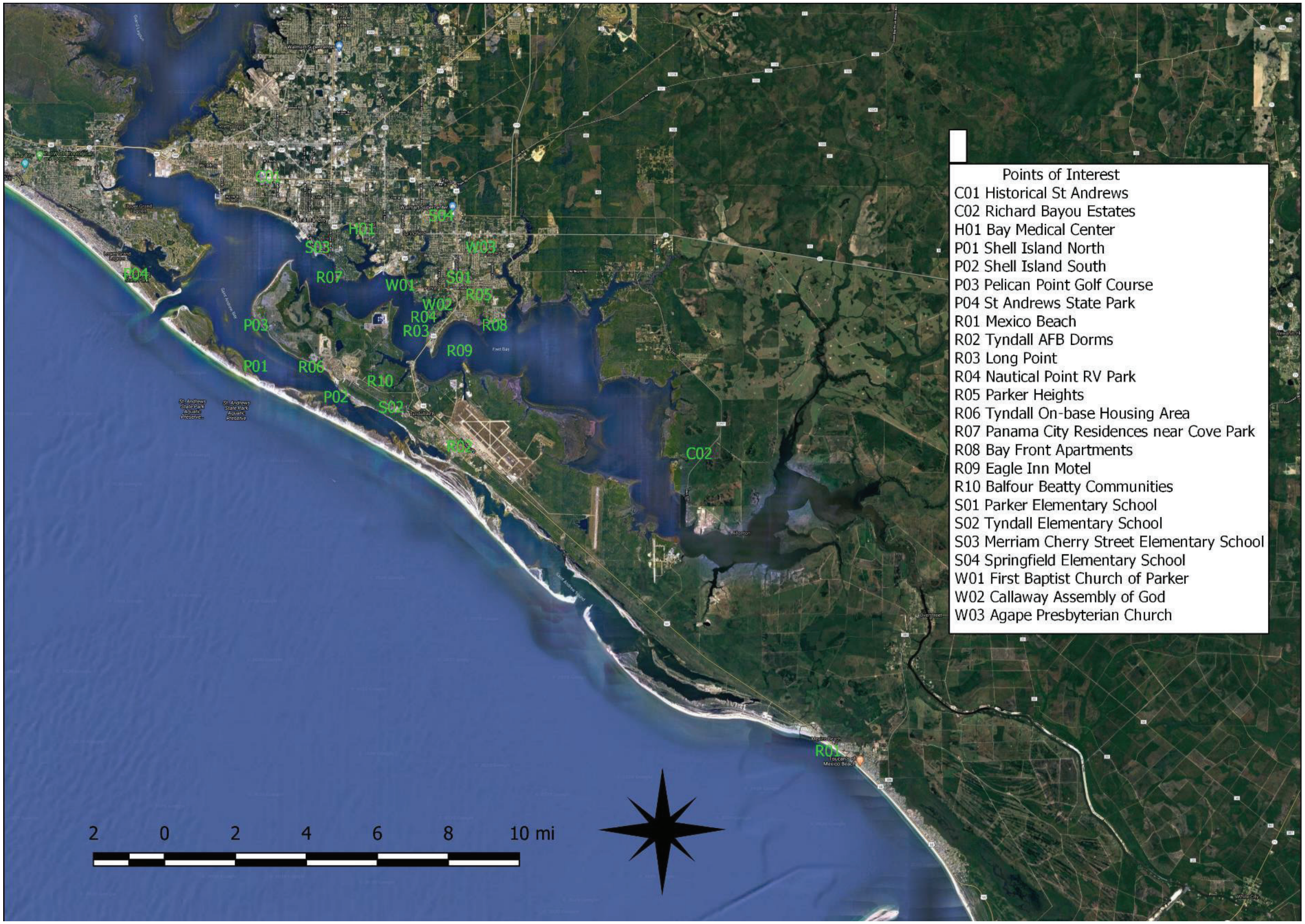
THE FIRST STEP IN IDENTIFYING NOISE SENSITIVE RECEPTORS, ALSO REFERRED TO AS POINTS OF INTEREST (POIS) AROUND MILITARY AIRFIELDS IS TO REVIEW PUBLISHED NATIONAL ENVIRONMENTAL POLICY ACT AND/OR AIR INSTALLATION COMPATIBLE USE ZONE REPORTS TO DETERMINE PREVIOUSLY IDENTIFIED POIS. THESE TYPICALLY INCLUDE SCHOOLS, PLACES OF WORSHIP, AND RESIDENTIAL AREAS AROUND THE AIRFIELD. IN ADDITION, INSTALLATION PERSONNEL WORK WITH THE COMMUNITY TO IDENTIFY AREAS AROUND THE AIRFIELD THAT SHOULD BE CONSIDERED FOR NOISE ANALYSIS.

A number of points of interest (POIs) were identified in the vicinity of Tyndall AFB. These POIs (as shown on **Figure 3-5**) are made up of noise sensitive receptors such as homes, schools, hospitals, and places of worship. **Table 3-4** lists the DNL as a result of aircraft operations at Tyndall AFB at the 24 POIs prior to Hurricane Michael. Two POIs were exposed to DNL above 70 dBA. Both of these locations are within Tyndall AFB's boundaries. The only off-base POIs with a DNL above 65 dBA were Long Point, and Eagle Inn Motel located on the opposite side of the Highway 98 Bridge from Tyndall AFB.



Source: Google EarthPro 2020.

Figure 3-4. Pre-Hurricane Day-Night Average Sound Level Contours at Tyndall Air Force Base.



Source: Google EarthPro 2020.

Figure 3-5. Points of Interest Identified Near Tyndall Air Force Base.

Table 3-4. Pre-Hurricane Day-Night Average Sound Level at Points of Interest at Tyndall Air Force Base

Points of Interest		DNL (dBA)
ID	Description	
C01	Historical St Andrews	50
C02	Richard Bayou Estates	58
H01	Bay Medical Center	56
P01	Shell Island North	65
P02	Shell Island South	64
P03	Pelican Point Golf Course	66
P04	St Andrews State Park	48
R01	Mexico Beach	55
R02	Tyndall AFB Dorms	76
R03	Long Point	66
R04	Nautical Point RV Park	62
R05	Parker Heights	59
R06	Tyndall On-base Housing Area	64
R07	Panama City Residences near Cove Park	64
R08	Bay Front Apartments	61
R09	Eagle Inn Motel	67
R10	Balfour Beatty Communities	62
S01	Parker Elementary School	55
S02	Tyndall Elementary School	74
S03	Merriam Cherry Street Elementary School	58
S04	Springfield Elementary School	59
W01	First Baptist Church of Parker	59
W02	Callaway Assembly of God	51
W03	Agape Presbyterian Church	60

Notes:
Affected POIs, identified prior to Hurricane Michael, were based off NOISEMAP-modeled noise contours and used to calculate the POIs within each noise contour.

AFB = Air Force Base; dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

3.2.2.2 Existing Conditions Post-Hurricane Michael

After Hurricane Michael, all Tyndall AFB-based F-22 and T-38 aircraft operations stopped, resulting in a dramatic decrease in operations tempo and noise levels. Although F-22 aircraft are no longer based at Tyndall AFB, F-22 aircraft continue to visit Tyndall AFB at a rate of about one per week for aircraft-specific maintenance purposes. Other aircraft types continue to operate at the installation more-or-less as they had prior to the hurricane. Existing annual aircraft operations at Tyndall AFB are summarized in **Table 3-5**. Noise levels reflecting existing conditions are shown in **Figure 3-6**. Following the figure, **Table 3-6** provides a comparison of noise levels pre- and post-hurricane on POIs. As shown, noise levels at the Tyndall AFB Dorms exceed 65 dB DNL under existing, post-hurricane conditions.

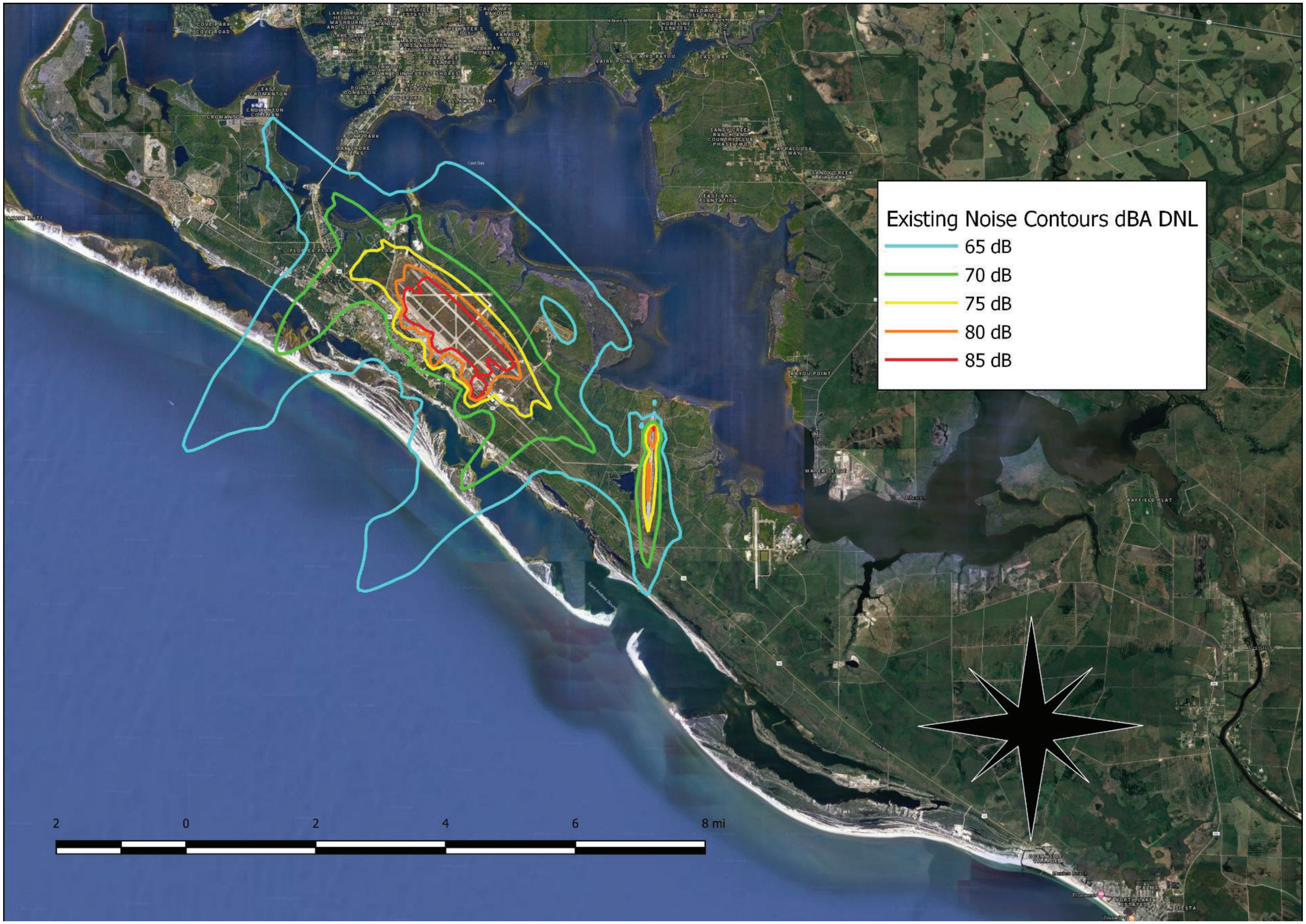


Figure 3-6 Existing Conditions Day-Night Average Sound Level Contours at Tyndall Air Force Base.

Source: Google EarthPro 2020.

Table 3-5. Existing Annual Aircraft Operations Summary at Tyndall Air Force Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
Based Aircraft	2,902	20	2,896	26	1,131	7	6,929	53	6,982
Transient F-22A	48	0	1,407	7	10,051	51	11,506	58	11,564
Transient F-35A	35	0	35	0	6,830	0	6,999	0	6,999
Other Transients	1,090	20	1,090	20	277	11	2,457	51	2,508
Grand Total	4,075	40	5,428	53	18,289	69	27,891	162	28,053

Table 3-6. Day-Night Average Sound Level at Points of Interest Under Pre-Hurricane and Existing Conditions

Points of Interest		Pre-Hurricane	Existing
ID	Description		
C01	Historical St Andrews	50	48
C02	Richard Bayou Estates	58	50
H01	Bay Medical Center	56	51
P01	Shell Island North	65	53
P02	Shell Island South	64	60
P03	Pelican Point Golf Course	66	54
P04	St Andrews State Park	48	42
R01	Mexico Beach	55	47
R02	Tyndall AFB Dorms	76	71
R03	Long Point	66	59
R04	Nautical Point RV Park	62	56
R05	Parker Heights	59	54
R06	Tyndall On-base Housing Area	64	56
R07	Panama City Residences near Cove Park	64	59
R08	Bay Front Apartments	61	56
R09	Eagle Inn Motel	67	61
R10	Balfour Beatty Communities	62	54
S01	Parker Elementary School	55	48
S02	Tyndall Elementary School	74	70
S03	Merriam Cherry Street Elementary School	58	52
S04	Springfield Elementary School	59	46
W01	First Baptist Church of Parker	59	51
W02	Callaway Assembly of God	51	43
W03	Agape Presbyterian Church	60	54

Notes:
Affected POIs, identified prior to Hurricane Michael, were based off NOISEMAP-modeled noise contours and used to calculate the POIs within each noise contour.

AFB = Air Force Base; dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

The DNL metric is useful for describing the noise environment at a location with a single number, but it does not provide a complete description of the noise environment. In accordance with current DoD policy, this EA uses several supplemental noise metrics (e.g., number of events with potential to interfere with speech in residential areas, noise interference with classroom learning) to provide an expanded description of the noise experience.

For the purposes of this analysis, it was conservatively assumed that any event exceeding 50 dB has some potential to interfere at least momentarily with speech and other forms of communication involving listening. Please note that flight paths are variable and speech-interference events sometimes occur far from standard flight patterns. As presented in **Table 3-7**, the number of noise events per average daytime hour with the potential to interfere with outdoor speech ranges from less than one per hour at one of the 20 POIs, and up to three events per hour at 19 of the POIs, and close to ten per hour at one POI (Tyndall AFB Dorms) under existing conditions. When compared to pre-hurricane conditions, the number of speech interference events per hour were greater pre-hurricane than is found now.

Table 3-7. Number of Outdoor Noise Events With Potential to Interfere With Speech Under Pre-Hurricane and Existing Conditions

Points of Interest		Pre-Hurricane Events	Existing Events
ID	Description		
C01	Historical St Andrews	1.6	0.8
C02	Richard Bayou Estates	5.8	1.9
H01	Bay Medical Center	3.6	1.5
P01	Shell Island North	3.7	1.1
P02	Shell Island South	5.2	1.7
P03	Pelican Point Golf Course	3.8	1.5
P04	St Andrews State Park	1.9	0.8
R01	Mexico Beach	2.4	0.6
R02	Tyndall AFB Dorms	14.5	9.4
R03	Long Point	7.3	3.0
R04	Nautical Point RV Park	7.2	2.9
R05	Parker Heights	6.6	2.3
R06	Tyndall On-base Housing Area	7.2	3.2
R07	Panama City Residences near Cove Park	5.1	2.3
R08	Bay Front Apartments	6.6	2.3
R09	Eagle Inn Motel	7.3	3.1
R10	Balfour Beatty Communities	1.6	3.3
W01	First Baptist Church of Parker	3.5	2.3
W02	Callaway Assembly of God	6.4	1.6
W03	Agape Presbyterian Church	4.7	2.6

Nighttime flying, which is required as training for certain missions, has an increased likelihood of causing sleep disturbance. The lack of quality sleep has the potential to affect health and concentration. The probability of being awakened at least once per night was calculated using a method described by the American National Standards Institute (American National Standards Institute, 2008). The method first predicts the probability of awakening associated with each type of flying event (higher SELs yield higher probability of awakening) and then sums the probabilities associated with all event types. The overall probability of awakening at least once per night reflects all flying events that occur between 10:00 p.m. and 7:00 a.m., when most people sleep (**Table 3-8**). The analysis also accounts for standard building attenuation of 15 dB and 25 dB with windows open and closed, respectively. Sleep disturbance probabilities listed for parks are not intended to imply that people regularly sleep in parks, but instead are indicative of impacts in nearby residential areas. Flight operations between 10:00 p.m. and 7:00 a.m. made up less than 1 percent of total operations under pre- and post-hurricane conditions. The estimated percentage of people awakened at least once per night by aircraft noise is less than 1 percent under existing and pre-hurricane conditions.

Table 3-8. Percent Probability of People Awakened by Aircraft Noise at Least Once Per Night Pre-Hurricane and Existing Conditions at Points of Interest

Points of Interest		Pre-Hurricane (%)	Existing (%)
ID	Description		
P01	Shell Island North	0.2	0
P04	St Andrews State Park	0.3	0
R01	Mexico Beach	0.2	0.1
R02	Tyndall AFB Dorms	0.3	0.1
R03	Long Point	0.4	0.1
R04	Nautical Point RV Park	0.3	0.1
R05	Parker Heights	0.3	0.1
R06	Tyndall On-base Housing Area	0.3	0.1
R07	Panama City Residences near Cove Park	0.1	0.1
R08	Bay Front Apartments	0.3	0.1
R09	Eagle Inn Motel	0.3	0.1
R10	Balfour Beatty Communities	0.3	0.1

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. The DoD Noise Working Group guidelines recommend that exterior noise levels during the school day not exceed 60 dB 8-hour equivalent noise level (L_{eq-8hr}), as that would indicate that interior classroom noise levels likely exceed a recommended 40 dB maximum background noise level (DoD Noise Working Group, 2013a). As presented in **Table 3-9**, exterior school-day noise levels are below the 60 dB L_{eq-8hr} criteria level at all schools except Tyndall Elementary School under pre-hurricane and existing conditions. Under existing, post-hurricane conditions, the number of events at Tyndall Elementary School with potential to interfere with speech per average daytime hour is close to three, with windows open or closed. Under pre-hurricane conditions, which are described for a point of reference, the number of events with potential to interfere with speech at Tyndall Elementary School was a little more than six events per hour with windows open and about four with windows closed.

Table 3-9. Noise Levels at Schools Near Tyndall Air Force Base under Pre-Hurricane and Existing Conditions

Location Description	Outdoor L_{eq-8hr}		Speech-Interference Events per Hour with Windows Open		Speech-Interference Events per Hour with Windows Closed	
	Pre-Hurricane	Existing	Pre-Hurricane	Existing	Pre-Hurricane	Existing
Parker Elementary School	< 60 dB	< 60 dB	1.8	< 1	< 1	< 1
Tyndall Elementary School	76	73	6.4	3.2	4.3	1.4
Merriam Cherry Street Elementary School	< 60 dB	60.3 dB	1.5	< 1	< 1	< 1
Springfield Elementary School	< 60 dB	60.4 dB	< 1	< 1	< 1	< 1

Notes: NA=Not Applicable

Another analysis in terms of learning is the Number-of-Events Above (NA) metric. This gives the total number of events that exceed a noise level threshold (L) during a specified period of time. Combined with the selected threshold, the metric is denoted NAL. The threshold can be either SEL or L_{max}, and it is important that this selection is shown in the nomenclature. When labeling a contour line or POI, (NA) a Threshold Level (NAL) is followed by the number of events in parentheses. For example, if there were 10 events that exceed an SEL of 50 dB over a given period of time (in this analysis it is 8 hours, which represent a school day), the nomenclature would be NA50SEL(10). Similarly, for L_{max} it would be written as NA50 L_{max}(10).

The NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level. It provides additional information about the acoustic environment and is valuable in helping to describe noise exposure to the community. A threshold level and metric are selected that best meet the need for each situation. An L_{max} threshold is normally selected to analyze speech interference, while an SEL threshold is normally selected for analysis of sleep disturbance.

Under pre-hurricane conditions, the NA50L_{max} ranged from four events per hour at Tyndall Elementary School to less than one at the other three schools. Under existing conditions, Tyndall Elementary School experiences about one NA50L_{max} event per hour and the three other schools less than one per hour.

DoD policy for assessing hearing loss risk in the community pursuant to NEPA is to use the 80-dB DNL noise contour to identify populations at the most risk of potential hearing loss (DoD Noise Working Group, 2013b). No residences on or off base are exposed to noise levels exceeding 80 dB DNL under pre- and post-hurricane conditions. Therefore, the risk of noise-induced hearing loss in the community is small, and potential hearing loss calculation is not necessary.

3.3.3 *Existing Conditions – Airspace*

3.3.3.1 Tyndall AFB Airspace

For airspace noise conditions, no comparison to pre-hurricane and existing conditions are required. Airspace aircraft operations did not noticeably change as a result of Hurricane Michael. This is because the majority of F-22 operations moved from Tyndall AFB to Eglin AFB and aircraft out of Eglin AFB have historically shared this airspace with Tyndall AFB as well as others. Historically, the primary special use airspace used by Tyndall AFB aircraft are the Tyndall E, B/H, and C MOAs (and associated ATCAAs) and Warning Areas W-151 and W-470. Historically, Tyndall B/H MOA receives approximately 8 percent of sorties originating from Tyndall AFB while Tyndall C MOA receives approximately 22 percent, Tyndall E receives 30 percent, W-151 receives 10 percent, and W-470 receives 30 percent. A summary of Tyndall AFB's annual airspace operations is presented in **Table 3-10**. **Table 3-11** shows the existing L_{dnmr} noise levels, calculated using MR_NMAP, from the subsonic aircraft operations detailed in **Table 3-10** underneath Warning Areas W-151 and W-470 and the Tyndall B/H, C, and E MOAs.

Supersonic operations are allowed in Warning Areas W-151 and W-470 and the Tyndall B/H, C, and E MOAs (and associated ATCAAs) above 10,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie.

The BooMap program was used to compute cumulative sonic boom exposure under supersonic air combat training arenas. Under the existing conditions, the cumulative CDNL exposure in the special use airspace used by Tyndall AFB aircraft do not exceed the 45-dBA CDNL under any primary use airspace.

Table 3-10. Existing Annual Airspace Operations Summary from Tyndall Air Force Base

Aircraft	Tyndall B/H[1]		Tyndall C[1]		Tyndall E[2]		W-151		W-470		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Day	Night	Total
F-22	2,549	79	6,510	201	9,028	279	3,112	96	8,713	269	29,912	924	30,836
T-38A	1,753	54	4,476	138	6,207	192	2,139	66	5,991	185	20,566	635	21,201
Grand Total	**4,302**	**133**	**10,986**	**339**	**15,235**	**471**	**5,251**	**162**	**14,704**	**454**	**50,478**	**1,559**	**52,037**

Notes:
[1] The Compass Lake Air Traffic Control Assigned Airspace is within the same lateral confines as the Tyndall B and Tyndall C/H Military Operations Areas.
[2] The Carrabelle Air Traffic Control Assigned Airspace is within the same lateral confines as the Tyndall E Military Operations Area.

Table 3-11. Existing Noise Levels in the Airspace

Airspace	Noise Level (L_{dnmr} dB)
Warning Area W-151	56
Warning Area W-470	60
Tyndall B and H MOAs	51
Tyndall C MOA	61
Tyndall E MOA	61

Notes:
dB = decibel(s); L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level;
MOA = Military Operations Area

Single event sonic boom levels estimated for supersonic flights in the airspace noted above are shown in **Table 3-12**. Overpressure (psf) and CSEL (decibels) were estimated directly under the flight path for the F-22 and T-38A aircraft at various altitudes and Mach numbers. Overpressure levels estimated for these airspaces range from 6.2 to 0.9 psf depending on the flight conditions.

Table 3-12. Warning Areas W-151 and W-470, Tyndall B/H, C, and E Military Operations Areas (Compass Lake Air Traffic Control Assigned Airspace): Sonic Boom Levels Undertrack for Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)			
	10,000	20,000	30,000	40,000
Mach 1.2				
Overpressure (psf)				
F-22	5.4	2.8	1.9	1.4
T-38A	3.3	1.8	1.2	0.9
C-Weighted Sound Exposure Level (dB)[1]				
F-22	116	111	107	105
T-38A	112	107	103	101
Mach 1.5				
Overpressure (psf)				
F-22	6.2	3.2	2.1	1.5
T-38A	3.8	2.0	1.3	0.9
C-Weighted Sound Exposure Level (dB)[1]				
F-22	117	112	108	105
T-38A	113	108	104	101

Note:
C-weighted Sound Exposure Level – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

dB = decibels; psf = pounds per square foot

When sonic booms reach the ground, they impact an area that is referred to as a “carpet.” The size of the carpet depends on the supersonic flight path and on atmospheric conditions. The width of the boom carpet beneath the aircraft is about 1 mi for each 1,000 ft of altitude (National Aeronautics and Space Administration [NASA], 2017). Sonic booms are loudest near the center of the carpet, having a sharp “bang-bang” sound. Near the edges, they are weak and have a rumbling, sounding like distant thunder. The boom levels shown in **Table 3-12** are the loudest levels computed at the center of the carpet, directly under the flight path, for the constant Mach, level flight conditions indicated. The location of these booms would vary with changing flight paths and weather conditions, so it is unlikely that any given location would experience these undertrack levels more than once over multiple events. Public reaction (limited to vessels 15 NM from shore) is expected to occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although post-boom rumbling sounds may be heard.

3.3.3.2 Eglin AFB Airspace

The primary special use airspace used by Eglin AFB-based aircraft are the Eglin E MOA/ATCAA, the Rose Hill MOA/ATCAA, and Warning Area W-151. The Eglin E MOA/ATCAA receives approximately 45 percent of all airspace operations originating from Eglin AFB, the Rose Hill MOA/ATCAA receives 10 percent, and Warning Area W-151 receives 45 percent. Minimal nighttime aircraft operations are performed in the listed airspaces. The F-22 and T-38 aircraft do not perform operations within the Eglin E or Rose Hill MOAs/ATCAAs. With the exception of Warning Area W-151, the majority of their annual operations occur in special use airspace not proposed for use by contract ADAIR training operations. A summary of Eglin

AFB's current annual airspace operations in the airspace proposed for contract ADAIR use is presented in **Table 3-13**.

Table 3-14 shows the existing L_{dnmr} noise levels, calculated using MR_NMAP, from the subsonic aircraft operations detailed in **Table 3-13** underneath the special use airspace.

Table 3-13. Existing Annual Airspace Operations Summary at Eglin Air Force Base

Aircraft	Eglin E MOA	Rose Hill MOA	Warning Area W-151	Total Operations
F-35	2,374	527	2,374	5,275
F-15A/E	391	93	1,465	1,949
F-16C	633	124	1,012	1,769
F-18A/C	114	-	145	259
A-10A	84	-	84	168
F-22	-	-	3,208	3,208
T-38	-	-	2,205	2,205
Grand Total	**3,596**	**744**	**10,493**	**14,833**

Notes:
MOA = Military Operations Area

Table 3-14. Existing Noise Levels in the Airspace

Airspace	Noise Level (L_{dnmr} dB)
Eglin E MOA	61
Rose Hill MOA	51
Warning Area W-151	61

Notes:
dB = decibel(s); L_{dnmr} = Onset-Rate Adjusted Monthly Day-Night Average Sound Level; MOA = Military Operations Area

Supersonic operations are allowed in W-151 beyond 15 NM from land and above 10,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to less than 5 minutes of supersonic flight activity per sortie.

The BooMap program was used to compute cumulative sonic boom exposure under supersonic air combat training arenas. Under the existing conditions, the cumulative CDNL exposure in the special use airspace used by based Eglin AFB aircraft do not exceed the 45-dBA CDNL under any primary use airspace.

Single event sonic boom levels estimated for supersonic flights in Warning Area W-151 are shown in **Table 3-15**. Overpressure (psf) and CSEL (dB) were estimated directly under the flight path for the F-35A/C, F-15C/E, and F-16C aircraft at various altitudes and Mach numbers. Overpressure levels estimated for these airspaces range from 6.2 to 1.1 psf depending on the flight conditions.

Table 3-15. Warning Area W-151: Sonic Boom Levels Undertrack for Aircraft in Level Flight at Mach 1.2 and 1.5

	Altitude (feet above mean sea level)			
Aircraft	**10,000**	**20,000**	**30,000**	**40,000**
Mach 1.2				
Overpressure (psf)				
F-35A	5.4	2.8	1.9	1.4
F-15A/E	5.2	2.8	1.8	1.4
F-16C	4.2	2.2	1.5	1.1
C-Weighted Sound Exposure Level (dB)[1]				
F-35A	116	111	107	105
F-15A/E	116	110	107	105
F-16C	114	109	105	103
Mach 1.5				
Overpressure (psf)				
F-35A	6.2	3.2	2.1	1.5
F-15A/E	6.0	3.2	2.0	1.5
F-16C	4.9	2.5	1.6	1.2
C-Weighted Sound Exposure Level (dB)[1]				
F-35A	117	112	108	105
F-15A/E	117	112	108	105
F-16C	115	110	106	103

Notes:
C-weighted Sound Exposure Level – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

dB = decibel(s); psf = pounds per square foot

3.4 Safety

3.4.1 *Definition of the Resource*

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support unit operations including arresting gear capability, jet blast/maintenance testing, and safety danger. Aircraft maintenance testing occurs in designated safety zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace. CZs and Accident Potential Zones (APZs) around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns.

Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, bird/wildlife-aircraft strike hazard (BASH), and in-flight emergency. Contractor planes would follow Air Force safety procedures and aircraft specific emergency procedures based on the aircraft design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 [Volume 3], *General Flight Rules*, and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

Existing conditions are organized by ground, explosive, and flight safety. The ROI includes Tyndall AFB and areas immediately adjacent to the base where ground and explosive safety concerns are described, as well as the airfield and airspace where flight safety is discussed.

3.4.2 *Existing Conditions – Tyndall Air Force Base and Airspace*

3.4.2.1 Ground Safety

Ground safety includes several categories including ground and industrial operations, operational activities, and motor vehicle use. Ground mishaps can occur from the use of equipment or materials and maintenance functions. Day-to-day operations and maintenance activities conducted by the 325 FW are performed in accordance with applicable Air Force safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements identified within AFI 91-202 (2019), *The US Air Force Mishap Prevention Program*, and AFMAN 91-203 (2018), *Air Force Occupational Safety, Fire, and Health Standards*.

Emergency Response

For emergency response to incidents on-base, the Air Force will provide emergency responders i.e., firefighters; medical; Crashed, Damaged, or Disabled Aircraft Recovery (CDDAR) personnel trained on the Contractor's aircraft. The Contractor will ensure the host base's CDDAR personnel receive familiarization training on their aircraft and procedures prior to commencing local flying operations. The Contractor will provide technical expertise, personnel, and aircraft-specific equipment for all CDDAR events involving their aircraft. The Contractor will integrate with the host base's response and recovery of their aircraft, consistent with the following considerations: (1) urgency to open the runway for operational use; (2) prevention of secondary damage to the aircraft; and (3) preservation of evidence for mishap or accident investigations IAW AFI 91-202, The US Air Force Mishap Prevention Program, and AFI 91-204, National Transportation Safety Board (NTSB) guidelines, and any local base guidance.

For an event occurring off-base, civilian authorities (city, county, or state) will be first responders to the incident and provide all incident response functions. The Air Force will respond to the scene and provide an Incident Commander and command staff for site management, security, and safety investigation purposes when Air Force assets are involved i.e., an Air Force pod was onboard the Contractor aircraft. For incidents not involving Air Force assets, The Air Force will respond to incidents to collaborate and coordinate with civilian and Federal authorities in accordance with established guidelines and agreements.

Safety Zones

Safety zones around airfields that restrict incompatible land uses are designated to reduce exposure to aircraft safety hazards. These include the CZs, which are areas immediately beyond the ends of a runway, and APZ I and APZ II, which are areas beyond the CZ. The standards for CZs and APZs are established by DOD Instruction 4165.57, *Air Installations Compatible Use Zones*. Within the CZ, which covers a 3,000-by-3,000-ft area at the end of each runway, the overall accident risk is the highest. APZ I, which extends for 5,000 ft beyond the CZ, is an area of reduced accident potential. In APZ II, which is 7,000 ft long, accident potential is the lowest among the three zones.

Open space (undeveloped) and agricultural uses (excluding raising of livestock) are the only uses deemed compatible in a CZ. Land use within APZs is based on the concept of limiting density of land use, and uses such as residential development, educational facilities, and medical facilities are considered incompatible and are strongly discouraged. There are no incompatible land uses within Tyndall CZs or APZs (Tyndall AFB, 2015a). The safety zones are shown on **Figure 3-7**.

Quantity-distance (Q-D) arcs are an additional safety zone, described in **Section 3.3.2.2** and shown on **Figure 3-7**.

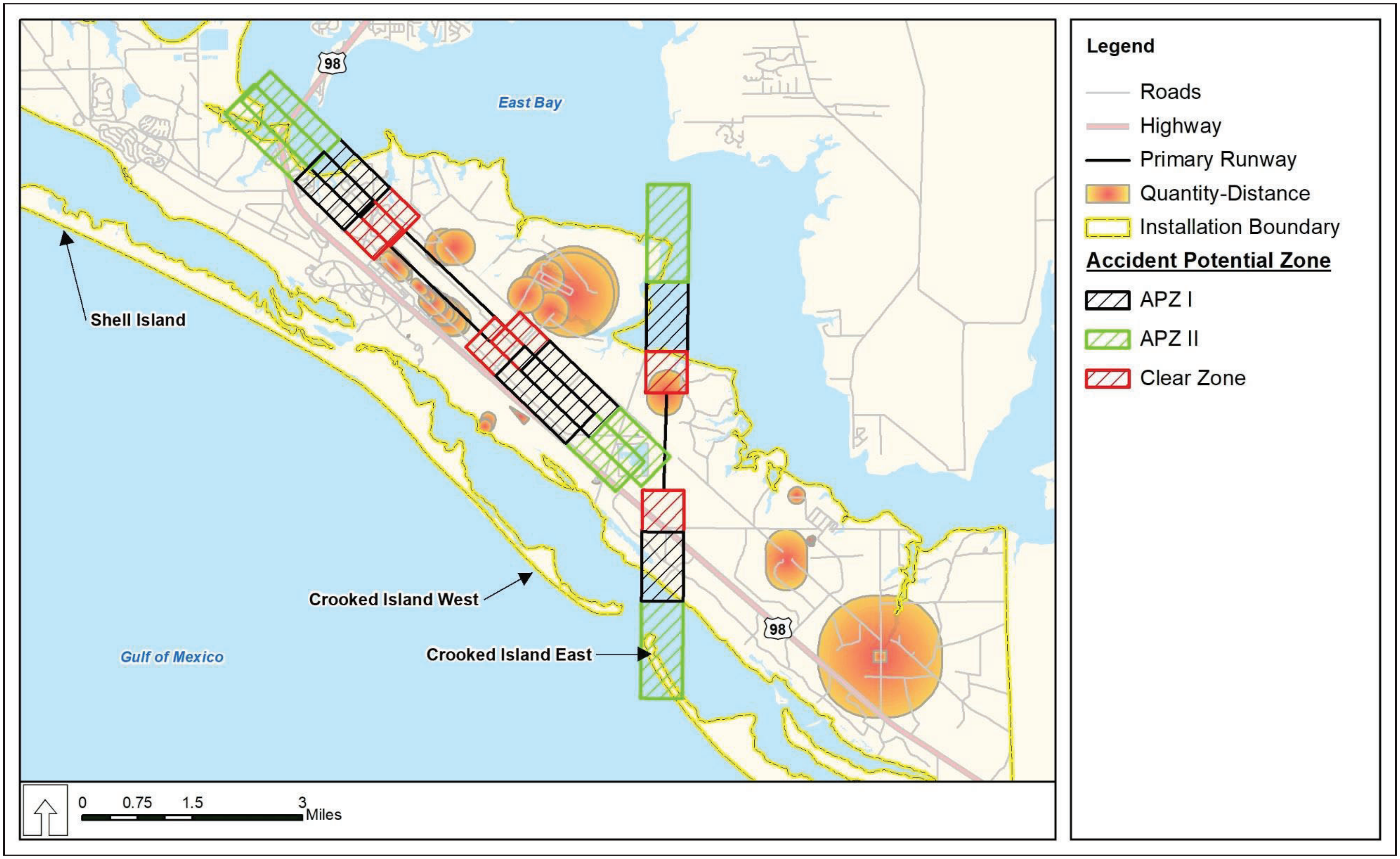


Figure 3-7. Tyndall Air Force Base Clear Zones, Accident Potential Zones, and Quantity-Distance Arcs.

Arresting Gear Capability

Per AFI 32-1043, *Managing Aircraft Arresting Systems*, criteria for siting aircraft arresting systems vary according to the type of system and operational requirement. The best location for arresting systems used extensively during instrument meteorological conditions is 2,200 to 2,500 ft from the threshold; however, if aircraft that are not compatible with the arresting system must operate on the same runway, the installation commander may shift the installation site as close to the threshold as possible. The critical factor in this case is assurance that the runout area for an aircraft engaging the system in an aborted takeoff scenario is large enough to safely accommodate other arresting systems or equipment such as light fixtures. Tyndall AFB is equipped with BAK-12 arresting systems at the approach and departure ends of runways 14L/32R and 14R/32L, BAK-15 arresting systems in the overruns of runways 14L/32R and MB-60 systems near each threshold.

3.4.2.2 Explosive Safety

The 325 FW's Munitions Flight is assigned to the 325 MXS located at Tyndall AFB. Personnel assigned to the 325 MXS Munitions Flight currently support the 325 FW flying mission with munitions support, including storage, inspection, maintenance, and accountability as well as delivery and pick-up of aircraft munitions to the airfield.

Aircraft munitions include ammunition, propellants (solid and liquid), pyrotechnics, warheads, explosive devices, and chemical agent substances and associated components that present real or potential hazards to life, property, or the environment. AFMAN 91-201, *Explosives Safety Standards*, defines the guidance and procedures dealing with munition storage and handling.

During typical training operations, aircraft are not loaded with high-explosive ordnance. Training munitions usually include captive air-to-air training missiles, countermeasure chaff and flares, and cannon ammunition with inert projectiles. All munitions are stored and maintained in the munitions storage area within facilities sited for the allowable types and amounts of explosives. All storage and handling of munitions is carried out by trained and qualified munitions systems personnel and in accordance with Air Force-approved technical orders.

Defined distances are maintained between munitions storage areas and a variety of other types of facilities. These distances, called Q-D arcs, are determined by the type and quantity of explosive material to be stored. Each explosive material storage or handling facility has Q-D arcs extending outward from its sides and corners for a prescribed distance. Within these Q-D arcs, development is either restricted or prohibited altogether to ensure personnel safety and to minimize potential for damage to other facilities in the event of an accident. In accordance with AFMAN 91-201, paragraphs 12.47.2 and 12.47.3, the ramp does not need to be sited for chaff and flare and is not currently sited for Hazard Class 1.3. The Q-D arcs on Tyndall AFB are shown on **Figure 3-7**.

3.4.2.3 Flight Safety

Tyndall AFB control tower is located center-field and west of Tyndall AFB's two runways. The 325th Operations Support Squadron operates the tower and supports the training and readiness of Air Force, Air National Guard, and Air Force Reserve F-22 pilots. The 325th Operations Support Squadron also controls air traffic, manages the airfield complex, and provides weather support. The control tower manages the aircraft flying within a range of approximately 5 mi of the base; when aircraft fly beyond this range, control is transferred to radar approach control.

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of midair collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training.

Midair Collision

Midair collision accidents involve two or more aircraft coming in contact with each other during flight. Navigation errors, miscommunications, deviations from flight plans, and lack of collision avoidance systems all increase the potential for midair collisions. Aircraft mishaps and their prevention represent a paramount concern for the Air Force. Air Force Policy Directive (AFPD) 91-2, *Safety Programs*, defines four major categories of reportable mishaps based on total cost of property damage or the degree of injury: Class A, B, C, and D mishaps. Mishap types range from loss of life or destruction of an aircraft (Class A) to a minor, reportable injury or property damage less than $50,000 (Class D). Reporting and investigation requirements for aviation mishaps are defined in AFI 91-204, *Safety Investigation and Hazard Reporting*, and AFMAN 91-223, *Safety: Aviation Safety Investigations and Reports*.

In-Flight Emergency

Each aircraft type has different emergency procedures based on the aircraft design which are produced by the original equipment manufacturer of the aircraft. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3) and established aircraft flight manuals.

Bird/Wildlife-Aircraft Strike Hazards

BASH presents a safety concern for aircraft operations because of the potential for damage to aircraft or injury to aircrews or local populations if a crash should occur. Aircraft can encounter birds at nearly all altitudes up to 30,000 ft MSL; however, most birds fly close to the ground. According to the Air Force Safety Center (2018) BASH statistics, about 52 percent of strikes occur from birds flying below 400 ft and 88 percent occur at less than 2,000 ft AGL.

The Air Force BASH program was established to minimize the risk for collisions of birds/wildlife with aircraft and the subsequent loss of life and property. In accordance with AFI 91-202, each flying unit in the Air Force is required to develop a BASH plan to reduce hazardous bird/wildlife activity relative to airport flight operations. The intent of each plan is to reduce BASH issues at the airfield by creating an integrated hazard abatement program through monitoring, avoidance, and actively controlling bird and animal population movements. The Tyndall AFB BASH program is facilitated by active dispersals and depredation as required by a US Department of Agriculture/Wildlife Services biologist augmented by Airfield Management and Flight Safety personnel as required. Application of harassment via pyrotechnics and bioacoustics is the primary deterrent. Tyndall AFB is not in a migratory flyway but does occasionally see weather patterns that cause transient hazards from several bird species. Primary residents on the airfield are meadowlarks (*Sturnella magna*), mourning doves (*Zenaida macroura*), cowbirds (*Molothrus* spp.)/starlings (*Sturnus vulgaris*), and various perching birds. A population of vultures (*Coragyps atratus*), osprey (*Pandion haliaetus*), bald eagles (*Haliaeetus leucocephalus*), and kestrels (*Falco sparverius*) can be observed at various times throughout the year (vultures and osprey are present year round). A Bird Hazard Working Group is active in the 325 FW and Civil Engineering applies continuous effort to maintain infields and CZs to make the environment the least attractive to birds and wildlife.

3.5 Air Quality

3.5.1 *Definition of the Resource*

Under the authority of the Clean Air Act (CAA) and subsequent regulations, the USEPA has divided the country into geographical regions known as Air Quality Control Regions (AQCRs) to evaluate compliance with the National Ambient Air Quality Standards (NAAQS). Tyndall AFB is located in Bay County which is located in the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR (40 CFR § 81.68). This AQCR includes all the counties in the Florida panhandle west of Apalachicola, Florida, including Bay, Calhoun, Escambia, Gulf, Holmes, Jackson, Okaloosa, Santa Rosa, Walton, and Washington Counties.

It also includes the 3 southernmost counties of Alabama and 38 counties covering the southern half of Mississippi.

For air quality, there are multiple ROIs, one in the immediate vicinity of Tyndall AFB, one in the immediate vicinity of Eglin AFB (includes Eglin E MOA), one that encompasses the airspace over the Gulf of Mexico (W-151 and W-470), one that encompasses the airspace for the Rose Hill MOA, and one for the Tyndall E MOA (Carrabelle ATCAA), Tyndall B MOA (Compass Lake ATCAA), and the Tyndall C/H MOA (Compass Lake ATCAA).. All MOAs except Rose Hill coincide with the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR. The Rose Hill MOA coincides with Geneva, Covington and Coffee Counties in Southern Alabama which are part of the Southeast Alabama Intrastate AQCR (40 CFR § 81.267). With respect to the Warning Areas, nearly all of W-151 and W-470 are located beyond the State Seaward boundary (9 NM for the Florida Gulf Coast) and the US territorial sea limit (12 NM from the coast). Thus, as the Warning Areas start 3 NM from the coast and extends out approximately 100 NM, only a very small portion of the Warning Areas would fall under state jurisdiction with respect to NAAQS compliance.

For consideration of potential air quality impacts, it is the volume of air extending up to the mixing height (3,000 ft AGL) and coinciding with the spatial distribution of the ROIs that is considered. Pollutants that are released above the mixing height typically will not disperse downward and this will have little or no effect on ground level concentrations of pollutants. The mixing height represents the altitude at which the lower atmosphere will undergo mechanical or turbulent mixing, producing a nearly uniform air mass. The height of the mixing level determines the volume of air within which pollutants can disperse. Mixing heights at any one location or region can vary by the season and time of day, but for air quality applications, an average mixing height of 3,000 ft AGL is an acceptable default value (40 CFR § 93.153[c][2]). A portion of the ADAIR training is expected to occur at or below 3,000 ft within all airspace except for the Rose Hill MOA and the Tyndall B MOA. Similarly, in the vicinity of the Tyndall airfield itself, it is the portions of the landing and takeoff (LTO) and touch and go (TGO) cycles that occur at or below 3,000 ft that are analyzed. Also considered in the air quality analysis are the ground support and construction activities (if applicable) that take place on or adjacent to the airfield. Because all ADAIR training will occur above 3,000 ft in the Rose Hill MOA and Tyndall B MOA, they are not addressed further in the air quality assessment.

3.5.1.1 Criteria Pollutants

In accordance with CAA requirements, the air quality in a given region or area is measured by the concentration of various pollutants in the atmosphere. Measurements of these “criteria pollutants” in ambient air are expressed in units of parts per million (ppm) or in units of micrograms per cubic meter ($\mu g/m^3$). Regional air quality is a result of the types and quantities of atmospheric pollutants and pollutant sources in an area as well as surface topography, the size of the “air basin,” and prevailing meteorological conditions.

The CAA directed the USEPA to develop, implement, and enforce strong environmental regulations that would ensure clean and healthy ambient air quality. To protect public health and welfare, the USEPA developed numerical concentration-based standards, NAAQS, for pollutants that have been determined to impact human health and the environment and established both primary and secondary NAAQS under the provisions of the CAA. NAAQS are currently established for six criteria air pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulates equal to or less than 10 microns in diameter (PM_{10}) and particulates equal to or less than 2.5 microns in diameter ($PM_{2.5}$), and lead (Pb). The primary NAAQS represent maximum levels of background air pollution that are considered safe, with an adequate margin of safety to protect public health. Secondary NAAQS represent the maximum pollutant concentration necessary to protect vegetation, crops, and other public resources in addition to maintaining visibility standards. The primary and secondary NAAQS are presented in **Table 3-16**.

The criteria pollutant O_3 is not usually emitted directly into the air but is formed in the atmosphere by photochemical reactions involving sunlight and previously emitted pollutants, or “O_3 precursors.” These O_3 precursors consist primarily of nitrogen oxides (NO_x) and volatile organic compounds (VOCs) that are directly emitted from a wide range of emissions sources. For this reason, regulatory agencies limit atmospheric O_3 concentrations by controlling VOC pollutants (also identified as reactive organic gases) and NO_x.

Table 3-16. National Ambient Air Quality Standards

Pollutant	Standard Value[6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m³)	Primary
1-hour average	35 ppm	(40 mg/m³)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 µg/m³)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 µg/m³)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(137 µg/m³)	Primary and Secondary
Lead (Pb)			
3-month average[3]		0.15 µg/m³	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]		150 µg/m³	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		12 µg/m³	Primary
Annual arithmetic mean[4]		15 µg/m³	Secondary
24-hour average[4]		35 µg/m³	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 µg/m³)	Primary
3-hour average[5]	0.5 ppm	(1,300 µg/m³)	Secondary

Notes:
1 In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas. A 1-hour standard no longer exists.
3 In November 2008, USEPA revised the primary lead standard to 0.15 µg/m³. USEPA revised the averaging time to a rolling 3-month average.
4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 µg/m³ and retained the level of the annual $PM_{2.5}$ standard at 15 µg/m³. In 2012, USEPA split standards for primary and secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.
5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.
6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.

µg/m³ = microgram(s) per cubic meter; mg/m³ = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

The USEPA has recognized that particulate matter emissions can have different health affects depending on particle size and, therefore, developed separate NAAQS for coarse particulate matter (PM_{10}) and fine particulate matter ($PM_{2.5}$). The pollutant $PM_{2.5}$ can be emitted from emission sources directly as very fine dust and/or liquid mist or formed secondarily in the atmosphere as condensable particulate matter, typically forming nitrate and sulfate compounds. Secondary (indirect) emissions vary by region depending upon the predominant emission sources located there and thus which precursors are considered significant for $PM_{2.5}$ formation and identified for ultimate control.

The CAA and USEPA delegated responsibility for ensuring compliance with NAAQS to the states and local agencies. As such, each state must develop air pollutant control programs and promulgate regulations and rules that focus on meeting NAAQS and maintaining healthy ambient air quality levels. When a region or area fails to meet a NAAQS for a pollutant, that region is classified as “nonattainment” for that pollutant. In such cases the affected State must develop a State Implementation Plan (SIP) that is subject to USEPA review and approval. A SIP is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS. Any changes to the compliance schedule or plan (e.g., new regulations, emissions budgets, controls) must be incorporated into the SIP and approved by USEPA.

The CAA required that USEPA draft general conformity regulations that are applicable in nonattainment areas, or in designated maintenance areas (attainment areas that were reclassified from a previous nonattainment status and are required to prepare a maintenance plan for air quality). These regulations are designed to ensure that federal actions do not impede local efforts to achieve or maintain attainment with the NAAQS. The General Conformity Rule and the promulgated regulations found in 40 CFR Part 93 exempt certain federal actions from conformity determinations (e.g., contaminated site cleanup and natural disaster response activities). Other federal actions are assumed to conform if total indirect and direct project emissions are below *de minimis* levels presented in 40 CFR § 93.153. The threshold levels (in tons of pollutant per year) depend upon the nonattainment status that USEPA has assigned to a region. Once the net change in nonattainment pollutants is calculated, the federal agency must compare them to the *de minimis* thresholds.

Title V of the CAA Amendments of 1990 requires state and local agencies to implement permitting programs for major stationary sources. A major stationary source is a facility (plant, base, activity, etc.) that has the potential to emit more than 100 tons per year (tpy) of any one criteria air pollutant in an attainment area.

Federal Prevention of Significant Deterioration (PSD) regulations also define air pollutant emissions from proposed major stationary sources or modifications to be “significant” if a project’s net emission increase meets or exceeds the rate of emissions listed in 40 CFR § 52.21(b)(23)(i); or 1) a proposed project is within 10 kilometers of any Class I area (wilderness area greater than 5,000 ac or national park greater than 6,000 ac).

Although Titles I and V of the CAA Amendments of 1990 apply to Tyndall AFB, compliance requirements under the relevant regulations would not apply. This is because virtually all of the emissions increase from the Proposed Action would occur from mobile sources, which are not governed by Titles I and V. As such, the requirements originating from these titles are not considered further.

The FDEP Division of Air Resource Management implements the federal CAA and related Florida statutes that are codified in Chapter 62 of the Florida Administrative Code. With respect to ambient air quality standards Florida Administrative Code 62-204.800 adopts the National Primary and Secondary Ambient Air Quality Standards (40 CFR Part 50) by reference, thereby requiring the use of the standards within the State of Florida. Florida‘s statewide air quality monitoring network is operated by both state and local environmental programs. The air is monitored for CO, Pb, NO_2, O_3, $PM_{2.5}$, PM_{10} and SO_2. Not all pollutants are monitored in all areas. Florida has over 210 air quality monitors at 97 sites strategically positioned across the state (FDEP, 2018).

3.5.1.2 Greenhouse Gases

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere. These emissions are generated by both natural processes and human activities. The accumulation of GHGs in the atmosphere helps regulate the earth’s temperature and are believed to contribute to global climate change. GHGs include water vapor, carbon dioxide (CO_2), methane, nitrous oxide, O_3, and several hydrocarbons and chlorofluorocarbons. Each GHG has an estimated global warming potential (GWP), which is a function of its atmospheric lifetime and its ability to absorb and radiate infrared energy emitted from the earth’s surface. The GWP of a particular gas provides a relative basis for calculating its CO_2 equivalent (CO_2e) or the amount of CO_2e to the emissions of that gas. CO_2 has a GWP of 1 and is, therefore, the standard by which all other GHGs are measured. Potential impacts associated with GHG emissions are discussed in **Section 4.4**.

In Florida, the USEPA regulates GHG primarily through a permitting program known as the GHG Tailoring Rule. This rule applies to GHG emissions from stationary sources. As there is an emissions decrease from the per-hurricane baseline and the emissions from the Proposed Action would occur from mobile sources, this rule does not apply here. As such, this rule is not considered further. Again, this only applies to stationary sources of emissions.

In addition to the GHG Tailoring Rule in 2009, the USEPA promulgated a rule requiring sources to report their GHG emissions if they emit more than 25,000 metric tons or more of CO_2e per year (40 CFR § 98.2[a][2]).

3.5.2 *Existing Conditions – Tyndall Air Force Base and Airspace*

3.5.2.1 Regional Climate

The regional climate of the Florida panhandle is classified as humid subtropical which is characterized by mild winters and hot, humid summers. The region is heavily influenced by semipermanent subtropical cyclone, referred to as the Bermuda High located to the east and southeast of Florida. The circulation around this feature results in a moist, maritime air flow across the Gulf of Mexico and the southeast United States (Weatherbase, 2019). The warmest months are July and August, with average high and low temperatures of 90 degrees Fahrenheit (°F) and 75°F, respectively. January is the coldest month with an average high temperature of 63°F and average low temperature of 42°F. The wettest month is July with an average of 7.4 in. of rain, and the driest month is January with an average of 3.1 in. of precipitation (US Climate Data, 2019). Overall, June through September are the wettest months due to frequent thunderstorms and occasional tropical waves/cyclones (Weatherbase, 2019). Although the winters are mild, the region is occasionally affected by polar fronts that can usher in cold, continental air masses that result in dry and cold conditions that sometimes result in frost. Winter precipitation is most often a result of frontal cyclones that form along the polar front (Weatherbase, 2019). Because of the proximity of the special use airspace to Tyndall AFB, it falls within the same regional climate regime as Tyndall AFB.

3.5.2.2 Baseline Air Emissions

Tyndall AFB and the nearby MOAs (Eglin E, Tyndall E, B, and C/H) are located in an attainment area for all criteria pollutants (USEPA, 2019c). In addition, the counties bordering W-151 and W-470 are also in attainment for all criteria pollutants. All the counties within and bordering the special use airspace are part of the Mobile (Alabama)-Pensacola-Panama City (Florida)-Southern Mississippi Interstate AQCR. Because of the attainment status, Tyndall AFB and the airspace proposed for ADAIR training would not be subject to the General Conformity Rule; however, to evaluate potential air quality impacts, emissions were compared against the General Conformity Rule *de minimis* thresholds as a significance indicator and regional/county baseline emissions in the ROIs. Note in this case using the General Conformity Rule *de minimis* thresholds as a significance indicator does not trigger a regulatory requirement if exceeded. It provides a sign that an action could be approaching a threshold which would trigger regulatory requirements.

Tyndall AFB has taken emission limits through the States Operating Permit Program, and thus, the facility is classified as a synthetic minor source. For stationary sources, Tyndall's State Operating Permit limits CO, SO_2, and NO_X emissions to 90 tpy and VOC emissions to 80 tpy (FDEP, 2015). Tyndall AFB is not classified as a major source for PSD, and its airspace is not located within 10 kilometers of any of the 156 USEPA-designated Class I areas protected by the Regional Haze Rule. As shown in **Table 3-17**, Tyndall AFB accounts for less than 3.0 percent of NO_x emissions in Bay County and less than 1.5 percent for all other criteria pollutants.

Table 3-18 summarizes baseline GHG emissions for the State of Florida. The State emissions shown represent CO_2 from fossil fuel combustion only. Overall fossil fuel combustion is the largest source of GHG emission in the United States, accounting for approximately 76 percent of all GHG emissions emitted (USEPA, 2018b). This is also the case on the state level. Other sectors (i.e., industrial processes; agriculture; waste; and land use, land-use change, and forestry) can also be significant on a state level but are not included in the state total shown in **Table 3-18** because of the lack of reliable data (USEPA, 2018b).

Table 3-17. Tyndall Air Force Base Criteria Pollutant Emission Summary (Tons per Year)

	CO	NO_X	PM_{10}	$PM_{2.5}$	SO_2	VOC
Stationary Emissions[1]	7.18	11.5	1.15	1.03	0.671	13.1
Mobile Emissions[2,3]	200	256	42.6	37.8	20.7	36.1
Total Tyndall AFB	207	268	43.8	38.8	21.4	49.2
Bay County[4]	51,670	9,220	10,125	3,526	8,360	36,318
Tyndall AFB Percent of County Emissions	0.40	2.90	0.43	1.10	0.26	0.14

Notes:
[1] Air Force, 2016a
[2] Air Force, 2013
[3] Mobile Source Inventory includes aerospace ground equipment, aircraft operations, nonroad engine, and vehicle emissions.
[4] USEPA, 2019a

AFB = Air Force Base; CO = carbon monoxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

Table 3-18. Baseline Greenhouse Gas Emission

Location/Description	Carbon Dioxide (metric tons per year)
Tyndall AFB Emissions[1]	4,225
Florida Emissions[2,3]	230.1*E6
Tyndall AFB Percentage of State GHG Emissions	0.002

Notes:
[1] Air Force, 2016b
[2] USEPA, 2018b
[3] Represents 2016 fossil fuel emissions of carbon dioxide for commercial, industrial, residential, transportation, and energy sectors.

AFB = Air Force Base; GHG = greenhouse gas; USEPA = United States Environmental Protection Agency

There are 15 categories of stationary emissions sources listed in the Tyndall AFB air inventory (Air Force, 2016a). Jet engine testing is the largest source of NO_x, CO, PM, and SO_x emissions. Surface coating is the largest source of VOC emissions. For mobile sources, NO_x had the largest emission rate (256 tpy). Aircraft operations accounted for over 40 percent of the NO_x emissions.

The Eglin E MOA spans Okaloosa, Walton, and Santa Rosa Counties and are part of the same AQCR as Eglin AFB. **Table 3-19** shows provides the total emissions for the area based upon the National Emissions Inventory (USEPA, 2019a).

Table 3-19. Military Operations Area Counties and Associated Baseline Emissions (Tons per Year)

Pollutant[1]	Okaloosa, Walton, Santa Rosa (Eglin E MOA)[2]
CO	183,080
NO_2	16,400
PM_{10}	42,616
$PM_{2.5}$	13,561
SO_2	2,608
VOC	140,667

Notes:
[1] USEPA, 2018b
[2] Includes emissions from highway and off-highway vehicles

CO = carbon monoxide; MOA = Military Operations Area; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

The Tyndall MOAs are within several counties that are all part of the same AQCR. **Table 3-20** shows the counties that each MOA falls within and provides the total emissions for these areas based upon the National Emissions Inventory (USEPA, 2019a).

Table 3-20. Counties and Associated Baseline Emissions (Tons per Year) by Military Operations Area

Pollutant	Bay, Washington (Tyndall B MOA)	Bay, Liberty, Calhoun, Jackson (Tyndall C/H MOA)	Franklin, Gulf, Liberty, Wakulla (Tyndall E MOA)
CO	64,608	121,182	127,564
NO_2	11,100	14,253	5,780
PM_{10}	16,908	33,819	25,267
$PM_{2.5}$	4,742	10,552	11,059
SO_2	8,426	9,679	1,144
VOC	60,815	132,586	135,911

Notes:
[3] USEPA, 2018b

CO = carbon monoxide; MOA = Military Operations Area; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

3.6 Biological Resources

3.6.1 *Existing Conditions – Airspace*

The information presented in this section was gathered from the Eglin AFB INRMP (Eglin AFB, 2017a), the Tyndall AFB INRMP (Tyndall AFB, 2015b), and the *Final Atlantic Fleet Testing and Training Environmental Impact Statement/Overseas Environmental Impact Statement* (US Navy, 2018). Data were also gathered from the USFWS, NMFS, and FWC.

3.6.1.1 Regional Biological Setting

Military Operations Areas

The Eglin E MOA is located almost entirely over the Eglin Reservation and the nearshore environment of the Gulf of Mexico; as such the vegetation and wildlife description provided for Eglin AFB is representative of the natural resources in the Eglin E MOA.

The Rose Hill MOA is located entirely within the Southeastern Plains Level III Ecoregion. Ecoregions are used to describe areas of similar type, quality, and quantity of environmental resources (USEPA, 2018a). Ecoregions are assigned hierarchical levels to delineate ecosystems spatially based on different levels of planning and reporting needs. Level I is the broadest ecoregion level, dividing North America into 15 ecological regions. Level II includes 50 ecoregions and Level III divides the continental United States into 105 ecoregions. Level IV further subdivides the Level III ecoregions (USEPA, 2018a).
To describe the ecosystems within the Rose Hill MOA, the Level III Ecoregion is used. Level III ecoregion descriptions provide a regional perspective and are more specifically oriented for environmental monitoring, assessment and reporting, and decision-making (Commission for Environmental Cooperation, 1997). The vegetation and wildlife common within the ecoregions are described below.

The Tyndall MOAs are located within two Level III Ecoregions. To describe the ecosystems within the MOAs, Level III Ecoregions are used. The Southeastern Plains and Southern Coastal Plain are the two Level III ecoregions associated with the Tyndall MOAs.

Southeastern Plains Ecoregion. The Southeastern Plains Ecoregion consists of a mosaic of cropland, pasture, woodland, and forest. Natural vegetation is mostly oak-hickory-pine and southern mixed forest. Streams and rivers in this region are typically low gradient drainages with sandy bottoms (USEPA, 2018a). Typical wildlife and fish species found in this ecoregion are similar to the terrestrial wildlife and freshwater fish species described for Eglin AFB.

Southern Coastal Plain Ecoregion. The Southern Coastal Plain Ecoregion is comprised of mostly flat plains containing swamps, marshes and lakes. Historically, this ecoregion was dominated by forests of beech (*Fagus grandifolia*), sweetgum (*Liquidambar styriciflua*), southern magnolia (*Magnolia grandiflora*) slash pine, loblolly pine (*Pinus taeda*), white oak (*Quercus alba*), and laurel oak (*Quercus hemisphaerica*); however, most of the ecoregion now contains longleaf-slash pine forest, with oak-gum-cypress forest in low lying areas, and pasture and urban development (USEPA, 2018a). Typical wildlife and fish species found in this ecoregion are similar to those described for Tyndall AFB.

Southern Coastal Plain Ecoregion. The Southern Coastal Plain Ecoregion is comprised of mostly flat plains containing swamps, marshes and lakes. Historically, this ecoregion was dominated by forests of beech (*Fagus grandifolia*), sweetgum (*Liquidambar styriciflua*), southern magnolia (*Magnolia grandiflora*) slash pine, loblolly pine (*Pinus taeda*), white oak (*Quercus alba*), and laurel oak (*Quercus hemisphaerica*); however, most of the ecoregion now contains longleaf-slash pine forest, with oak-gum-cypress forest in low lying areas, and pasture and urban development (USEPA, 2018a). Typical wildlife and fish species found in this ecoregion are similar to those described for Tyndall AFB.

Warning Areas W-151 and W-470

The Warning Areas include offshore waters off the coast of Florida. The inshore and offshore boundaries of the Warning Areas are roughly parallel to the shoreline contour. The shoreward boundary is 3 NM from shore, and the seaward boundary is approximately 85 to 100 NM offshore. Water depths range from approximately 65 to 2,300 ft. Approximately half of the Warning Areas overlie the continental shelf and half overlie the continental slope (Air Force, 2018c).

Plankton. Plankton are organisms that move with the ocean's currents and cannot maintain independent movement against water currents. Plankton include phytoplankton, which are plant-like organisms including algae, zooplankton, which are animals including fish eggs and larvae, and bacterioplankton, which are comprised of bacteria. Phytoplankton are critical to marine food webs. Phytoplankton are most commonly found in surface waters and in nearshore environments where nutrients and sunlight are more plentiful. Phytoplankton concentrations generally decrease with the distance from shore and become less prevalent in the deeper waters of the continental slope.

The eggs and larvae of fish, which comprise a large portion of zooplankton in the marine environment, are typically found in the upper 650 ft of the ocean water column. As fish larvae mature, their motility increases, and they feed on phytoplankton and smaller zooplankton. The combination of phytoplankton and the smaller zooplankton concentrations are critical to supporting fisheries health and abundance (US Navy, 2018).

Benthic Organisms. Benthic organisms are bottom-dwelling animals that live on and within the marine sediments. These include crustaceans, echinoderms, anthozoans, annelids, mollusks, and ground fish. Some benthic organisms burrow into soft bottoms while other attach themselves to hard structure located on the ocean floor. Most of the Warning Areas are comprised of soft bottoms and the benthic organisms present in these areas include polychaete and archiannellid worms, bivalves, amphipods, and asteroids (US Navy, 2018).

Hard and intermediate bottom structure is present in the Warning Areas off the coast of Florida. This structure includes rock outcrops, hard structure from fossil remains, artificial reefs, and shipwrecks that could support benthic invertebrates, such as bryozoans, hard and soft corals, hydroids, anemones, encrusting algae, and sponges. These hard structure areas also support foraging sea turtles and commercial/recreational fishes (US Navy, 2018).

Fish. Fish species vary greatly with depth of water, salinity, distance from shore, clarity of the water, availability of structure, and availability of prey. The upper 650 ft of the ocean is the epipelagic zone where there is sufficient sunlight penetration to support phytoplankton while the portion of the ocean’s water column between 650 and 3,200 ft is the mesopelagic zone where light penetration is minimal. Sunlight does not penetrate below the mesopelagic zone (Moyle and Cech, 2004). Most fish in the ocean occur in the epipelagic zone and those associated with the nearshore environment are the most commercially valuable. Fish species of greatest interest in the nearshore environment include gobies (Gobiidae), drums (Sciaenidae), seabasses (Serranidae), groupers (Epinephelidae), snappers (Lutjanidae), and sculpins (Cottidae) associated with hard bottom habitat and white flounder (Bothidae and Paralichthyidae) and stingrays (Dasyatidae) associated with soft bottom habitat. Tunas (Scombridae), salmon (Salmonidae), billfishes and swordfishes (Xiphiidae), sharks (Carcharhinidae), sauries (Scomberesocidae), and ocean sunfish (Molidae) are oceanic epipelagic fish that could occur in the Warning Areas (US Navy, 2018).

Marine Mammals. There are 22 cetacean species that could occur within the Warning Areas (**Table 3-21**). Some cetacean species are resident year round while others occur seasonally as they migrate through the area.

Table 3-21. Marine Mammals with the Potential to Occur in Warning Areas

Common Name	Scientific Name	Endangered Species Act Listing	Occurrence in the Warning Areas[1]
Cetaceans			
Bryde’s whale	*Balaenoptera brydei*	Endangered	Occurs year-round.
Sperm whale	*Physeter macrocephalus*	Endangered	Occurs year-round in deep waters.
Pygmy sperm whale	*Kogia breviceps*	-	Occurs year-round.
Dwarf sperm whale	*Kogia sima*	-	Occurs year-round.
Cuvier's beaked whale	*Ziphius cavirostris*	-	Occurs over the continental slope year-round.

Common Name	Scientific Name	Endangered Species Act Listing	Occurrence in the Warning Areas[1]
Gervais' beaked whale	*Mesoplodon europaeus*	-	Occurs over the continental slope year-round.
Blainville's beaked whale	*Mesoplodon densirostris*	-	Occurs over the continental slope year-round.
Killer whale	*Orcinus orca*	-	Occurs year-round.
Short-finned pilot whale	*Globicephala macrorhynchus*	-	Occurs year-round.
Pygmy killer whale	*Feresa attenuata*	-	Occurs in waters over the continental slope year-round.
False killer whale	*Pseudorca crassidens*	-	Occurs in warm waters off of the continental shelf year-round.
Melon-headed whale	*Peponocephala electra*	-	Occurs in deep warm waters over the continental shelf year-round.
Rough-toothed dolphin	*Steno bredanensis*	-	Occurs in waters over the continental slope year-round.
Bottlenose dolphin	*Tursiops truncatus*	-	Occurs in waters over the continental shelf year-round.
Risso's dolphin	*Grampus griseus*	-	Occurs along the continental shelf break year-round.
Pantropical spotted dolphin	*Stenella attenuata*	-	Occurs in waters over the continental slope i year-round.
Atlantic spotted dolphin	*Stenella frontalis*	-	Year-round occurrences.
Spinner dolphin	*Stenella longirostris*	-	Occurs in deep warm waters year-round.
Clymene dolphin	*Stenella clymene*	-	Occurs year-round in the deep warmer waters.
Striped dolphin	*Stenella coeruleoalba*	-	Occurs in waters over the continental slope from the continental break eastward year-round.
Fraser's dolphin	*Lagenodelphis hosei*	-	Likely rare; however, there is the potential to occur year-round.
Sirenia			
West Indian manatee	*Trichechus manatus*	Threatened	Commonly occurs in nearshore waters

Notes:
[1] Sources: Würsig, 2017; US Navy, 2018

Threatened and Endangered Species and/or Species of Concern

Federally endangered and threatened marine species protected under the ESA that could occur in the offshore environment in the Warning Areas are managed by NMFS (see **Table 3-21**). Because there are no proposed ocean surface or underwater activities in Warning Areas, and activities are limited to aircraft overflights in the airspace where noise and visual cues could cause behavioral changes in birds, mammals, and sea turtles, there would be no impacts on listed fish, such as the Gulf sturgeon or smalltooth sawfish, invertebrates, or crustaceans. Of the listed species in the Warning Areas, the RCW, piping plover, snowy plover, least tern, red knot, Southeastern American kestrel, Choctawhatchee beach mouse, St. Andrew beach mouse, West Indian manatee, Gulf sturgeon, and smalltooth sawfish can occur in the Tyndall MOAs and were previously described for Tyndall AFB.

A list of all federal and state listed species with the potential to occur in the Eglin and Tyndall MOAs is provided in **Appendix D**.

Federal and state listed threatened and endangered species that could occur in the Rose Hill MOA are provided in **Appendix D**. The state of Alabama does not have a state law equivalent to the ESA that lists species as threatened or endangered; all of the state listed species in the Rose Hill MOA are Florida state listed species and have state status only for that portion of the Rose Hill MOA that extends into the state of Florida. The federally listed species that could occur in the Rose Hill MOA and potentially be affected by contract ADAIR sorties are the RCW, wood stork, gray bat (*Myotis grisescens*), and Gulf sturgeon.

Invasive Species

Overflight activities from contract ADAIR training in the Warning Areas and MOAs would have no impacts on invasive species. Invasive species in the Warning Areas and MOAs are therefore not described further.

3.7 CULTURAL RESOURCES

Hurricane Michael damaged or destroyed a large number of facilities on Tyndall AFB. As analyzed in the 2020 EA for Hurricane Recovery and Installation Development, 264 facilities on base are scheduled for demolition. A comprehensive analysis of cultural resource impacts was conducted and is incorporated by reference.

Prior to the hurricane, a total of 316 buildings and structures were evaluated for inclusion in the National Register of Historic Places (NRHP). These resources were built between 1942 and 1991. Of these, nine extant resources were determined to be eligible for inclusion in the NRHP. After the hurricane there is one extant resource determined to be eligible. That resource is Building 703, Chapel 1, constructed in 1943. All other facilities have been designated and consulted on with SHPO as not eligible (Tyndall AFB, 2019c).

There are two historic districts on Tyndall AFB but none in the cantonment or flightline area (Tyndall AFB, 2019c; National Park Service, 1996).

After Hurricane Michael, consultation with the Florida State Historic Preservation Office and six recognized Native American Tribes promptly commenced, aided by the expedited review inherent in disaster relief regulations. To date more than 20 consultations have been successfully concluded, with undertakings addressing the construction of temporary facilities, demolition of facilities assessed as beyond safe repair, timber debris removal and salvage, equipment recovery of displaced items, and debris stockpile removal, to note just a few. Subsequent consultations have addressed major planning efforts to reduce installation vulnerabilities, such as replacing overhead utilities with underground systems.

Tyndall AFB, supported by AFCEC, hosted a two-day consultation meeting in March 2019 with tribal representatives. The consultation meeting featured a base tour to observe the hurricane damage and recovery efforts. In addition, Tyndall AFB and the tribes agreed to work towards the creation of a programmatic agreement to facilitate continued consultation and relationship building in connection with recovery actions. Concerns expressed by tribal representatives included the disturbance of newly exposed cultural material and artifacts in areas not previously or sufficiently surveyed. To address these concerns, archaeological monitors are utilized onsite during certain actions and several cultural resources assessment surveys are in process to evaluate areas not previously assessed for historic eligibility (Tyndall AFB, 2019c).

The Tyndall archaeological sites inventory includes 361 sites (Tyndall AFB, 2019c). Of these, 29 have been recommended eligible for inclusion in the NRHP, 173 have been determined potentially eligible (or are not evaluated), and 189 have been recommended as not eligible. Nearly two-thirds of the base's property has been surveyed (Tyndall AFB, 2019c). This area of Florida has a particularly rich history, and site types range from large and/or complex (e.g., burial mounds, villages with extensive shell middens) to the smaller and more discrete (e.g., limited use resource extraction locations). Cultural classifications for these sites is not always conclusive; however, all of the eligible sites have Native American components spanning the Archaic to Mississippian, or roughly 9,500 years before present to AD 1500. The great majority of the potentially eligible sites represent the same range. There is also the potential for historic site types (e.g., farmsteads, cemeteries, abandoned settlements). Though this directly reflects resources associated with the base, it can also be extrapolated to address overland airspace.

The National Oceanic and Atmospheric Administration (NOAA) maintains a Wrecks and Obstructions Database. Their Automated Wreck and Obstruction Information System contains information on over 10,000 submerged wrecks and obstructions in the coastal waters of the United States (NOAA, n.d.). There are several hundred wrecks and obstructions under the airspace. It is important to note that the potential for submerged prehistoric sites is equally great. Since Florida has one of the longest continuous coastlines in the country, the range of underwater archaeological sites is broad and covers thousands of years. The State Underwater Archaeologist has conducted surveys and excavations on both prehistoric and historic sites located offshore - from submerged Native American middens (garbage dumps) and habitation sites to the remains of sunken steamboats and schooners (Florida Division of Historic Resources, 2019).

No ground disturbance is currently anticipated to take place as part of the Proposed Action; therefore, potential archaeological deposits would not be impacted. Sorties within the special use airspace would be performed at an altitude that would not affect cultural resources.

3.8 Hazardous Materials and Wastes, Contaminated Sites, and Toxic Substances

3.8.1 *Definition of the Resource*

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act and the Toxic Substances Control Act (TSCA), defines hazardous materials (HAZMAT). HAZMAT is defined as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration (OSHA) is responsible for enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. OSHA also includes the regulation of HAZMAT in the workplace and ensures appropriate training in their handling.

The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act, which was further amended by the Hazardous and Solid Waste Amendments, defines hazardous wastes. Hazardous waste is defined as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

AFPD 32-70 establishes the policy that the Air Force is committed to

- cleaning up environmental damage resulting from its past activities;
- meeting all environmental standards applicable to its present operations;
- planning its future activities to minimize environmental impacts;
- responsibly managing the irreplaceable natural and cultural resources it holds in public trust; and
- eliminating pollution from its activities wherever possible.

AFI 32-7044, *Storage Tank Compliance*, implements AFPD 32-70 and identifies compliance requirements for underground storage tanks (USTs), aboveground storage tanks (ASTs), and associated piping that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants.

Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a Proposed Action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and well-being of wildlife species, botanical habitats, soil systems, and water resources. In the event of release of HAZMAT or hazardous wastes, the extent of contamination varies based on type of soil, topography, weather conditions, and water resources.

AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities.

Through the Environmental Restoration Program (ERP) (formerly the Installation Restoration Program [IRP]) initiated in 1980, a subcomponent of the Defense ERP that became law under Superfund Amendments and Reauthorization Act, each DOD installation is required to identify, investigate, and clean up hazardous waste disposal or release sites. Remedial activities for ERP sites follow the Hazardous and Solid Waste Amendment of 1984 under the Resource Conservation and Recovery Act Corrective Action Program and Comprehensive Environmental Response, Compensation, and Liability Act. The ERP provides a uniform, thorough methodology to evaluate past disposal sites, control the migration of contaminants, minimize potential hazards to human health and the environment, and clean up contamination through a series of stages until it is decided that no further remedial action is warranted.

Description of ERP activities provides a useful gauge of the condition of soils, water resources, and other resources that might be affected by contaminants. It also aids in identification of properties and their usefulness for given purposes (e.g., activities dependent on groundwater usage might be foreclosed where a groundwater contaminant plume remains to complete remediation).

Toxic substances might pose a risk to human health but are not regulated as contaminants under the hazardous waste statutes. Included in this category are asbestos-containing materials (ACM), lead-based paint (LBP), radon, and polychlorinated biphenyls (PCBs). The presence of special hazards or controls over them might affect, or be affected by, a Proposed Action. Information on special hazards describing their locations, quantities, and condition assists in determining the significance of a Proposed Action.

Asbestos. AFI 32-1052, *Facility Asbestos Management*, provides the direction for asbestos management at Air Force installations. This instruction incorporates by reference applicable requirements of 29 CFR Part 669 et seq., 29 CFR § 1910.1025, 29 CFR § 1926.58, 40 CFR § 61.3.80, Section 112 of the CAA, and other applicable AFIs and DOD Directives. AFI 32-1052 requires bases to develop an Asbestos Management Plan to maintain a permanent record of the status and condition of ACM in installation facilities, as well as documenting asbestos management efforts. In addition, the instruction requires installations to develop an asbestos operating plan detailing how the installation accomplishes asbestos-related projects. Asbestos is regulated by the USEPA with the authority promulgated under OSHA, 29 U.S.C. § 669 et seq. Section 112 of the CAA regulates emissions of asbestos fibers to ambient air. USEPA policy is to leave asbestos in place if disturbance or removal could pose a health threat.

Lead-based Paint. Human exposure to lead has been determined an adverse health risk by agencies such as OSHA and the USEPA. Sources of exposure to lead are dust, soils, and paint. In 1973, the Consumer Product Safety Commission established a maximum lead content in paint of 0.5 percent by weight in a dry film of newly applied paint. In 1978, under the Consumer Product Safety Act (Public Law 101-608, as implemented by 16 CFR Part 1303), the Consumer Product Safety Commission lowered the allowable lead level in paint to 0.06 percent (600 ppm). The Act also restricted the use of LBP in nonindustrial facilities. DOD implemented a ban of LBP use in 1978; therefore, it is possible that facilities constructed prior to or during 1978 may contain LBP.

Radon. The US Surgeon General (USSG) defines radon as an invisible, odorless, and tasteless gas, with no immediate health symptoms, that comes from the breakdown of naturally occurring uranium inside the earth (USSG, 2005). Radon that is present in soil can enter a building through small spaces and openings, accumulating in enclosed areas such as basements. No federal or state standards are in place to regulate residential radon exposure at the present time, but guidelines were developed. Although 4.0 picocuries per liter (pCi/L) is considered an “action” limit, any reading over 2 pCi/L qualifies as a “consider action” limit. The USEPA and the USSG have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1 (high) to 3 (low).

Polychlorinated Biphenyls. PCBs are a group of chemical mixtures used as insulators in electrical equipment, such as transformers and fluorescent light ballasts. Chemicals classified as PCBs were widely manufactured and used in the United States until they were banned in 1979. The disposal of PCBs is regulated under the federal TSCA (15 U.S.C. § 2601 et seq., as implemented by 40 CFR Part 761), which banned the manufacture and distribution of PCBs, with the exception of PCBs used in enclosed systems. Per Air Force policy, all installations should have been PCB-free as of 21 December 1998. In accordance with 40 CFR Part 761 and Air Force policy, both of which regulate all PCB articles, which are regulated as follows:

- Less than 50 ppm—non-PCB (or PCB-free)
- 50 ppm to 499 ppm—PCB-contaminated
- 500 ppm and greater—PCB equipment (USEPA, 2008)

The TSCA regulates and the USEPA enforces the removal and disposal of all sources of PCBs containing 50 ppm or more; the regulations are more stringent for PCB equipment than for PCB-contaminated equipment.

The ROI for hazardous materials and wastes, the installation ERP, and toxic materials includes the airfield, proposed facilities, and ramp space at Eglin AFB.

3.8.2 *Existing Conditions – Tyndall Air Force Base*

The information below was summarized from several documents, including management plans, material surveys, FDEP, the Florida Department of Health, and other State of Florida records, and related documentation.

3.8.2.1 Hazardous Materials and Wastes

Hazardous and toxic material procurements at Tyndall AFB are approved and tracked by the Tyndall AFB 325th Civil Engineer Squadron (325 CES), Environmental Element (CEIE), which has overall management responsibility of the installation environmental program. The 325 CES/CEIE supports and monitors environmental permits, hazardous materials, and hazardous waste storage, spill prevention and response, and participation on the Environmental Safety and Occupational Health Council (ESOHC) (Tyndall AFB, 2017).

The ESOHC is a network of safety, environmental, and logistics experts who work with hazardous materials Managers, Unit Environmental Coordinators, and other hazardous materials users to ensure safe and compliant hazardous materials management throughout the base. The 325 CES, Environmental Compliance (CEIEC) maintains the *Hazardous Waste Management Plan* (Tyndall AFB, 2019) as directed by AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*, and complies with 40 CFR Parts 260 to 272. This plan prescribes the roles and responsibilities of all members of the ESOHC with respect to the waste stream inventory, waste analysis plan, hazardous waste management procedures, training, emergency response, and pollution prevention. The *Hazardous Waste Management Plan* establishes the procedures to comply with applicable federal, state, and local standards for solid waste and hazardous waste management. The plan outlines procedures for transport, storage, and disposal of hazardous wastes.

There is no central Hazardous Material Pharmacy on Tyndall AFB. Tyndall AFB utilizes the Enterprise Environmental, Safety, and Occupational Health Management Information System (EESOH-MIS) to make purchases and track inventory of hazardous materials on base. Each command has a Hazardous Materials

Coordinator who is responsible for making purchases, tracking inventory, and maintaining records at the shop level (Tyndall AFB, 2016b).

The EESOH-MIS tracks acquisition and inventory control of hazardous materials. Hazardous materials and petroleum products such as fuels, flammable solvents, paints, corrosives, pesticides, deicing fluid, refrigerants, and cleaners are used throughout Tyndall AFB for various functions including aircraft maintenance; aircraft ground equipment maintenance; and ground vehicles, communications infrastructure, and facilities maintenance (Tyndall AFB, 2017).

Hazardous wastes generated at Tyndall AFB include waste flammable solvents, contaminated fuels and lubricants, paint/coating, stripping chemicals, waste oils, waste paint-related materials, mixed-solid waste, and other miscellaneous wastes. Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called "Universal Wastes," and their associated regulatory requirements are specified in 40 CFR Part 273. Types of waste currently covered under the universal waste regulations include fluorescent light tubes, hazardous waste batteries, hazardous waste thermostats, and hazardous waste lamps. Tyndall AFB recycles all lubricating fluids, batteries, and shop rags and hazardous wastes are managed in accordance with the Tyndall AFB *Hazardous Waste Management Plan* (Tyndall AFB, 2019).

Tyndall AFB is classified as a Large-Quantity hazardous waste generator as defined by the USEPA (40 CFR § 260.10), generating more than 2,200 pounds of nonacute hazardous waste per month. Tyndall AFB operates initial accumulation points (IAPs), where up to 55 gallons (gal) of "total regulated hazardous wastes" or up to 1 quart of "acutely hazardous wastes" are accumulated. IAP managers are responsible for properly segregating, storing, characterizing, labeling, marking, packaging, and transferring all hazardous wastes for disposal from the IAP to the established 90-day storage area according to federal, state, local, and Air Force regulations. The Hazardous Waste Program Manager is responsible for characterizing and profiling each waste stream. Tyndall AFB operates one 90-day accumulation site, located in Building 6011 at 233 Florida Avenue, where hazardous waste accumulates before transfer to the DLA Disposition Services for transportation off-installation for ultimate disposal (Tyndall AFB, 2017; Tyndall AFB, 2013a).

An inventory of ASTs and USTs is maintained at Tyndall AFB and includes the location, contents, capacity, containment measures, status, and installation dates (Tyndall AFB, 2016b). Storage tanks at Tyndall AFB contain jet fuel, diesel fuel, used cooking oil, used oil, and unleaded gasoline. In addition to the 325 FW, several of the units listed in **Section 1.1.2** store, transfer, and consume various petroleum products of significant quantity, such as Jet A, diesel, biodiesel, gasoline, and used oil. Those units are addressed in the Tyndall AFB *Spill Prevention, Control, and Countermeasures Plan* (Tyndall AFB, 2016b).

While the potential for fuel spills exist for each tank and piping system, Tyndall AFB has two areas where bulk quantities of oil are stored. The Operational Storage Area (Area 400) has the capacity to store approximately 36,000 gal of diesel, biodiesel, and gasoline and 880,000 gal of Jet A. The Bulk Storage Area (Area 6000) has the capacity to store almost 2 million gal of Jet A. In addition, the Bulk POL Area houses a marine transfer operation (Tyndall AFB, 2016b).

3.8.2.2 Environmental Restoration Program

Tyndall AFB began its IRP in 1983 with the investigation of possible locations of various Areas of Concern and Solid Waste Management Units for hazardous waste contamination. Sites that have been contaminated since 1984 are addressed under the appropriate environmental compliance cleanup program. At present, Tyndall AFB has 16 active IRP sites. A total of 19 IRP sites have been closed. Access to Tyndall AFB IRP sites that pose a threat to human health is restricted through land use designation, signage, fencing, and barriers. During hunting/fishing season, there is limited public access to a few IRP sites, but only in the uncontaminated portions. Ground disturbing activities that may spread the contamination and/or expose workers to contamination at IRP sites as well as changes in the land use of IRP sites must be approved by 325 CES, Environmental Flight (CEV) and conducted with special precautions.

3.8.2.3 Asbestos and Lead-Based Paint

The 325 CES/CEIEC developed the *Asbestos Management and Operations Plan* for Tyndall AFB, which includes program administration, organizational roles and responsibilities, standard work practices, and documentation (Tyndall AFB, 2018). To date, Tyndall AFB has not developed an LBP Management Plan.

3.8.2.4 Radon

The USEPA and the USSG have evaluated the radon potential around the country to organize and assist building code officials in deciding whether radon-resistant features are applicable in new construction. Radon zones can range from 1.0 (high) to 3.0 (low). The USEPA radon zone for Bay County, Florida, is Zone 3 (Low Potential, predicted indoor average level less than 2 pCi/L); however, radon potential throughout the county can vary (USEPA, 2014). The Florida Department of Health (2018) indicates that radon levels in Bay County vary from under 2.0 pCi/L (98 percent of reported results in Zone 3) to 2 percent of results between 2.0 and 3.9 pCi/L (Zone 2). Each zone designation reflects the average short-term radon measurement that can be expected in a building without the implementation of radon control methods.

3.8.2.5 Polychlorinated Biphenyls

The high-voltage electrical system and all three associated transformers on the installation are not owned or operated by Tyndall AFB. All operations are the responsibility of Gulf Power, including inspection and spill prevention aspects of oil-containing operating equipment (e.g., transformers). Specific PCB materials at the installation have not been identified. Note that ballasts and starters from light fixtures could contain PCB-containing material. The disposal of these materials is regulated. If the ballasts are not plainly marked as “Non-PCB”, the material must be treated as PCB-containing (or be tested and proven to be non-PCB containing). As facility repairs and demolition occur, the suspected ballasts are identified, removed, and disposed of in accordance with AFMAN 32-7002.

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CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter presents a detailed analysis of the potential environmental impacts associated with the Proposed Action and No Action Alternative as described in **Chapter 2**. Impacts are described for each ROI previously described in **Chapter 3.** The analysis described in this chapter utilizes operational and environmental information for conditions prior to Hurricane Michael as an expected approximate baseline. The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; federal, state, or local agency guidelines and requirements; and/or legislative criteria. All F-22 FTU and T-38 training operations in Warning Areas W-151 and W-470 would end with the departure of the F-22 FTU and T-38s yielding an overall reduction in training operations in W-151 and W-470 under the Proposed Action. The specific criteria for evaluating impacts and assumptions for the analyses are presented under each resource area. Evaluation criteria for most potential impacts were obtained from standard criteria; federal, state, or local agency guidelines and requirements; and/or legislative criteria.

Impacts are defined in general terms and are qualified as adverse or beneficial, and as short- or long-term. For the purposes of this EA, short-term impacts are generally considered those impacts that would have temporary effects. Long-term impacts are generally considered those impacts that would result in permanent effects.

Impacts may be direct or indirect and are described in terms of type, context, duration, and intensity, which is consistent with the CEQ regulations. “Direct effects” are caused by an action and occur at the same time and place as the action. “Indirect effects” are caused by the action and occur later in time or are farther removed from the place of impact but are reasonably foreseeable.
Impacts are defined as

- negligible, the impact is localized and not measurable or at the lowest level of detection;
- minor, the impact is localized and slight but detectable;
- moderate, the impact is readily apparent and appreciable; or
- major, the impact is severely adverse or highly noticeable and considered to be significant.

Major impacts are considered significant and receive the greatest attention in the decision-making process. The significance of an impact is assessed based on the relationship between context and intensity. Major impacts require application of a mitigation measure to achieve a less than significant impact. Moderate impacts may not meet the criteria to be classified as significant, but the degree of change is noticeable and has the potential to become significant if not effectively mitigated. Minor impacts have little to no effect on the environment and are not easily detected; impacts defined as negligible are the lowest level of detection and generally not measurable. Beneficial impacts provide desirable situations or outcomes.

Direct and indirect effects and their significance, as well as the means (e.g., BMPs) for reducing adverse environmental impacts are also discussed for each resource.

4.1 AIRSPACE MANAGEMENT AND USE

4.1.1 *Evaluation Criteria*

Adverse impacts on airspace might include modifications to the special use airspace or significantly increasing flight operations within airspaces as a result of the Proposed Action. For the purposes of this EA, an impact is considered significant if it modifies airspace location, dimensions, or aircraft operational capacity.

4.1.2 *Proposed Action*

Under the Proposed Action, an estimated 12 contract ADAIR aircraft would provide training sorties in support of Eglin AFB from Tyndall AFB and in special use airspace as described in **Chapter 2**. An estimated 2,400 contracted sorties would be added to the current number of sorties flown at Tyndall AFB. This number includes training sorties and a smaller number of sorties for aircraft leaving and returning from either maintenance or other deployments. The number of sorties within special use airspace would increase by an estimated 2,320 sorties over the baseline. Sorties in the special use airspace would include both subsonic and supersonic flight operations.

The addition of an estimated 2,400 sorties at Tyndall AFB is negligible. Compared to the pre-hurricane baseline, it would increase the annual number of sorties by 8 percent; however, due to the departure of the F-22 operational squadron, the F-22 FTU and supporting T-38s, the annual number of operations, including the estimated number of ADAIR sorties, would be approximately 33,352, which is 50 percent lower than the pre-hurricane baseline. The F-22 FTU temporarily based at Eglin AFB still performs 11,516 airfield operations annually at Tyndall AFB. As they depart for their permanent location that number would gradually decrease to zero. This would would result in annual airfield operations being reduced to 21,836, which is 67 percent lower than the pre-hurricane baseline. This change is not expected to impact the operational capacity or necessitate changes to airspace locations or dimensions around Eglin AFB. Potential impacts on the airspace around the airfield are expected to be negligible.

Contract ADAIR would include an estimated 2,320 sorties in the special use airspace; however, the overall number of sorties in Warning Areas W-151 and W-470 would be fewer than the baseline because the F-22 FTU and supporting T-38s are scheduled to depart prior to the arrival of contract ADAIR aircraft. Air Force training flights at night would not increase under the Proposed Action. The addition of contract ADAIR sorties would not increase the overall number of sorties above the baseline amount, and as such, potential impacts would not be significant.

The MOAs/ATCAAs and Warning Areas proposed for use have the capacity and are in locations with the dimensions necessary to support the contracted sorties proposed; therefore, potential negligible impacts on airspace are expected from the implementation of the Proposed Action.

4.1.3 *No Action Alternative*

Under the No Action Alternative, contract ADAIR would not perform sorties at Tyndall AFB and in the nearby airspace. Under the No Action Alternative, the F-22 FTU and associated T-38s would depart Eglin AFB as analyzed in the Special EA (Air Force, 2019). This would result in fewer sorties and airfield operations and less airspace use in W-151 and W-470.

4.2 NOISE

4.2.1 *Evaluation Criteria*

Noise impact analysis typically evaluates potential changes to existing noise environments that would result from implementation of the Proposed Action. At the installation, the 65-dBA DNL is the noise level below which generally all land uses are compatible with noise from aircraft operations. Areas beyond the 65-dBA DNL can also experience levels of appreciable noise depending upon training intensity or weather conditions. In addition, DNL noise contours may vary from year to year due to fluctuations in operational tempo due to unit deployments, funding levels, and other factors. In the airspace, supersonic flight operations in the special use airspace have the potential to generate sonic booms.

Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased noise exposure to unacceptable noise levels). Projected noise impacts were evaluated from the Proposed Action and No Action Alternative.

4.2.2 *Proposed Action*

The Proposed Action includes contracting for the support of an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW and 325 FW at Tyndall AFB. This includes sorties expected for training activities and aircraft leaving for or returning from either maintenance or other deployments. Of the estimated 2,400 sorties, approximately 2,320 of those are the training sorties that would occur within the special use airspace. Contract ADAIR proposed aircraft specifications are described in **Table 2-1**, and six of these aircraft (F-5, F-16, Dassault Mirage, Eurofighter Typhoon, JAS-39 Gripen, or MiG-29) were deemed most likely for contract ADAIR at Tyndall AFB. One, or a combination, of these aircraft types may be operated by a contractor at Tyndall AFB in support of ADAIR training.

ADAIR aircraft to be used by contractors include six potential aircraft. Specific aircraft that would support the mission have not yet been identified by ADAIR contract service providers. Conservatively, the Air Force has used the F-18 E/F as an appropriate surrogate for the Eurofighter Typhoon, the loudest of the six aircraft, to ensure noise impacts are not underestimated. Flight profiles for contract ADAIR (i.e., schedules of altitude use, power setting, and airspeed along each flight track) were reviewed and approved by the Air Force and presented in **Appendix B**. All contract ADAIR departures profiles were modeled using afterburner or the maximum possible power on all takeoffs. Proposed contract ADAIR flight operations at Tyndall AFB and the associated airspace would be identical to existing conditions except for the contract ADAIR sorties. Noise analysis of the High Noise Scenario was conducted to analyze changes to the airfield noise contours and the special use airspace.

Because it is not known at this time what type of aircraft would be used by contract ADAIR, three aircraft scenarios were evaluated (High, Medium, and Low) to represent the range of aircraft types that could be selected. For this EA, the High Noise Scenario was analyzed and compared with the pre-hurricane and existing conditions. Noise impacts using Medium and Low Noise Scenarios would be less because those scenarios would use aircraft that are not as loud as the High Noise Scenario aircraft.

If the Proposed Action were implemented, no significant impacts on the noise environment are expected. Potential impacts are summarized in **Table 4-1**, with details regarding these impacts described in **Section 4.2.2.1**.

Table 4-1. Summary of Potential Noise Impacts

	Change in Noise
Proposed Action High Noise Scenario	At the base, long-term, minor noise increases (0 to 3 dBA) for most POIs as well as a long-term, moderate noise increase (5 dBA) for a single POI outside the 60-dBA DNL contour. Impacts are primarily localized north and west of Tyndall AFB. Land use compatibility, speech interference, sleep disturbance, and classroom learning events would not markedly change from conditions found currently at and around Tyndall AFB. Within the airspace, negligible increase in noise from contract ADAIR subsonic flight operations in Warning Areas W-151 and W-470 and the Tyndall B/H, C, and E MOAs and/or supersonic in all special use airspace.
No Action Alternative	None

4.2.2.1 Tyndall Air Force Base Noise Environment

Implementation of the High Noise Scenario Proposed Action would result in close to a 20 percent increase in the number of operations at Tyndall AFB when compared to existing conditions. Contract ADAIR would fly less than 1 percent of the operations during environmental night hours when the effects of aircraft noise are accentuated (10:00 p.m. to 7:00 a.m. local time). Runway utilization, flight tracks, and flight track utilization for contract ADAIR aircraft would be similar to historic F-22 operations. Proposed annual departure, arrival, and closed pattern aircraft operations at Tyndall AFB with the addition of contract ADAIR are summarized in **Table 4-2**. Contract ADAIR would also perform static run-up operations, such as pre/postflight run-ups. This increase would not result in significant impacts if the Proposed Action were implemented, especially when compared to the 66,360 operations conducted pre-hurricane.

Table 4-2. Proposed Annual Aircraft Operations Summary at Tyndall Air Force Base

Aircraft	Departures		Arrivals		Closed Patterns		Total Operations		
	Day	Night	Day	Night	Day	Night	Day	Night	Total
*Contract ADAIR**	*2,400*	*0*	*2,040*	*360*	*648*	*0*	*5,088*	*360*	*5,488*
Based Aircraft	2,902	20	2,896	26	1,131	7	6,929	53	6,982
Transient F-22A	48	0	1,407	7	10,051	51	11,506	58	11,564
Transient F-35A	35	0	35	0	6,830	0	6,999	0	6,999
Other Transients	1,090	20	1,090	20	277	11	2,457	51	2,508
Grand Total	**6,475**	**40**	**7,468**	**413**	**18,937**	**69**	**32,979**	**522**	**33,541**

Notes:
* One sortie or one closed-pattern equals two aircraft operations. See Sec**tions 2.1.5, 2.1.6**, and **3.2.2** for an explanation of closed patterns, sorties, and operations.
ADAIR= adversary air

A person's reaction to noise is dependent on several non-acoustic factors, including the person's perception of the importance of the activity generating the noise and the activity the person is involved in at the time the noise occurs. Several social surveys have found that people are consistently more likely to become annoyed by aircraft noise at higher DNL and are less likely to become annoyed at lower DNL (Schultz, 1978; Finegold, Harris, & Von Gierke, 1994; Miedema & Vos, 1998). The 65-dBA DNL is the noise level below which generally all land uses are considered compatible with noise from aircraft operations. Noise levels greater than 65 dB DNL are considered incompatible with noise-sensitive land uses, such as residential, in accordance with DoD guidelines.

Figure 4-1 presents the resultant 65- to 85-dBA DNL contours in 5-dBA increments under the proposed High Noise Scenario. Again, this scenario represents the most conservative estimate of noise levels under the Proposed Action; if the Medium or Low Noise Scenarios were implemented then the impacts associated with those alternatives would lessen. The primary changes in noise contour features between the High Noise Scenario and existing conditions is the elongation of the DNL contours along the extended centerlines of the main runways to the northwest and southeast of the installation. This overall increase in noise level is a result of contract ADAIR departures and straight-in arrivals flight operations. A comparison of the DNL noise contours of the High Noise Scenario and the existing conditions is also shown on **Figure 4-2**, and the change in area within noise contours as a result of the High Noise Scenario is tabulated in **Table 4-3**. Under the High Noise Scenario, no changes to the compatibility of land uses within the 65-dBA DNL and greater noise contours would be introduced, therefore, no significant impacts would occur if the Proposed Action High Noise Scenario were implemented.

Table 4-3. Proposed High Noise Scenario Day-Night Average Sound Level Area Affected on and Surrounding Tyndall Air Force Base

Noise Level (dBA DNL)	Area Within Noise Contour (acres)			
	Pre-Hurricane	Existing	High Noise Scenario	Increase from Existing
65-70	18,382	10,031	12,380	2,349
70-75	8,566	2,927	4,012	1,085
75-80	3,018	1,066	1,506	440
80-85	1,114	442	648	206
>85	797	723	797	74

Notes:
dBA = A-weighted decibel(s); DNL = day-night average sound level

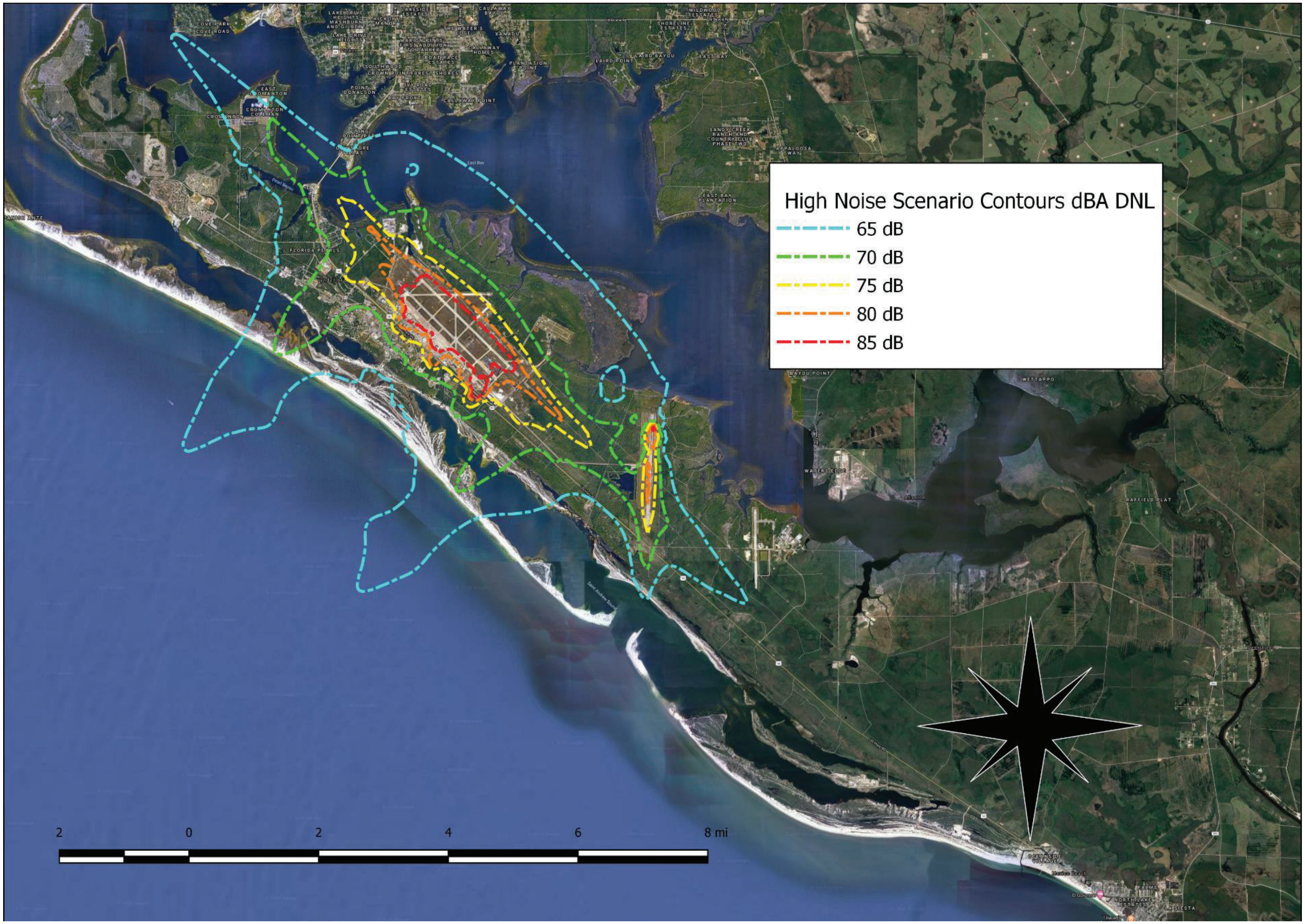

Figure 4-1 High Noise Scenario Day-Night Average Sound Level Contours at Tyndall Air Force Base.

Source: Google EarthPro 2020.

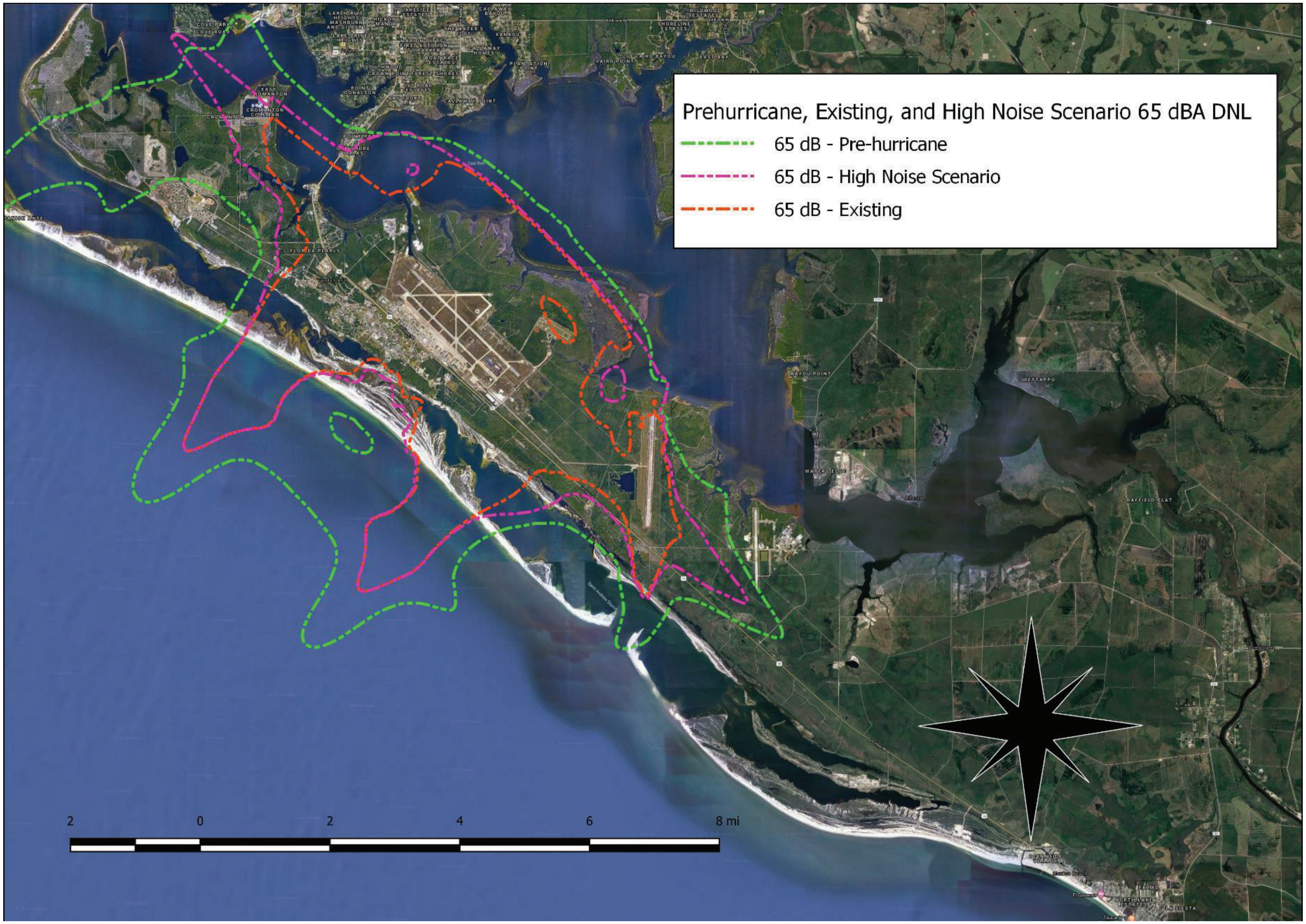

Figure 4-2 Comparison of High Noise Scenario, Pre-Hurricane, and Existing Day-Night Average Sound Level Contours at Tyndall Air Force Base.

Source: Google EarthPro 2020.

Implementation of the High Noise Scenario at representative POIs described in **Section 3.2.2** would increase the DNL by an amount ranging from 0 to 5 dBA (**Table 4-4**). Typically, noise level changes of 3 dBA are noticeable to the human ear. Therefore, when compared to existing conditions, there would be a noticeable minor increased DNL at 11 POIs, which would be slightly noticeable and long-term. Impacts would be considered minor under the Proposed Action. Areas affected by noise levels 65-dBA DNL and greater would still be less when compared to conditions pre-hurricane where six POIs experienced noise levels exceeding 65-dBA DNL (see **Table 3-4**).

Table 4-4. Proposed High Noise Scenario Day-Night Average Sound Level at Representative Points of Interest on and Near Tyndall Air Force Base

Points of Interest		DNL (dBA)		
ID	Description	Existing	High Noise Scenario	Increase in DNL
C01	Historical St Andrews	48	51	3
C02	Richard Bayou Estates	50	52	2
H01	Bay Medical Center	51	53	2
P01	Shell Island North	53	56	3
P02	Shell Island South	60	60	0
P03	Pelican Point Golf Course	54	59	5
P04	St Andrews State Park	42	43	1
R01	Mexico Beach	47	50	3
R02	Tyndall AFB Dorms	71	72	1
R03	Long Point Condo	59	63	4
R04	Nautical Point RV Park	56	59	3
R05	Parker Heights	54	56	2
R06	Tyndall On-base Housing Area	56	58	2
R07	Panama City Residences near Cove Park	59	62	3
R08	Bay Front Apartments	56	59	3
R09	Eagle Inn Motel	61	66	5
R10	Balfour Beatty Communities	54	57	3
S01	Parker Elementary School	48	50	2
S02	Tyndall Elementary School	70	71	1
S03	Merriam Cherry Street Elementary School	52	55	3
S04	Springfield Elementary School	46	48	2
W01	First Baptist Church of Parker	51	53	2
W02	Callaway Assembly of God	43	45	2
W03	Agape Presbyterian Church	54	57	3

Notes:
Affected POIs, identified prior to Hurricane Michael, were based off NOISEMAP modeled noise contours and used to calculate the POIs within each noise contour.
dBA = A-weighted decibel(s); DNL = Day-Night Average Sound Level; POI = point of interest

As identified in **Section 3.2.2**, the DNL metric is useful for describing the noise environment at a location with a single number, but it does not provide a complete description of the noise environment. Accordingly, this EA uses several supplemental noise metrics (e.g., number of events with potential to interfere with speech, noise interference with learning) to provide an expanded description of the noise experience. For purposes of this analysis, it was conservatively assumed that any event exceeding 50 dB has some potential to interfere at least momentarily with speech and other forms of communication involving listening. Under the High Noise Scenario Proposed Action, all of the POIs would experience an increase of less than one event per average daytime hour when compared to existing conditions (**Table 4-5**). While the increase would be long term, it would not result in significant impacts for noise events interfering with speech if the Proposed Action High Noise Scenario were implemented.

Table 4-5. Number of Outdoor Noise Events With Potential to Interfere With Speech Under Existing Conditions and High Noise Scenario Proposed Action

Points of Interest		Existing Events	High Noise Scenario Events	Increase in Events
ID	Description			
C01	Historical St Andrews	0.8	1.2	0.4
C02	Richard Bayou Estates	1.9	2.6	0.7
H01	Bay Medical Center	1.5	2.0	0.5
P01	Shell Island North	1.1	1.6	0.5
P02	Shell Island South	1.7	2.4	0.7
P03	Pelican Point Golf Course	1.5	2.1	0.6
P04	St Andrews State Park	0.8	1.2	0.4
R01	Mexico Beach	0.6	1.0	0.4
R02	Tyndall AFB Dorms	9.4	10.3	0.9
R03	Long Point	3.0	3.7	0.7
R04	Nautical Point RV Park	2.9	3.6	0.7
R05	Parker Heights	2.3	3.0	0.7
R06	Tyndall On-base Housing Area	3.2	3.8	0.6
R07	Panama City Residences near Cove Park	2.3	3.0	0.7
R08	Bay Front Apartments	2.3	3.0	0.7
R09	Eagle Inn Motel	3.1	4.0	0.9
R10	Balfour Beatty Communities	3.3	3.9	0.6
W01	First Baptist Church of Parker	2.3	2.5	0.2
W02	Callaway Assembly of God	1.6	2.1	0.5
W03	Agape Presbyterian Church	2.6	3.0	0.4

Nighttime flying, which is required as training for certain missions, has an increased likelihood of causing sleep disturbance (see **Section 3.2.2**). The overall percent probability of awakening at least once per night reflects all flying events that occur between 10:00 p.m. and 7:00 a.m., when most people sleep. The analysis also accounts for standard building attenuation of 15 dB and 25 dB with windows open and closed, respectively. Sleep disturbance probabilities listed for parks are not intended to imply that people regularly sleep in parks, but instead are indicative of impacts in nearby residential areas. Flight operations between 10:00 p.m. and 7:00 a.m. make up less than 1 percent of total operations under existing conditions and about 2 percent under the High Noise Scenario. The estimated percentage of people awakened at least once per night by aircraft noise is presented in **Table 4-6**. Under the High Noise Scenario Proposed Action, there would be a negligible, less than 1 percent probability increase to six of the 12 POIs; the other six POIs would not have any noticeable increases in the probability of awakening. While this increase would be long term it would not introduce significant impacts.

Table 4-6. Percent Probability of People Awakened by Aircraft Noise at Least Once Per Night Pre-Hurricane and Existing Conditions at Points of Interest

Points of Interest		Existing (%)	High Noise Scenario (%)	Percent Increase
ID	Description			
P01	Shell Island North	0	0.2	0.2
P04	St Andrews State Park	0	0.3	0.3
R01	Mexico Beach	0.1	0.1	0
R02	Tyndall AFB Dorms	0.1	0.2	0.1
R03	Long Point	0.1	0.2	0.1
R04	Nautical Point RV Park	0.1	0.2	0.1
R05	Parker Heights	0.1	0.1	0
R06	Tyndall On-base Housing Area	0.1	0.1	0
R07	Panama City Residences near Cove Park	0.1	0.1	0
R08	Bay Front Apartments	0.1	0.2	0.1
R09	Eagle Inn Motel	0.1	0.1	0
R10	Balfour Beatty Communities	0.1	0.1	0

Noise interference with learning in schools is of particular concern because noise can interrupt communication or interfere with concentration. As presented in **Table 4-7**, exterior school-day noise levels are at or below the 60 dB $L_{eq\text{-}8hr}$ criteria level at all schools except Tyndall Elementary School under existing conditions. If the High Noise Scenario were implemented, the number of events at Tyndall Elementary School with potential to interfere with speech per average daytime hour would increase no more than one event per hour with windows open or closed. Under pre-hurricane conditions, which are described for a point of reference, the number of events with potential to interfere with speech at Tyndall Elementary School was six with windows open or five with windows closed. If the High Noise Scenario Proposed Action were implemented, the number of speech interference events would increase but not to such a level as to negatively impact learning at Tyndall Elementary School and would be long-term but minor and not significant.

Table 4-7. Noise Levels at Schools Near Tyndall Air Force Base under Pre-Hurricane and Existing Conditions

Location Description	Outdoor $L_{eq\text{-}8hr}$		Speech-Interference Events per Hour with Windows Open		Speech-Interference Events per Hour with Windows Closed	
	Existing	High Noise Scenario	Existing	High Noise Scenario	Existing	High Noise Scenario
Parker Elementary School	< 60 dB	< 1	< 1	1.2	< 1	< 1
Tyndall Elementary School	73	72	3.2	3.3	1.4	2.1
Merriam Cherry Street Elementary School	60.3 dB	< 1	< 1	1.1	< 1	< 1
Springfield Elementary School	60.4 dB	< 1	< 1	< 1	< 1	< 1

Notes: NA=Not Applicable

As presented in **Section 3.2.1**, the NA metric is the only supplemental metric that combines single-event noise levels with the number of aircraft operations. In essence, it answers the question of how many aircraft (or range of aircraft) fly over a given location or area at or above a selected threshold noise level. It provides additional information about the acoustic environment and is valuable in helping to describe noise exposure to the community. A threshold level and metric are selected that best meet the need for each situation.

Under existing conditions, with windows closed Tyndall Elementary School experiences about four NA50L_{max} events per hour and up to two events per hour at the other three school. Under the Proposed Action High Noise Scenario, NA50L_{max} ranges from up to five events per hour at Tyndall Elementary School and less than three events at the other schools. This minor increased NA50L_{max} would be long term but would be considered of minor significance.

DoD policy for assessing hearing loss risk in the community pursuant to NEPA is to use the 80-dB DNL noise contour to identify populations at the most risk of potential hearing loss (DoD Noise Working Group, 2013). No residences on or off base would be exposed to noise levels exceeding 80 dB DNL under the High Noise Scenario Proposed Action. Therefore, the risk of noise-induced hearing loss in the community is negligible, and potential hearing loss calculation was not conducted.

4.2.2.2 Airspace Noise Environment

Under the High Noise Scenario, contract ADAIR would perform an estimated 2,320 annual airspace operations in the special use airspace. Contract ADAIR would only operate in the same MOAs/ATCAAs and Warning Areas already used (pre-hurricane and existing) by based Tyndall AFB aircraft. The Tyndall MOAs/ATCAAs would receive approximately 5 percent of sorties originating from Tyndall AFB while the Warning Areas would receive approximately 95 percent. A summary of estimated annual airspace operations is presented in **Table 4-8.**

Using the methods described in **Section 3.2.1.2** for MR_NMAP, the L_{dnmr} noise levels from the proposed High Noise Scenario were calculated from the subsonic aircraft operations underneath the appropriate portions of the Tyndall MOAs/ATCAAs and Warning Areas W-151 and W-470. Subsonic noise levels modeled for Tyndall AFB-based aircraft and contract ADAIR aircraft under the High Noise Scenario using MR_NMAP differ negligibly from the levels reported in **Table 3-11**. Due to the potential negligible change in noise levels and the overall low L_{dnmr} noise levels from the proposed High Noise Scenario, there are no significant impacts expected to the noise environments of any of the listed airspace.

Supersonic operations are allowed in Warning Areas W-151 and W-470 and the Tyndall B/H, C, and E MOAs above 10,000 ft MSL. Airspace sorties require aircraft to exceed Mach 1.0 (supersonic) for brief periods of time for approximately 10 percent of total flight time. This is equivalent to approximately 3.5 minutes of supersonic flight activity per sortie. That percentage of supersonic flight during training sorties is not expected to change with the addition of contract ADAIR aircraft.

For cumulative sonic boom exposure under supersonic air combat training arenas, the BooMap program as described in **Section 3.2.1.2** was used to model the cumulative CDNL exposure in the special use airspace proposed for use under the Proposed Action. The sonic boom noise levels modeled for the High Noise Scenario are unlikely exceed the 45-dBA CDNL under any primary use airspace unit.

Single event sonic boom levels were estimated, using the PCBoom program also described in **Section 3.2.1.2**, directly undertrack for the F-22 and T-38A aircraft at various altitudes and Mach numbers. The single event levels reported include overpressure (psf) and CSEL (dB). Sonic boom levels estimated for contract ADAIR supersonic flights in Warning Areas W-151 and W-470 and the Tyndall B/H, C, and E MOAs and ATCAAs are shown on **Table 4-9** along with the F-22 and T-38A sonic boom levels for comparison.

The sonic boom levels shown on **Table 4-9** are the loudest levels computed at the center of the footprint for the constant Mach, level flight conditions indicated. Supersonic flights in Warning Areas W-151 and W-470, the Tyndall B/H, C, and E MOAs, and ATCAAs occur at high altitudes but would still generate booms that are certain to be noticed. The location of these booms would vary with changing flight paths and weather conditions, so it is unlikely that any given location would experience these undertrack levels more than once over multiple events. Overpressure levels, directly under the flight path, estimated for these airspaces would range from 6.2 to 0.9 psf depending on the flight conditions. Public reaction (limited to vessels 15 NM from shore) may occur with overpressures above 1 psf, and in rare instances, damage to structures have occurred at overpressures between 2 and 5 psf (NASA, 2017). People located farther away from the supersonic flight paths, who are still within the primary boom carpet, might also be exposed to levels that may be startling or annoying, but the probability of this decreases the farther away they are from the flight path. People located beyond the edge of the boom carpet are not expected to be exposed to sonic boom although post-boom rumbling sounds may be heard. The addition of contractor aircraft operating at supersonic speeds means that the number of sonic booms heard would likely increase; however, potential impacts associated with sonic booms are still expected to be negligible under the Proposed Action and would not be considered significant.

Table 4-8. Proposed Annual Airspace Operations Summary from Tyndall and Eglin Air Force Base

Airspace	Current Altitude[1]	Baseline Training Sorties[2]	Projected Contract ADAIR Training Sorties[3]	Projected Total Sorties
W-151	Surface to Unlimited	12,191	947	13,479
W-470	Surface to Unlimited (or as assigned); floor restricted to 5,000 ft MSL in ACMI East and West		341	
Rose Hill MOA/ ATCAA	8,000 ft MSL to FL230	744	183	927
Eglin E MOA / ATCAA	Surface to Unlimited	3,416	825	4,241
R-2419A / R-2519A	Surface to Unlimited	180	0	180
Tyndall E MOA (Carrabelle ATCAA)	300 ft AGL to 17,999 ft MSL (FL180 to FL230 or as assigned)	9,307	12	9,319
Tyndall B and H MOAs (Compass Lake ATCAA)	9,000 ft MSL to 17,999 ft MSL (FL180 to FL230 or as assigned)	2,628	3	2,631
Tyndall C MOA (Compass Lake ATCAA)	300 ft AGL to 6,000 ft MSL (FL180 to FL230 or as assigned)	6,711	9	6,720
Total Proposed Airspace Sorties		**35,177**	**2,320**	**37,497**

Source: 96 CEG/CEIEA (96th Civil Engineer Group/Environmental Assets), personal communication, 19 April 2018

Notes:
1 No change to current minimum flight altitude is proposed.
2 Based on 33rd Fighter Wing, 325 FW, 85th Test Squadron, 53rd Wing, 96th Test Wing. The baseline includes the F-22 and T-38 aircraft from Tyndall AFB analyzed in the Special Environmental Assessment and excludes the Navy F-35C aircraft expected to depart Eglin Air Force Base in July 2019.
3 A total of 80 of the 2,400 contractor sorties would not be traveling from Tyndall AFB to the airspace; they would return to contractor's base for maintenance or pilot proficiency training.

ADAIR = adversary air; AFB = Air Force Base; ATCAA= Air Traffic Control Assigned Airspace; FL = flight level (vertical altitude expressed in hundreds of feet); ft = feet; MOA = Military Operations Area; MSL = mean sea level; W = Warning Area

Table 4-9. Warning Areas W-151 and W-470 and Tyndall B/H, C, and E Military Operations Areas (Compass Lake Air Traffic Control Assigned Airspace): Sonic Boom Levels Undertrack for Aircraft in Level Flight at Mach 1.2 and 1.5

Aircraft	Altitude (feet above mean sea level)			
	10,000	20,000	30,000	40,000
Mach 1.2				
Overpressure (psf)				
F-22	5.4	2.8	1.9	1.4
T-38A/B	3.3	1.8	1.2	0.9
Eurofighter Typhoon[1]	5.1	2.7	1.8	1.4
Dassault Mirage[2]	4.2	2.2	1.5	1.1
JAS 39 Gripen[3]	4.2	2.2	1.5	1.1
C-Weighted Sound Exposure Level (dB)[1]				
F-22	116	111	107	105
T-38A/B	112	107	103	101
Eurofighter Typhoon[1]	116	110	107	105
Dassault Mirage[2]	114	109	105	103
JAS 39 Gripen[3]	114	109	105	103
Mach 1.5				
Overpressure (psf)				
F-22	6.2	3.2	2.1	1.5
T-38A/B	3.8	2.0	1.3	0.9
Eurofighter Typhoon[1]	5.9	3.1	2.0	1.5
Dassault Mirage[2]	4.9	2.5	1.6	1.2
JAS 39 Gripen[3]	4.9	2.5	1.6	1.2
C-Weighted Sound Exposure Level (dB)[1]				
F-22	117	112	108	105
T-38A/B	113	108	104	101
Eurofighter Typhoon[1]	117	111	108	105
Dassault Mirage[2]	115	110	106	103
JAS 39 Gripen[3]	115	110	106	103

Notes:
[1] As modelled with the surrogate F-18E/F
[2] As modelled with the surrogate F-16C
[3] As modelled with the surrogate F-16A

C-weighted Sound Exposure Level – Sound Exposure Level with frequency weighting that places more emphasis on low frequencies below 1,000 hertz

dB = decibel(s); psf = pound(s) per square foot

4.2.3 *No Action Alternative*

Under the No Action Alternative, contract ADAIR would not perform sorties at Tyndall AFB and in the nearby airspace. Under the No Action Alternative, there would be no change to the existing noise environment.

Airspace Noise Environment

Under the No Action Alternative, the subsonic and supersonic airspace noise environment would be identical to the subsonic and supersonic airspace noise environment under the existing conditions for the MOAs/ATCAAs. Under the No Action Alternative, the subsonic noise environment in Warning Area W-151 would be 60 dB L_{dnmr} (1 dB lower than the existing conditions). Because there would be no increase in noise levels under the No Action Alternative, no significant impacts would be expected under the No Action Alternative.

4.3 SAFETY

4.3.1 *Evaluation Criteria*

Impacts from implementation of the Proposed Action are assessed according to the potential to increase or decrease safety risks to personnel, the public, property, or the environment. Adverse impacts on safety might include implementing contractor flight procedures that result in greater safety risk or constructing new buildings within established Q-D safety arcs. For the purposes of this EA, an impact is considered significant if the proposed safety measures are not consistent with AFOSH and OSHA standards resulting in unacceptable safety risks.

Safety concerns associated with ground, explosive, and flight activities are considered in this section. Ground safety considers issues associated with ground operations and maintenance activities that support operations including arresting gear capability, jet blast/maintenance testing, and safety danger zones. Ground safety also considers the safety of personnel and facilities on the ground that may be placed at risk from flight operations in the vicinity of the airfield and in the airspace.

CZs and APZs around the airfield restrict the public's exposure to areas where there is a higher accident potential. Although ground and flight safety are addressed separately, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns. Explosives safety relates to the management and safe use of ordnance and munitions. Flight safety considers aircraft flight risks such as midair collision, BASH, and in-flight emergency requirements. Contractor planes would follow Air Force safety procedures and aircraft specific emergency procedures based on the aircraft design. Basic airmanship procedures also exist for handling any deviations to ATC procedures due to an in-flight emergency; these procedures are defined in AFI 11-202 (Volume 3) and established aircraft flight manuals. The Flight Crew Information File is a safety resource for aircrew day-to-day operations which is composed of air and ground operation rules and procedures.

4.3.2 *Proposed Action*

Ground, explosive, and flight safety associated with implementation of the Proposed Action are described in the following sections. Contract ADAIR safety procedures described in this section are mandated by the *Performance Work Statement for the Combat Air Forces (CAF) Contracted Air Support (CAF CAS)* (PWS) (Air Force, 2018d).

Ground Safety

Under the Proposed Action, limited contractor aircraft maintenance and testing would occur on the aircraft parking ramp or in the hangar and would be consistent with current aircraft maintenance activities on Tyndall AFB. No unique maintenance activities would be associated with the contract ADAIR aircraft. All scheduled depot-level or other heavy maintenance requirements would occur at off base contractor facilities.

Emergency Response

For initial emergency response involving a contract ADAIR aircraft, the Air Force would provide emergency responders (Airport Firefighter) trained on the applicable mission design series they are providing. For crash response, the DOD would provide on-field aircraft CDDAR. For events occurring off-base, civilian authorities (city, county, or state) would be first on scene. After the initial response, the contractor would be required to facilitate crash site security and clean-up. The contractor would be responsible to cooperate with the Air Force or the National Transportation Safety Board investigation, depending upon circumstances of the incident.

The contractor emergency response would include the following:

- Establish a CDDAR program that is fully integrated into the host operating location's CDDAR program. The contractor would provide technical expertise and facilitate the host operating location's response and recovery capability of contractor-owned aircraft, consistent with the following considerations: (1) urgency to open the runway for operational use; (2) prevention of secondary damage to the aircraft; and (3) preservation of evidence for mishap or accident investigations in accordance with AFI 91-202 and AFI 91-204; National Transportation Safety Board guidelines; and any local operating location guidance, as applicable. The contractor would ensure the host operating location's CDDAR personnel receive familiarization training on contractor aircraft and procedures prior to commencing local flying operations, at permanent and temporary duty operating locations.
- The contractor would develop an egress/cockpit familiarization training program to ensure all host operating location's nonegress personnel (e.g., emergency response personnel, fire department, CDDAR) who may access contractor aircraft cockpits, equipped with egress systems, receive initial and annual refresher training.

Safety Zones

Under the Proposed Action, safety zones around the airfield would not change.

Arresting Gear Capacity

Contract ADAIR aircraft would be compatible with the arresting systems on the airfield; or able to operate on the airfield without interference to the existing arresting system. There would be no need to change or modify the existing arresting gear. There would be no impacts on arresting gear capability for the implementation of the Proposed Action.

No significant impacts on ground safety are anticipated to occur under the Proposed Action provided the contractor establishes a CDDAR program and all applicable AFOSH and OSHA requirements are implemented.

Explosives Safety

Under the Proposed Action, the 325 MXS would support contract ADAIR daily training operations with the maintenance and delivery of countermeasure chaff and flares. This support would be provided by trained and certified personnel following Air Force safety guidance and technical orders. Trained and certified contract ADAIR personnel would be responsible for the loading and unloading of countermeasures on contract ADAIR aircraft and would follow approved safety measures outlined in the PWS. Contract ADAIR personnel would also be responsible for the maintenance of captive air training missiles and any ejector cartridges as contractor-provided equipment.

There may be rare occasions in which egress CADs and PADs may need to be removed from the aircraft for maintenance. In accordance with AFMAN 91-201, 11.15, when necessary, units may license a limited quantity of in-use egress explosive components of any Hazard Division explosive in the egress shop after removal from aircraft undergoing maintenance. This limit would not exceed the total number of complete sets for the number of aircraft in maintenance and the net explosive weight is limited. Contract ADAIR would work with the Wing Safety Office to obtain a license, if needed, to store egress CADs and PADs. Short-term storage could be provided at either the 325 MXS Munitions Storage Area provided a courtesy storage agreement is created and space is available. Short-term storage would be limited and only needed in the event of an emergency or unforeseen occurrence such as the issuance of a suspension or restriction egress equipment or munitions. All scheduled maintenance would occur at the contractor's off-base Central Repair Facility. CAD/PAD items are typically replaced just prior to expiration of the service life, which is typically part of aircraft scheduled maintenance. If temporary storage of contract ADAIR CAD/PAD items within the Wing munitions storage area is needed, they would be stored in facilities sited in the Explosive Safety plan for the type and amount of explosives to be stored.

The loading and unloading of countermeasure chaff and flares would occur on the aircraft parking ramp. The proposed ramp area for contract ADAIR aircraft is authorized for chaff and flare operations (Hazard Class 1.3) in accordance with AFMAN 91-201 para 12.47.2 and 12.47.3.

No significant impacts on explosive safety are anticipated to occur under the Proposed Action provided contract ADAIR personnel are trained and all applicable safety guidelines are implemented. Q-D arcs would not change.

Flight Safety

The potential for aircraft accidents is a primary public concern with regard to flight safety. Such accidents may occur as a result of midair collisions, collisions with manmade structures or terrain, mechanical failure, weather-related accidents, pilot error, BASH, or strikes from defensive countermeasures used during training. Under the Proposed Action, contract ADAIR would be required to strictly conform to the flight safety rules directed by the Operations Group Commander. In addition, the PWS stipulates the following requirements for contract ADAIR:

- Contractor Flight Operations would respond to and follow ATC vectors from approved facilities per FAA and AFI guidelines.
- Contract ADAIR would be conducted under positive tactical control. Pilots would be responsible to respond to tactical vectors and instructions by the applicable controlling authority (Ground Controller Intercept, Baron Controllers, Range Control Officer, Joint Terminal Attack Controller, etc.). If positive control is unavailable, mission flights would remain autonomous and adhere to the briefed presentations and Special Instructions.
- Contract ADAIR aircraft would
  - be equipped with applicable communication and navigation capability to operate in the National Airspace Structure under FAA IFR and aircraft operating limitations (if applicable) and International Civil Aviation Organization equipment prerequisites;
  - have at least one type of FAA-approved Navigation System such as a Tactical Air Navigation, Automatic Direction Finder Receiver System, with Automatic Direction Finder indicator; Very High Frequency Omni Directional Range; or Global Positioning System/Long Range Navigation;
  - have sufficient precision approach instrumentation (compatible with standard Air Force instrument landing systems) to permit operations down to 300-ft ceilings and 1-statute-mi visibility; and
  - have at least two functional voice radios operating in either the very high frequency/ultra-high frequency bands, and one must be ultra-high frequency.

Bird/Wildlife-Aircraft Strike Hazards

Contractor operations would not follow government BASH procedures; they follow the PWS-directed Flight Operations Procedures and Quality Management System per the references above. In this case, the contractor's BASH plan would be part of the Quality Management System and be integrated with the host Wing's plan. It is expected the contract ADAIR BASH plan would very closely mirror and, in fact, may be an exact copy of the Wing's BASH plan. While it is not required to be so, the contract ADAIR BASH plan would comply with the FAA Wildlife Hazard Mitigation Program.

No significant impacts on airspace/flight safety are anticipated to occur under the Proposed Action provided that contractor flight safety rules are followed and all applicable AFOSH and OSHA requirements are implemented.

4.3.3 *No Action Alternative*

Under the No Action Alternative, contract ADAIR would not perform sorties at Tyndall AFB and in the nearby special use airspace. Under the No Action Alternative, there would be no change to safety.

4.4 AIR QUALITY

4.4.1 *Evaluation Criteria*

The CAA Section 176(c), *General Conformity*, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIPs for attainment of the NAAQS. General conformity applies to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases.

This section discusses the potential effects of the Proposed Action on air quality within the ROIs. The Mobile-Pensacola-Panama City-Southern Mississippi AQCR is considered an attainment area. Because of the attainment status, the general conformity rule would not apply to any of the ROIs. As a result, air quality impacts are assessed by comparing projected contract ADAIR emissions to current Tyndall AFB emissions and county emissions. In addition, although general conformity does not apply, the applicability criteria of the rule are evaluated against projected contract ADAIR emissions as an additional significance indicator. Thus, project emissions of $PM_{2.5}$, PM_{10}, CO, SO_2, NO_x, and VOCs were compared against the conformity rule *de minimis* thresholds of 100 tpy. In nonattainment and maintenance areas, emissions at or above 100 tpy are considered significant, particularly as this threshold triggers full conformity analysis. Emissions below 100 tpy are considered moderate or, if very low, minor.

Operations in the Warning Areas would occur mostly outside the state jurisdictional boundary and outside the AQCR. Warning Area W-151 begins 3 NM from the coastline; the state jurisdictional boundary for Florida extends 9 NM from the coastline. Thus, there is a 6-NM overlap in state jurisdiction and the Warning Areas; however, the Warning Areas extend roughly 100 NM into the Gulf. As a result, it was assumed that approximately 6 percent of the ADAIR emissions in the Warning Areas would occur in the 6-NM overlap area.

The Rose Hill MOA and Tyndall B and H MOAs were not included in the analysis, as all ADAIR training for that MOA would occur above 3,000 ft. As described in **Section 3.4.1**, only air operations occurring at or below 3,000 ft AGL are considered in the impact analysis; thus, only the Tyndall AFB airfield, Tyndall C and E MOAs, Eglin E MOA, and Warning Areas W-151 and W-470 were evaluated.

The Air Conformity Applicability Model (ACAM) (version 5.0.13a) was used to provide emissions estimates for contract ADAIR airfield operations, maintenance activities, worker commutes, and fueling operations in the vicinity of the airfield and for flight operations in the airspace. ACAM was developed by the Air Force (Air Force, 2017a) and provides estimated air emissions from proposed federal actions for each specific criteria and precursor pollutant as defined in the NAAQS. Assumptions of the model are discussed in **Appendix C**. ACAM uses the procedures established by the Air Force as provided in *Air Emissions Guide for Air Force Mobile Sources* (Air Force, 2018a) and the *Air Emissions Guide for Air Force Stationary Sources* (Air Force, 2018b). Emission calculations in the stationary guide often reflect the use of emission factors published in USEPA's AP-42. For aircraft, operational modes (including taxi/idle [in and out], take off, climb out, approach, and pattern flight that includes TGO operations) are used as the basis of the emission estimates. By default, ACAM only accounts for emissions occurring at or below 3,000 ft (within the mixing layer). The mixing layer extends from ground level up to the point at which the vertical mixing of pollutants decreases significantly. The USEPA recommends that a default mixing layer of 3,000 ft be used in aircraft emission calculations (40 CFR § 93.153[c][2]); therefore, aircraft emissions released above 3,000 ft were not included in the analysis. The emissions associated with the use of flares at or below 3,000 ft within the Warning Areas were estimated using draft emission factors found in AP-42 Section 15.8 (USEPA, 2009).

The basis for the air emissions performed is summarized in **Table 4-10**. Emissions were calculated separately for the airfield operations, Tyndall C and E MOAs, the Eglin E MOA, and Warning Areas W-151 and W-470.

Details regarding impacts specific to the Proposed Action and No Action Alternative are described in **Sections 4.4.2** and **4.4.3**.

Table 4-10. Basis of Air Emission Calculations

Location	Type of Operation	Number of Sorties per Year	Ground Operation Emission Sources
Tyndall Airfield	LTO Cycles	2,400	Auxiliary power unit equipment, AGE, personal vehicle use, aircraft maintenance (solvent use), fuel handling and storage, emergency generator, aircraft trim tests (24 per aircraft)
	TGO Cycles	324[1]	
Eglin E MOA	Sorties @ ≤3,000 feet	1,080[2,3]	Not Applicable
Rose Hill MOA	Sorties @ ≥8,00 feet	Not Applicable – No Analysis[4]	Not Applicable
Tyndall C MOA	Sorties @ ≤3,000 feet	82	Not Applicable
Tyndall E MOA	Sorties @ ≤3,000 feet	82	Not Applicable
Tyndall B and H MOAs	Sorties @ >9,000 feet	Not Applicable – No Analysis[4]	Not Applicable
Warning Area W-151	Sorties @ ≤3,000 feet	1,080[2,3]	Not Applicable
Warning Area W-470	Sorties @ ≤3,000 feet	2,396	Not Applicable

Notes:
[1] 5 percent of on-airfield daytime sorties (2,160) are expected to include multiple patterns for contractor proficiency. Each of those 5 5 percent sorties is assumed to include three TGO/low approaches.
[2] 45 percent of all sorties (1,080).
[3] Impacts include flare use below at and below 3,000 ft.
[4] Sorties occur above the mixing height. No emissions calculated.

AGE = Aerospace Ground Equipment; LTO = landing and takeoff; MOA = Military Operations Area; TGO = touch and go

4.4.2 *Proposed Action*

As described in **Section 1.1.3**, the recovery and rebuilding efforts are anticipated to take several years and the base is expected to return to full operational status after the recovery efforts are complete. For the purposes of this analysis it is assumed that there would be no new construction as a result of the contract ADAIR program. Contract ADAIR generated air emissions would be strictly the result of the contracted training operations.

No significant short-term or long-term effects to air quality would be expected from the proposed action. The only new air emissions that will be associated with the proposed action are direct and indirect emissions sources resulting from the flight operations and additional personnel. Emissions from the flight operations for this Action can cause temporary and localized increases in air emissions. There will be no long-term significant increases in air emissions, as the trail beddown is not indefinite.

Additionally, the action would occur within an area that is in attainment with all NAAQs; therefore, the proposed action is not subject to General Conformity Regulations and a General Conformity Applicability Analysis is not required. The proposed action will fall within the base boundaries which is designated as attainment; therefore, General Conformity does not apply.

An air quality impact assessment was conducted in accordance with the guidance in the Air Force Air Quality EIAP Guide and 32 CFR Part 989. Under existing USAF guidance, since none of these areas are not subject to general conformity requirements, the PSD thresholds are used to assess significance under NEPA. If these values represent de minimis emissions levels for nonattainment or maintenance areas; logically they would also represent emissions levels too trivial or minor to merit consideration in an attainment area. Therefore, any net emissions below these significance indicators are consider too insignificant to pose a potential impact on air quality.

The Net Change Analysis was performed using the USAF' Air Conformity Applicability Model (ACAM) for criteria pollutant (or their precursors) and GHGs. The results of the ACAM assessment are summarized in **Table 4-11**, **Table 4-12**, and **Table 4-13** (see Appendix C for details). All estimated total annual emissions are below the significance indicators; therefore, the emissions associated with the proposed actions are too insignificant to pose a potential impact on air quality. There were three emission scenarios analyzed for this Action; High, Medium and Low (Tables 4-15, 4-16 and 4-17 respectively). The high emission scenario utilized the F-15 aircraft as a viable surrogate for the MiG-29, the medium utilized the F-16 as a surrogate for the Mirage aircraft, and the low emission scenario utilized the F-5 aircraft. For air quality in attainment areas, Ozone is the primary concern as the EPA regularly prepares more stringent NAAQS for ozone. Ozone precursors for Ozone are Nitrogen Oxides (NOx) and Volatile organic Compounds (VOCs). Aircraft primarily emit NOx, and thus this is the pollutant of highest concern relating the air quality in attainment areas.

Table 4-11. Net Change Analysis Results - High Emission Scenario

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	10.545	250	No
NOx	**56.214**	**250**	**No**
CO	89.499	250	No
SOx	4.769	250	No
PM 10	8.046	250	No
PM 2.5	7.329	250	No
Pb	0.000	25	No
NH3	0.013	250	No
CO2e	11419.0		

Table 4-12. Net Change Analysis Results - Medium Emission Scenario

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.411	250	No
NOx	**32.714**	**250**	**No**
CO	45.236	250	No
SOx	3.109	250	No
PM 10	4.601	250	No
PM 2.5	3.068	250	No

Pb	0.000	25	No
NH3	0.013	250	No
CO2e	7609.4		

Table 4-13. Net Change Analysis Results - Low Emission Scenario

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	30.050	250	No
NOx	**14.653**	**250**	**No**
CO	158.509	250	Yes
SOx	2.263	250	No
PM 10	1.273	250	No
PM 2.5	1.234	250	No
Pb	0.000	25	No
NH3	0.013	250	No
CO2e	4925.4		

The tables above represent the worst annual emissions as a result of this Action. All scenarios show all criteria pollutants below the Significance Indicators, except the low emissions scenario which exceeds for Carbon Monoxide (CO). As previously mentioned, the pollutant of concern for attainment areas is NOx, and therefore the emissions scenario ranking is based off this NOx and does not take the other pollutant totals into account. While low the scenario does exceed the significance indicator for CO, CO is not a pollutant of great concern. The vast majority of the country has continuously reduced the amount of CO in the atmosphere. Furthermore, the increase as a result of this Action is temporary and thus will not cause a significant deterioration of air quality in the affected region in the long term.

Under the Proposed Action, the Tyndall C and E MOAs, Eglin E MOA, W-151 and W-470 would include contract ADAIR sorties at or below 3,000 ft and thus are included in the air quality analysis. Consistent with the USEPA recommendation regarding mixing height, only those emissions that would occur with the mixing layer (lowest 3,000 ft) were analyzed. Out of the of the proposed sorties, 82 are in the Tyndall C and E MOAs, 1,080 are expected to include some time at or below 3,000 ft above sea level in the Eglin E MOA, 1,080 in W-151 and 2,396 were analyzed in W-470. Defensive countermeasures (chaff and flares) are authorized for use below 3,000 ft in the Warning Areas and Eglin E MOA.

The emissions associated with contract ADAIR sorties proposed for the special use airspace were evaluated using ACAM for the High, Medium, and Low Scenarios described previously. The flight time in the mixing layer was estimated to be approximately 7.72 minutes per sortie. In addition, it was assumed the time it would take to fly from Tyndall AFB to and from the airspace would occur at an altitude above 3,000 ft; thus, this portion of the sortie is not included in the analysis. The methodologies, emission factors, and assumptions used for the emission estimates for each of the scenarios are outlined in **Appendix C**. Emissions were estimated for a 10-year project period beginning in July 2019 and ending in June 2029. Although this period may not represent the final start and end dates, the annual emissions shown determined will be representative for any project year.

Because the special use airspace is within and border an attainment area for all criteria pollutants the general conformity rule does not apply; however, the rule's 100 tpy *de minimis* threshold was applied as a significance indicator. The Low Emission Scenarios are not necessarily lower for all pollutants. Because of its role in ozone formation NO_x is the primary pollutant of concern in many areas and thus the Low Emission Scenarios reflect lower emission rates for NO_x; however, the lower NO_x emissions are often at the expense of other pollutants such as higher CO. Other factors such as the number of engines, fuel flow rates, and power mode can cause variations that may result in a Low Emission Scenario having higher emissions for some pollutants when compared to an engine with higher emission factors (pounds pollutant/1,000 pounds fuel burned).

For defensive countermeasures, only the emission from flares were evaluated. The air quality impacts of chaff were studied by the Air Force and reported in *Environmental Effects of Self-Protection Chaff and Flares* (Air Force, 1997). That study determined that chaff material maintains its integrity after ejection and that the use of explosive charge in impulse cartridges results in minimal PM_{10}. As a result, it was concluded that the deployment of chaff would not contribute to an exceedance of the NAAQS; therefore, chaff deployment was not included in the air quality assessment. Emission from M206 Countermeasure Flares were estimated using Emission Factors for AP-42 Section 15.8 (USEPA, 2009). Only flares expected to be deployed at or below 3,000 ft in Warning Areas W-151 and W-470 and the Eglin E MOA were included in the analysis. The quantity of flare to be deployed (baseline use minus estimated future use) at or below 3,000 ft was proportioned based on the percent of total time spent at or below 3,000 ft.

Table 4-14 shows the projected emissions for aircraft use in the Eglin E MOA and Warning Areas W-151 and W-470. The highest emission rate in the Warning Areas is modeled to be 79.5 tpy for NO_x in W-470. This action was originally proposed to conduct 2,396 sorties per year in W-470 and the air quality analysis was based on that number. That proposed action was modified from 2,396 sorties per year to 341 sorties per year, meaning the emissions for W-470 would actually be one-seventh of the quantities depicted in **Table 4-14**. The emission rates in W-470 for the higher sortie numbers are already below the conformity *de minimis* threshold and other metrics that can be used as indicators for significance, the emissions for one-seventh of those sorties have no potential for significance. Only a small portion of these emissions are expected to occur within the state jurisdictional boundary. The part of the Warning Areas within the state jurisdictional boundary is roughly 6 percent of the total Warning Areas. Scaling down the Warning Areas emissions to account for this would result in emissions of less than 10 tpy for all criteria pollutants. As a result of this, and the fact that the total emissions would be dispersed over a wide area, no impacts with respect to the NAAQS and air quality in general are expected.

Table 4-14. Contract Adversary Air Emissions – Eglin E Military Operations Area and Warning Areas W-151 and W-470

Airspace	Scenario	Contract (Years)[1]	Emissions (tpy)[2,3]								
			VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
Eglin E	High	2019 (July - December)	0.09	16.4	0.44	0.64	0.44	0.39	0.0	0.0	1,960
		2020 through 2028	0.17	32.8	0.87	1.29	0.87	0.79	0.0	0.0	3,921
		2029 (January - June)	0.09	16.4	0.44	0.64	0.44	0.39	0.0	0.0	1,960
	Med	2019 (July - December)	0.15	5.22	2.02	0.39	0.20	0.13	0.0	0.0	1,181
		2020 through 2028	0.29	10.4	4.04	0.77	0.40	0.26	0.0	0.0	2,362
		2029 (January - June)	0.15	5.22	2.02	0.39	0.20	0.13	0.0	0.0	1,181

Airspace	Scenario	Contract (Years)[1]	Emissions (tpy)[2,3]								
			VOC	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$	Pb	NH_3	CO_2e
	Low	2019 (July - December)	0.71	0.40	7.54	0.19	0.00	0.00	0.0	0.0	567
		2020 through 2028	1.41	0.81	15.1	0.37	0.00	0.00	0.0	0.0	1,134
		2029 (January - June)	0.71	0.40	7.54	0.19	0.00	0.00	0.0	0.0	567
W-151[3]	High	2019 (July - December)	0.09	16.4	0.44	0.64	0.44	0.39	0.0	0.0	1,960
		2020 through 2028	0.17	32.8	0.87	1.29	0.87	0.79	0.0	0.0	3,921
		2029 (January - June)	0.09	16.4	0.44	0.64	0.44	0.39	0.0	0.0	1,960
	Med	2019 (July - December)	0.15	5.22	2.02	0.39	0.20	0.13	0.0	0.0	1,181
		2020 through 2028	0.29	10.4	4.04	0.77	0.40	0.26	0.0	0.0	2,362
		2029 (January - June)	0.15	5.22	2.02	0.39	0.20	0.13	0.0	0.0	1,181
	Low	2019 (July - December)	0.71	0.40	7.54	0.19	0.00	0.00	0.0	0.0	567
		2020 through 2028	1.41	0.81	15.1	0.37	0.00	0.00	0.0	0.0	1,134
		2029 (January - June)	0.71	0.40	7.54	0.19	0.00	0.00	0.0	0.0	567
W-470[4]	High	2019 (July - Dec)	0.208	39.7	1.06	1.55	1.06	0.95	0	0	4,743
		2020 through 2028	0.416	79.5	2.11	3.11	2.11	1.90	0	0	9,485
		2029 (January - June)	0.208	39.7	1.06	1.55	1.06	0.95	0	0	4,743
	Med	2019 (July - Dec)	0.316	12.5	4.59	0.91	0.478	0.308	0	0	2,785
		2020 through 2028	0.632	25.1	9.17	1.82	0.956	0.616	0	0	5,570
		2029 (January - June)	0.316	12.5	4.59	0.910	0.478	0.308	0	0	2,785
	Low	2019 (July - Dec)	1.71	0.98	18.2	0.45	0.005	0.004	0	0	1,371
		2020 through 2028	3.41	1.95	36.5	0.90	0.009	0.008	0	0	2,743
		2029 (January - June)	1.71	0.98	18.2	0.45	0.005	0.004	0	0	1,371

Source: Air Conformity Applicability Model output

Notes:

1 While contract ADAIR targeted performance is estimated to start in February 2020 with a 10-year contract, the emissions were estimated for each year of the Proposed Action beginning in July 2019 and ending in June 2029. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract.

2 Represents total per year emissions.

3 Emission based on 1,080 sorties (45 percent of 2,400 on airfield sorties).

4 Emission based on 2,396 sorties

NO_x = nitrogen oxides; CO = carbon monoxide; CO_2e = carbon dioxide equivalent; NH_3 = ammonia; Pb = lead; $PM_{2.5}$ = particulate matter less than 2.5 microns; PM_{10} = particulate matter less than 10 microns; SO_x = sulfur oxides; VOC = volatile organic compound

4.4.3 *No Action Alternative*

The No Action Alternative would not generate any new emissions and are not expected to change emissions from current baseline levels presented in **Section 3.4**. As a result, there would be no change to regional air quality.

4.4.4 *Climate Change Considerations*

Like many locations, climate trends in the Florida Panhandle appear to be reflecting the influence of global warming. The sea level is predicted to rise up to 26 inches by 2100 (NASA, 2018). This would have negative effects on the marine wildlife and coral reef off the coast of Florida and economic effects on waterfront property and communities. The warmer waters and sea level rise would create an increase in salinity levels around the panhandle that will affect established fish populations (FWC, 2009). In addition, sea level rises in Florida threaten to contaminate underwater freshwater aquifers that many residents in Florida depend on.

While research is ongoing to understand the connection between climate and the formation of intense hurricanes, the risk to low-lying and oceanfront areas, and the catastrophic impacts of storm surge from hurricanes as a result of sea level rise are well documented. According to a 2013 study published in the Proceedings of the National Academy of Sciences, the risk of a Hurricane Katrina-level storm surge has risen two to seven times for every 1.8°F increase in temperature (Grinsted, 2013). In addition, a warming planet means the atmosphere can hold more moisture resulting in more extreme rainfall events such as observed with Hurricanes Harvey and Florence.

To serve as a reference point, projected GHG emissions were compared against State of Florida GHG emissions form fossil fuel combustion, and to the Title V and PSD major source thresholds for CO_2e applicable to stationary sources (**Table 4-15**). Based on the relative magnitude of the project's GHG emissions, a general inference can be drawn regarding whether the Proposed Action is meaningful with respect to the discussion regarding climate change.

Table 4-15 demonstrates, GHG emissions for all three emission scenarios would be well below regulatory thresholds for stationary source permitting and would account for about 0.009 percent of the Florida GHG emissions that are the result fossil fuel combustion. Based on this analysis, the GHG emissions from the ADAIR program are not considered significant.

Table 4-15. Metrics for Greenhouse Gas Emission Impacts

Emission Scenario	Contract ADAIR Projected CO_2e Emissions (tpy)[1, 2]	CO_2e Regulatory Thresholds (tpy)		Florida 2016 GHG Inventory (million metric tons/yr)[3,4]	ADAIR % of Florida GHG Emissions[5]
		Title V Permit	PSD New/ Modified Source		
High	22,513				
Medium	13,787	100,000	100,000/ 75,000	230.1	0.009
Low	8,066				

Notes:
[1] CO_2e = carbon dioxide equivalent from Air Conformity Applicability Model
[2] Sum of highest emissions from airfield operations and MOA and Warning Area sorties
[3] Represents metric tons of CO_2 from fossil fuel combustion for residential, commercial, industrial, transportation, and electric power sectors
[4] Source: USEPA, 2018b
[5] Percentage based on worst case (high) emission scenario

ADAIR = adversary air; GHG = greenhouse gas; PSD = Prevention of Significant Deterioration; tpy = ton(s) per year

4.5 Biological Resources

4.5.1 *Evaluation Criteria*

The level of impact on biological resources is based on the

- importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource;
- proportion of the resource that would be affected relative to its occurrence in the region;
- sensitivity of the resource to the proposed activities; and
- duration of potential ecological ramifications.

The impacts on biological resources are adverse if species or habitats of high concern (i.e., federally and state listed threatened and endangered species, marine mammals, designated critical habitat, and Essential Fish Habitat) are negatively affected over relatively large areas. Impacts are also considered adverse if disturbances cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that agency actions do not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid unauthorized “take” of federally threatened or endangered species or adverse modification of designated critical habitat. Take is defined as an action: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct.

4.5.2 *Proposed Action*

Under the Proposed Action, there would be no ground-disturbing activities and all potential impacts on biological resources would be associated with aircraft operations at Tyndall AFB and in the MOAs, ATCAAs, and Warning Areas W-151 and W-470. The aircraft operations associated with the Proposed Action could have impacts on biological resources from aircraft movement, the use of defensive countermeasures, noise, or BASH.

Chaff and flares proposed for annual use during training operations could impact biological resources from the deposition of residual materials, such as plastic, from chaff and flare use, its accumulation in sensitive areas, and the ultimate breakdown of these materials into substrate mediums. Indirect impacts include transportation of these materials to other areas by environmental elements and the potential for ingestion by sensitive marine species within Warning Areas W-151 and W-470. Depending on the altitude of release and wind speed and direction, the chaff from a single bundle can be spread over distances ranging from less than a 0.25 mi to over 100 mi (Air Force, 1997). The most confined distribution would be from a low-altitude release in calm conditions (Air Force, 1997).

Chaff chemical composition, rate of decomposition, and tendency to leach toxic chemicals under various situations paired with baseline substrate chemistry and conditions are factors that could potentially alter substrate chemistry. A change in chemistry could potentially affect fauna, flora, vegetative cover, substrate stability, the type and quality of habitat, and leaching and runoff potential. Silica (silicon dioxide), aluminum, and stearic acid are major components of chaff with minor quantities of copper, manganese, titanium, vanadium, and zinc in the aluminum chaff coating. All are generally prevalent in the environment, and all but titanium are either found in plants and animals and/or necessary essentials for their growth. Silica does not present a concern to chemistry as it is found in silicate minerals, the most common mineral group on Earth. Silica is more stable in acidic environments than alkaline; however, Gulf of Mexico waters, where the majority of defensive countermeasures would be used during contract ADAIR training, are slightly more alkaline than neutral (USEPA, 2019b). Aluminum is also very abundant in the earth’s crust, forming common minerals like feldspars, micas, and clays. While acidic and extremely alkaline substrates increase the solubility of aluminum, what is left eventually oxidizes to aluminum oxide which is insoluble. Stearic acid is used in conjunction with palmitic acid to produce an anti-clumping compound for chaff fibers and both degrade when exposed to light and air (Air Force, 1997).

The primary material in flares is magnesium, which is not highly toxic, and it is highly unlikely organisms would ingest flare materials; however, plastic caps are released with the deployment of both chaff and flares and, although highly unlikely, could be ingested. Some flares utilize impulse cartridges and initiates which contain chromium and sometimes lead. Even though these are hazardous air pollutants under the CAA, a screening health risk assessment concluded that they do not present a significant health risk (Air Force, 1997). The amount of lead is expected to be very small and dispersed over great distances, and the use of BMPs would avoid the selection of flares containing lead. More significantly, flares have a potential to start fires that can spread, adversely and indirectly affecting many resources. Flare-induced fires depend on the probabilities of flare material reaching the ground, igniting vegetation, and causing significant damage if the fire spreads (Air Force, 1997). Flare use in the MOAs and ATCAAs are subject to altitude and seasonal restrictions based on specific location and the fire danger level.

The following BMPs would be implemented as appropriate:

- Comply with Air Force and local procedures.
- Establish a capability to analyze fire risks on a site-specific basis. The methodologies presented in this report provide a mechanism for accomplishing this.

- Replace impulse cartridges and initiators in future procurements of flares with models that do not contain toxic air pollutants such as chromium and lead.
- Consider a public information program in areas where flares are used over non-DOD land to educate the public about the hazards of dud flares and proper procedures to follow if a dud flare is found.

4.5.2.1 Vegetation

Under the Proposed Action, there would be no ground-disturbing activities and as such no potential to disturb vegetation or habitats on Tyndall AFB, or in the MOAs, ATCAAs, and Warning Areas W-151 and W-470; therefore, there would be no impacts on vegetation under the Proposed Action.

4.5.2.2 Wildlife

There is limited suitable habitat for wildlife on developed areas of Tyndall AFB and immediately adjacent to the airfield where contract ADAIR takeoffs and landings would occur; however, undeveloped areas along the Gulf of Mexico and the bay and sound shorelines support relatively common wildlife species associated with estuarine and nearshore environments. Most of the forested areas on and immediately adjacent to Tyndall AFB were decimated by Hurricane Michael with catastrophic damage reported to mature forests in Bay, Calhoun, and Gulf Counties, Florida (Florida Forest Service, 2018). Wildlife dependent upon mature trees and relatively open forest understory are now limited in distribution on Tyndall AFB and in nearby areas within the noise contours. Hurricane Michael caused extensive shoreline erosion, erosion to dunes, and a lowering of beach profiles east of Panama City Beach, but these habitats typically recover more quickly than mature loblolly and longleaf pine forests, although dune erosion could take a decade or more for recovery even with dune restoration efforts (FDEP, 2019).

Wildlife, and especially avian species, utilizing bayshore/nearshore and beach and dune habitats for foraging and breeding would normally be sensitive to increased noise impacts from military aircraft. Although there is variability in responses across species, many birds and wildlife have the ability to habituate to noise and movement from military aircraft (Grubb et al., 2010) and military aircraft operations have been ongoing at Tyndall AFB for decades. Under the High Noise Scenario, the area under the 65-dBA DNL contour along Gulf of Mexico beaches on and adjacent to Tyndall AFB where numerous shorebirds forage would not change substantially and the 70-dBA DNL contour would not encroach upon the beaches or on the bay or sound shorelines. As such, the noise and movement from increased contract ADAIR aircraft operations is anticipated to have potential negligible, short- and long-term impacts on wildlife, including birds breeding and foraging in nearby relatively undisturbed habitats.

Aircraft operations always have the potential for bird and other wildlife strikes. This can occur during takeoff and landing on and near active runways, as well as during flight at altitude. With an increase in air operations associated with contract ADAIR aircraft at Tyndall AFB, there is an increased risk of BASH; however, Tyndall AFB maintains a BASH prevention program specifically to manage BASH risk and implement measures to greatly reduce the likelihood for BASH incidents. Further, under the Proposed Action, the number of operations at Tyndall AFB would decrease compared to the pre-hurricane baseline, reducing the potential for BASH incidents. The outcome of the BASH program is both increased safety for pilots and military aircraft as well as less incidents of injury or death to birds and other wildlife. As such, with the continued airfield management and risk reduction implementation measures associated with the BASH program, the potential impacts on birds and other wildlife from contract ADAIR aircraft strikes during air operations at Tyndall AFB are minor as discussed in **Section 4.3.2**.

Although contract ADAIR aircraft training can operate as low as the sea level surface in Warning Areas W-151 and W-470 and the Eglin E MOA, the majority of contract ADAIR aircraft training operations would occur at altitudes above where most bird species would be migrating or foraging. As such, it is highly unlikely that aircraft movement would adversely impact foraging or migrating birds or have a risk of BASH. Migrating birds could have a greater potential of encountering contract ADAIR aircraft during training operations, especially those that migrate at altitudes above 2,000 ft; however, given the large area where training would occur, that all contract ADAIR training would occur during daytime hours while most songbirds migrate at night, and that most migratory birds migrate at altitudes less than 2,000 ft, the likelihood for birds to encounter aircraft during training operations is low; therefore, potential direct, adverse impacts on birds from aircraft movement is negligible. The number of training operations would decrease in W-151 and W-470under the Proposed Action relative to baseline conditions, reducing the potential interactions between aircraft and birds. Further, given the altitudes at which the majority of training occurs in the special use airspace, and a reduction in the number of operations in W-151 and W-470, aircraft movement in the Eglin E MOA and Warning Areas W-151 and W-470 would have no impacts on marine mammals or sea turtles.

Noise modeling for the contract ADAIR aircraft training operations (see **Section 4.2.2**) indicates that there would be no change in noise impacts within the special use airspace, and that subsonic and/or supersonic noise levels in the airspace would only experience negligible increases. Further, there is substantial attenuation of noise energy provided by the air/water interface. The negligible change to the noise environment as a result of contract ADAIR training would have no impact on terrestrial or marine wildlife in the MOAs and Warning Areas W-151 and W-470.

Sonic booms from supersonic flights within the Warning Areas could cause startle effects on avian and mammal species at or near sea level; however, the sonic boom and postboom rumbling sounds that would be experienced by wildlife do not differ substantially from thunder. A decrease in operations would occur in Warning Areas W-151 and W-470 under the Proposed Action with the departure of the F-22 FTU and T-38s reducing supersonic flight operations. Further, the sonic boom events would be highly isolated and rare occurrences in Warning Areas W-151 and W-470, there is substantial attenuation of energy from sonic booms provided by the air/water interface, and sonic booms would occur in areas where supersonic flights currently occur with military training activities. As such, sonic booms from supersonic flights would have no impact on wildlife, including marine mammals and sea turtles in the Warning Areas.

Under the Proposed Action, the use of chaff and flares would increase on average by 13 percent within the special use airspace. Of the total proposed use of chaff and flares, the largest increase in use would occur in the Eglin E and Rose Hill MOAs (25 percent increase) while Warning Areas W-151 and W-470 would have a 12 percent increase. Potential impacts on avian species from the use of chaff and flares would be limited to a startle effect from chaff and flare deployment, inhalation of chaff fibers or flare combustion products, and possible ingestion of residual plastic caps after discharge. The potential of being struck by debris, or by a dud flare, given the small increase in chaff and flare use in such a large area over Eglin E and Rose Hill MOAs and Gulf of Mexico, is remote. Startle effects from the release of chaff and flares would potentially be minimal relative to the noise of the aircraft. The potential for avian species, terrestrial mammals, marine mammals, or sea turtles to be startled from flare deployment at night when flares would be most visible would be minimal due to the short burn time of the flare and the very small number of night training flights that are proposed. It is highly unlikely that during active military training with contract ADAIR aircraft that birds would remain in the area where training is occurring to be adversely impacted by chaff and flares deployment. Further, chaff and flares are so small in size, that it is highly unlikely that a small amount of lightweight material ejected during their deployment would have an adverse impact on birds or that the material would reach the Gulf of Mexico surface. Lastly, an evaluation of the potential for chaff to be inhaled by humans and large wildlife found that the fibers are too large to be inhaled into the lungs and that chaff material is made of silicon and aluminum that has been shown to have low toxicity (Air Force, 1997); therefore, the use of chaff and flares during contract ADAIR training would have a potential negligible impact on birds.

Small residual plastic components of chaff and flares such as end caps and pistons however would be deposited on the Gulf of Mexico surface during training activities. Although it is highly unlikely due to low probability of bird species encountering residual plastic components in the very large Warning Areas where they would be used, some large foraging bird species as well as marine mammals and sea turtles could ingest the remaining plastic components of chaff and flares if these components remain on the Gulf of Mexico surface or in the water column. The effect of chaff and flare components on federally listed bird species, marine mammals, and sea turtles is discussed under the threatened and endangered species section below.

4.5.2.3 Fish

Contract ADAIR aircraft operations in the Eglin E MOA and Warning Areas would have no impact on anadromous and marine fish. The increased use of chaff and flares does increase the potential for plastics associated with chaff and flares to end up in aquatic ecosystems and in the Gulf of Mexico; however, the amount of plastic material expended in the use of chaff and flares is small (estimated to be one chaff bundle or flare for every 5.4 mi^2 of Warning Areas W-151 and W-470 annually), the size of the plastic material is also very small, and most of the material would fall to the Gulf floor at depths below which most fish species forage; however, the use of chaff and flares would have a potential minor, adverse impact on fish species that are large enough to ingest plastic pieces that fall to the Gulf floor on the portion of the continental shelf that overlaps the boundaries of the Warning Areas, even though the likelihood of any large fish species encountering plastic caps from chaff and flares is extremely low. The contract ADAIR sorties in the special use airspace, including the use of defensive countermeasures, would have no impact on Essential Fish Habitat.

4.5.2.4 Invasive Species

There are no activities associated with the Proposed Action that have the potential to affect invasive species. There would be no ground-disturbing activities that have the potential to spread or remove invasive plants. Similarly, aircraft operations on the airfield or in Warning Areas W-151 and W-470 would have no impact on invasive plants or wildlife.

4.5.2.5 Threatened and Endangered Species

Under the Proposed Action, there would be no ground-disturbing activities, and all potential impacts on biological resources would be associated with aircraft operations in the project area. Because there would be no ground-disturbing activities, there would be no impacts on federally or state listed plant species, reptiles, amphibians, fish, or invertebrates.

Effects on listed bird and mammal species could occur from flight operations associated with contract ADAIR training. These aircraft operations could affect biological resources from aircraft movement, noise, bird and animal aircraft strikes, and use of defensive countermeasures. For listed bird species, given the large area and high altitude where the majority of contract ADAIR training would occur, and that ADAIR training would occur during daytime hours, the likelihood for birds to encounter aircraft during training operations is low. Because contract ADAIR would fly only 232 annual sorties in the Rose Hill MOA and all of the training operations would be at altitudes above 8,000 ft, these training operations in the Rose Hill MOA would not adversely affect listed bird species such as the wood stork, or the gray bat. Lower altitude flights are proposed in the Eglin E MOA and Warning Areas W-151 and W-470; however, there would be no night flights when most songbirds migrate and the 2,113 annual contracted sorties would be a small percentage of the overall training operations that currently occur in these special use airspaces where avian species are habituated to aircraft movement.

Contract ADAIR takeoffs and landings at Tyndall AFB would have no effect on any of the listed avian or mammal species as the low level aircraft movement and aircraft noise do not occur directly over Eglin AFB Gulf of Mexico beaches where federally and state listed shorebirds such as the American oystercatcher, piping plover, snowy plover, least tern, and red knot, as well as the Choctawhatchee beach mouse, and St. Andrew beach mouse could occur. Relative to baseline conditions, a reduction in flight operations at Eglin AFB would occur under the Proposed Action, reducing the likelihood of aircraft movement or noise adversely affecting listed species near the airfield. Also, no RCW are known to occur adjacent to the airfield where low altitude takeoffs and landings occur. Aircraft movement at low altitudes during training operations in the Eglin E MOA could have a startle effect on all listed bird species, including RCW nesting and foraging in mature pine forests; therefore, low level aircraft movement may affect but is not likely to adversely affect the RCW, red knot, piping plover, and wood stork in the Eglin E MOA. Further, low level aircraft movement from contract ADAIR in the Eglin E MOA would have a potential minor, adverse impact on the state listed American oystercatcher, black skimmer, burrowing owl, Florida sandhill crane, Marian's marsh wren, least tern, little blue heron, reddish egret, snowy plover, kestrel, and tricolored heron if they were nesting or foraging on the Eglin Reservation.

Additional takeoffs and landings at Tyndall AFB would have no effect on any of the listed avian or mammal species as the low level aircraft movement and increased noise levels do not occur directly over Tyndall AFB Gulf of Mexico beaches where the piping plover, snowy plover, least tern, red knot, Choctawhatchee beach mouse, and St. Andrew beach mouse are known to occur. Also, no RCW are known to occur near the airfield where low altitude takeoffs and landings occur.

It is highly unlikely that either aircraft movement or noise emissions, especially at higher altitudes, would elicit a response from marine mammals or sea turtles. Noise from contract ADAIR aircraft would not increase substantially (including from sonic booms) in the Warning Areas where the number of training operations would decrease relative to the baseline conditions and would therefore have no effect on the listed marine mammal species and sea turtles. Sonic booms from supersonic aircraft movement could cause a startle response by the listed species when they are present on the surface of the Gulf of Mexico at the moment that a sonic boom occurred; however, sonic booms would be relatively rare events during contract ADAIR training in the action area, and the sonic boom and postboom rumbling would be similar to what mammal species and sea turtles experience during a thunderstorm, which are frequent occurrences across the Gulf of Mexico. Further, no substantial change in the noise environment in the Warning Areas is anticipated under the Proposed Action. Sonic booms from supersonic aircraft movement would therefore have no effect on listed species.

There is the potential for components of chaff and flares that remain after use to fall to the surface of the Gulf of Mexico where they could be ingested by birds, marine mammals, fish, and sea turtles. Chaff cartridges, chaff canisters, chaff components, and chaff and flare end caps and pistons would be released into the marine environment, where they would persist for long periods and could be ingested by marine wildlife while initially floating on the surface and sinking through the water column. Chaff and flare end caps and pistons would eventually sink to the seafloor (Spargo, 2007), which would reduce the likelihood of ingestion by marine wildlife at the surface or in the water column.

Bird species could potentially encounter chaff and flare components on the Gulf of Mexico surface while foraging. Some species of seabirds are known to ingest plastic when it is mistaken for prey (Auman et al., 1997; Yamashita et al., 2011; Provencher et al., 2014). The ingestion of plastic such as chaff and flare compression pads or pistons by birds could cause gastrointestinal obstructions or hormonal changes leading to reproductive issues (Provencher et al., 2014). Unless consumed plastic pieces were regurgitated, the chaff and flare compression pads or pistons could cause digestive tract blockages and eventual starvation and be lethal to birds foraging on the Gulf of Mexico surface; however, based on the available information, it is not possible to accurately estimate actual ingestion rates or responses of individual bird species (Moser and Lee, 1992); for example, it is possible that these bird species do not mistake these plastic components for prey and mistakenly consume them. Regardless, the majority of these chaff and flare plastic components would fall through the water column to the sea floor (Spargo, 2007) and would not remain on the surface of the Gulf of Mexico where a foraging bird would encounter and consume the plastic pieces. Further, with the exception of the black skimmer, the listed avian species in the Warning Areas and Eglin E MOA typically forage along shorelines and beaches and do not forage over the open waters of the Gulf of Mexico; therefore, the use of chaff and flares over the Gulf of Mexico as a result of the contract ADAIR training, would have no effect on any listed avian species except for the black skimmer. The black skimmer's feeding behavior could place them in contact with small plastic components in the Warning Areas or Eglin E MOA from the use of chaff and flares. A potential minor, adverse impact on the state listed black skimmer could occur from the use of defensive countermeasures as there is the potential for the black skimmer to encounter a small piece of plastic debris on the Gulf surface during foraging.

In the very unlikely event that unconsumed chaff and flare components were encountered and ingested by a marine mammal, the small size of chaff and flare end-caps and pistons (i.e., 1.3 in. in diameter and 0.13 in. thick) would pass through the digestive tract of marine mammals; therefore, the use of defensive countermeasures may affect but is not likely to adversely affect marine mammals. Sea turtles could also ingest the end caps of chaff and flares. It is likely that small residual plastic components of chaff and flares would also pass through the digestive tract of mature sea turtles. Small plastic components could however cause digestive problems for smaller sea turtles if ingested, but with the large area that would be utilized for contract ADAIR training in Warning Areas W-151 and W-470 and a proposed 12 percent annual increase in the use of chaff and flares in the Warning Areas from the proposed contract ADAIR training, it is highly unlikely that a sea turtle would encounter chaff and flare components; therefore, the use of chaff and flares over the Gulf of Mexico as a result of contract ADAIR training may affect but is not likely to adversely affect sea turtles. Manatees, which are herbivores in nearshore environments do not forage in a way that would cause them to mistakenly ingest small plastic components as prey; however, manatees could inadvertently ingest small plastic residual components from chaff and flares that could get lodged in seagrass or other aquatic plants; therefore, the use of chaff and flares in nearshore environments such as the Eglin E MOA may affect but is not likely to adversely affect the West Indian manatee.

The giant manta ray and oceanic whitetip shark would not be seeking prey that would be similar to plastic end caps from chaff and flares, nor do they typically feed on the Gulf of Mexico surface or seafloor where these plastic components would be most prevalent; however, there is still the possibility of an encounter between these fish species and the chaff and flare residual plastic components; therefore, the use of defensive countermeasures by contract ADAIR in the Warning Areas may affect but is not likely to adversely affect the giant manta ray and oceanic whitetip shark. Gulf sturgeon likewise may encounter small residual plastic components from chaff and flares as these species often feed on the Gulf bottom or the bottom of estuaries, such as those in the Eglin E MOA; therefore, the use of defensive countermeasures by contract ADAIR in the Eglin E MOA may affect but is not likely to adversely affect the Gulf sturgeon. The smalltooth sawfish would not occur in the Eglin E MOA or the deeper waters of Warning Areas W-151 and W-470; therefore, contract ADAIR would have no effect on the smalltooth sawfish.

As previously mentioned, ADAIR training would have no effect on federally or state listed reptiles (with the exception of sea turtles), amphibians, invertebrates, mollusks, and freshwater fish as all contract ADAIR training activities in the action area would be limited to aircraft movement and the use of defensive countermeasures in the Warning Areas. Further, ADAIR training would have no effect on the Choctawhatchee beach mouse, St. Andrew beach mouse, gray bat, Nassau grouper, and smalltooth sawfish.

The Air Force has made a may affect but not likely to adversely affect determination for the RCW, piping plover, red knot, wood stork, federally listed marine mammals, federally listed sea turtles, Gulf sturgeon, giant manta ray, and whitetip oceanic shark. Letters requesting concurrence with this determination have been sent to the USFWS and NMFS (**Appendix A**).

4.5.3 *No Action Alternative*

Under the No Action Alternative, the contract ADAIR operations would not occur at Tyndall AFB, and there would be no contract ADAIR training operations in the special use airspace. As such, there would be no impact on biological resources.

4.6 Cultural Resources

4.6.1 *Evaluation Criteria*

Adverse impacts on cultural resources might 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 audible elements that are out of character with the property or 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 enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an impact is considered major if it alters the integrity of Tyndall AFB or results in the loss of contributing resources in the historic district or potentially impacts traditional cultural properties.

4.6.2 *Proposed Action*

The Proposed Action includes elements affecting the base and military training airspace. As described in **Chapter 2**, the elements affecting the base include contract ADAIR aircraft, facilities, maintenance, personnel, and sorties. The elements affecting the airspace include airspace use and defensive countermeasures. Potential impacts resulting from the Proposed Action related to cultural resources are described below.

4.6.2.1 Traditional Cultural Properties

There are currently ten federally recognized Native American tribes in, and with historic ties to, Florida. These include the Alabama-Coushatta Tribe of Texas, Choctaw Nation of Oklahoma, Coushatta Tribe of Louisiana, Miccosukee Tribe of Indians, Mississippi Band of Choctaw Indians, Muscogee (Creek) Nation, Poarch Band of Creek Indians, Seminole Tribe of Florida, Seminole Nation of Oklahoma, and the Thlopthlocco Tribal Town. The airspace APE crosses into Alabama so the list of Tribes consulted as part of this EA was extended to include the Alabama-Quassarte Tribal Town. No known traditional cultural properties or sacred sites have been identified at Tyndall AFB nor have any been identified as part of ongoing consultation on the Proposed Action. The Proposed Action would therefore have no effect, and consequently no impact, on traditional cultural properties or sacred sites.

4.6.2.2 Archaeological Resources

No ground disturbance would take place as part of the Proposed Action; therefore, potential archaeological deposits would not be impacted. Sorties within the Warning Areas would be performed at an altitude over the Atlantic Ocean that would not affect potential submerged resources. The Proposed Action would therefore have no effect, and consequently no impact, on archaeological resources.

4.6.3 *No Action Alternative*

Under this alternative, no contract ADAIR assets would be established at Tyndall AFB resulting in no change to cultural resources.

4.7 HAZARDOUS MATERIAL AND WASTES, TOXIC SUBSTANCES, AND CONTAMINATED SITES

4.7.1 *Evaluation Criteria*

Impacts on HAZMAT management would be considered adverse if the federal action resulted in noncompliance with applicable federal and state regulations, or increased the amounts generated or procured beyond current Tyndall AFB waste management procedures and capacities. Impacts on the ERP would be considered adverse if the federal action disturbed (or created) contaminated sites resulting in negative effects on human health or the environment.

4.7.2 *Proposed Action*

Under the Proposed Action, maintenance and operations of 12 contracted ADAIR aircraft could contribute to the volume of HAZMAT stored and used at Tyndall AFB and the amount of hazardous wastes generated. Impacts associated with hazardous materials and wastes, contaminated sites, toxic substances are limited to Tyndall AFB. As discussed previously, an emergency fuel dump could occur in the special use airspace; however, due to the infrequent nature of fuel dumps as well as in-place safety precautions, these emergency procedures are not likely to have adverse effects.

4.7.3 *Hazardous Materials and Wastes*

The quantity of HAZMAT such as oil, Jet-A fuel, hydrazine, hydraulic fluid, solvents, sealants, and antifreeze would increase with the operations and maintenance of contract ADAIR aircraft at Tyndall AFB. HAZMAT required for the contract ADAIR aircraft and used by contract personnel would be procured, controlled, and tracked through the EESOH-MIS, following established Tyndall AFB procedures. This would ensure that only HAZMAT needed for operations and maintenance at the smallest quantities would be used and that all of the HAZMAT used for contract ADAIR at Tyndall AFB would be properly tracked. The existing hydrazine storage and servicing facility at Tyndall AFB has the capacity to support the additional contract ADAIR aircraft.

The quantity of hazardous wastes generated would increase as a result of the contract ADAIR operations at Tyndall AFB; however, all hazardous waste generated as a result of contract ADAIR aircraft operations and maintenance would be properly handled, stored, and disposed of following the Tyndall AFB Hazardous Waste Management Plan (Tyndall AFB, 2019). This ensures that hazardous waste is managed according to all federal, state, and local laws and regulations. As such, there would be no impact from the procurement and use of HAZMAT or the storage and disposal of hazardous waste.

4.7.4 *Installation Restoration Program*

The locations chosen for contract ADAIR operations and maintenance activities at Tyndall AFB would not be associated with any active IRP sites. There would be no ground disturbing activities that could spread existing contamination or expose workers to contamination at IRP sites. No impact is anticipated from the contract ADAIR operations and maintenance and pilot briefing activities.

4.7.5 *Asbestos-Containing Materials and Lead-Based Paint*

If ACM are determined to be present in the portion of a building chosen for contract ADAIR use and slated for renovation, the ACM would be properly removed and disposed of according to the Tyndall AFB Asbestos Management and Operations Plan (Tyndall AFB, 2018).

LBP could be present in an older building if chosen to support the contract ADAIR personnel. If renovations would be required to any building at Tyndall AFB chosen for use by contract ADAIR, any potential LBP would be properly handled and disposed of in accordance with federal, state, and local laws.

Building 503 was constructed in 1987 and is not known to have any ACM or LBP. With the implementation of the requirements described by the Asbestos Management Plan and proper handling of LBP if it was determined to be present in Building 503, there would be no impact from potential ACM or LBP.

4.7.6 *Radon*

There is a low potential for radon to pose a health hazard at Tyndall AFB. Further, no new construction is proposed. As such, no impact from radon is anticipated.

4.7.7 *Polychlorinated Biphenyls*

Removal of any light fixtures has the potential to disturb PCBs. If renovations of the interior buildings chosen to support contract ADAIR require the removal of fluorescent lighting fixtures that could contain PCBs, the lighting fixtures would be disposed of according to federal, state, and local laws. The removal and proper disposal of light fixtures containing PCBs is a potential long-term, minor, beneficial impact under the Proposed Action.

4.7.8 *No Action Alternative*

Under the No Action Alternative, the contract ADAIR operations would not occur at Tyndall AFB. As such, no increased quantity of HAZMAT would be used and no increased quantity of hazardous wastes would be generated. No interior renovations of buildings to support contract ADAIR personnel would be required; therefore, there would be no potential disturbance of ACM, LBP, or PCBs in Tyndall AFB buildings. As a result, there would be no direct or indirect impact on any HAZMAT or hazardous or special wastes.

CHAPTER 5 CUMULATIVE IMPACTS AND OTHER ENVIRONMENTAL CONSIDERATIONS

This section includes an analysis of the potential cumulative impacts by considering past, present, and reasonably foreseeable future actions; potential unavoidable adverse impacts; the relationship between short-term uses of resources and long-term productivity; and irreversible and irretrievable commitment of resources.

5.1 CUMULATIVE EFFECTS

The CEQ regulations stipulate that the cumulative effects analysis considers the potential environmental consequences resulting from "the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR § 1508.7). In addition, CEQ published guidance for addressing and analyzing cumulative impacts under NEPA. CEQ's publication, *Considering Cumulative Effects Under the National Environmental Policy Act* (January 1997), provides additional guidance for conducting an effective and informative cumulative impacts analysis.

This section identifies and evaluates past, present, and reasonably foreseeable future projects that could cumulatively affect environmental resources in conjunction with the Proposed Action. The ROI for the cumulative effects analysis is the same as defined for each resource in **Chapter 3**. Actions identified in **Table 5-1** would not interact with all resources; therefore, resources that potentially could result in a cumulative effect with the addition of the Proposed Action and alternatives are noted in the table.

Assessing cumulative effects begins with defining the scope of other actions and their potential interrelationship with the proposed or alternative actions. Other activities or projects that coincide with the location and timetable of the Proposed Action and other actions are evaluated. Actions not identified in **Chapter 2** as part of the proposed or alternative actions, but that could be considered as actions connected in time or space (40 CFR § 1508.25) may include projects that affect areas on or near Tyndall AFB.

An effort has been made to identify actions that are being considered or are in the planning phase at this time. To the extent that details regarding such actions exist and the actions have a potential to interact with the Proposed Action or alternatives, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available in order that they can evaluate the potential environmental consequences of the Proposed Action.

5.2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS

Past, present, and reasonably foreseeable actions by the Air Force on Tyndall AFB as well as in the region were considered. A review of the available information from federal, state, and regional agencies indicated that the region is currently in recovery and rebuilding following the devastation of Hurricane Michael. This process is expected to be ongoing for several years. Most buildings on Tyndall AFB sustained major damage, including flightline and support facilities. In addition, operational units have been relocated to other Air Force bases. These current and foreseeable future activities have the potential to result in a cumulative effect.

5.2.1 *Air Force Actions*

In addition to the Hurricane recovery efforts, recent past and ongoing military actions at Tyndall AFB were considered as part of the baseline or existing condition in the appropriate ROI. Each project summarized in this section was reviewed to consider the implication of each action with the Proposed Action or No Action Alternative. Potential overlap in the affected area and project timing were considered.

Tyndall AFB is currently in recovery and rebuilding following the devastation of Hurricane Michael. This process is expected to be ongoing for several years and will return to full operational status as facilities become available. Under full operational status, Tyndall AFB would continue to be an active military installation that experiences continuous evolution of mission and operational requirements. All construction projects must comply with land use controls, which include safety and environmental constraints, which are outlined in the ICEMAP (Tyndall AFB, 2015a). Tyndall AFB, like other major military installations, requires new construction, infrastructure improvements, and general maintenance. These routine projects are environmentally cleared using NEPA's Categorical Exclusion process and would continue to occur during operation of the Proposed Action. In addition to these routine projects, **Table 5-1** lists the past, present, and reasonably foreseeable future major Air Force projects anticipated to occur on the base. Anticipated future off-base projects that may overlap in the potentially affected area or project timing with the Proposed Action were also considered and are discussed in **Sections 5.2.2** and **5.2.3** below.

Table 5-1. Past, Present, Reasonably Foreseeable Future Projects at Eglin Air Force Base

Scheduled Project	Project Summary	Implementation Date	Relevance to Proposed Action	Resource Potentially Affected
Past Actions				
Replacement of QF-4 FSATs with QF-16 FSATs at Tyndall AFB	Project includes replacement of 82 outdated QF-4 FSATs with QF-16 FSATs to achieve full-scale aerial target training.	2014	Replacement occurred in the airspace proposed for contract ADAIR.	Airspace Management and Use
New Combat Arms Range at Tyndall AFB, Florida	Project includes construction of a new fully contained indoor combat arms range to support training in the use of small arms under the Combat Arms Training and Maintenance program.	2018	Construction coincides with rebuilding efforts following Hurricane Michael and potentially ADAIR implementation.	Noise, Air Quality, Biological Resources, Socioeconomics – Income and Employment
Present Actions				
Tyndall AFB Master Plan and associated NEPA	Project includes Master Plan for reconstruction of Tyndall AFB	2019	Planning and construction efforts would be completed prior to proposed ADAIR implementation.	Airspace Management and Use, Noise, Safety, Air Quality, Biological Resources, Socioeconomics – Income and Employment
Special EA for Emergency Beddown of the F-22 Formal Training Unit and Associated T-38 Aircraft from Tyndall AFB to Eglin AFB, Florida	Project includes special environmental review of the temporary beddown of F-22 aircraft and associated T-38 aircraft from Tyndall AFB to Eglin AFB resulting from the Hurricane Michael devastation.	2019	Aircraft temporary were relocated from Tyndall AFB to Eglin AFB.	Airspace Management and Use, Noise

Future Actions				
F-35A Wing and MQ-9 Wing Environmental Impact Statement – Tyndall AFB	Project includes beddown of an F-35A and/or an MQ-9 Wing. The beddown could bring 4,100 airmen, 72 F-35A and 24 MQ-9 aircraft.	EIS pending. Anticipated to be fully operational in 2023	Project would use same airfield and airspace as proposed for ADAIR operations.	Airspace Management and Use, Air Quality, Noise, Socioeconomics – Income and Employment
Combat Air Forces Adversary Air Eglin AFB Draft EA	Project includes contract ADAIR sorties for Combat Air Forces training at Eglin AFB. Approximately 2,320 contracted sorties would be added to perform training activities within Warning Area W-151, the Rose Hill MOA/ATCAA, and the Eglin E MOA/ATCAA.	2021	Project would be the follow on to this proposed action. It would determine a permanent location for the temporary ADAIR operations at Tyndall AFB.	Airspace Management and Use, Air Quality, Noise
AFSOC Aircraft Basing at Duke Field EA	Project includes growing the 6th Special Operations Squadron at Duke Field, FL. This growth would include 294 additional personnel and five armed Intelligence, Surveillance and Reconnaisance aircraft such as the Cessna 208 Caravan.	2022	Project would use some of the same airspace (R-2419A/R-2519A) as proposed for ADAIR operations at Tyndall AFB.	Airspace Management and Use, Air Quality, Noise

Notes:
ADAIR = adversary air; AFB = Air Force Base; ATCAA = Air Traffic Control Assigned Airspace; EIS = Environmental Impact Statement; FSATS = Full-Scale Aerial Targets; MOA = Military Operations Area; NEPA = National Environmental Policy Act

5.2.2 *Nonfederal Actions*

Nonfederal actions such as new development or construction projects occurring in the area surrounding Tyndall AFB were considered for potential cumulative impacts. One past project was considered in addition to the substantial efforts to rebuild the region after Hurricane Michael. The Florida Department of Transportation Highway 30 Expansion to reconfigure base traffic from through traffic on State Road 30 and Airey Avenue was completed in 2016.

5.3 Cumulative Effects Analysis

The following analysis considers how projects identified in **Table 5-1** could cumulatively result in potential environmental consequences with the Proposed Action. The development of the Tyndall AFB Master Plan and associated NEPA that analyzes the effects on the human and natural environment from implementing that plan are ongoing. When complete, contract ADAIR requirements will be evaluated or supplemental NEPA analysis would be completed.

5.3.1 *Airspace Management and Use*

Cumulative impacts on airspace management and use from contract ADAIR operations, in addition to past, present, and reasonably foreseeable future actions, are expected to be negligible. While the addition of contract ADAIR sorties would increase Eglin E and Rose Hill MOA use by 19 percent, the departure and permanent beddown of the F-22 FTU and supporting T-38s would reduce operational sorties by 59 percent at Eglin AFB (and reduce training operations at W-151) and thus increase airspace capacity. The addition of contract ADAIR operations would potentially result in a negligible cumulative effect when considered with past, present, and reasonably foreseeable future projects.

5.3.2 *Noise*

The Proposed Action, in addition to the majority of past, present, and reasonably foreseeable future actions at Tyndall AFB, would result in less than significant cumulative noise impacts. Construction and demolition projects as part of the recovery effort would continue to occur during the same period as the proposed contract ADAIR implementation at Tyndall AFB. In addition, following recovery, routine construction projects would take place as part of the installations evolving mission. Since construction noise is localized to the construction sites and would be short-term, no cumulative long-term noise impacts are anticipated. The temporary movement of Tyndall AFB aircraft to Eglin AFB has greatly reduced the cumulative noise level in the vicinity of the Tyndall AFB airfield in the short term. The addition of ADAIR aircraft would slightly increase the number of supersonic flights in the proposed airspace than what currently exists. Because there would only be a slight increase in supersonic flights, no major cumulative effect on noise is expected in the airspace. There are potential additive cumulative noise impacts if the MQ-9 Reaper Wing/F-35A Wing Beddown were to occur at Tyndall AFB. However, these impacts would not result in significant cumulative impacts when considering the duration and timing of implementation of the ADAIR proposal. The ADAIR proposal at Tyndall AFB would occur over 24 months or less, and its timing would not overlap proposed future operations of the F-35/MQ-9 beddown in such a way that could result in significant noise impacts.

5.3.3 *Safety*

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Tyndall AFB, would follow existing safety procedures and policies for ground and flight operations. Safety zones would not change under contract ADAIR. Contract personnel would be trained and required to follow safety procedures in accordance with the Flight Crew Information File and established aircraft flight manuals. As such, no cumulative impact on ground and flight safety is expected with implementation of the Proposed Action.

5.3.4 *Air Quality*

Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Tyndall AFB would result in negligible cumulative impacts to air quality. Since this Action is not a permanent beddown, the emissions resulting would only be temporary, and given the attainment status of Tyndall, there would be no significant deterioration of the air quality in the region even taking other actions into consideration.

5.3.5 *Biological Resources*

The Proposed Action, in addition to past, present, and reasonably foreseeable future actions on and off Tyndall AFB, would potentially result in a less than significant cumulative impacts on biological resources. Since there are no ground-disturbing activities proposed, there could be no cumulative impacts on vegetation. Potential noise impacts on wildlife using the bayshore/nearshore habitats would result in negligible impacts under the Proposed Action. There are potential additive cumulative noise impacts if the MQ-9 Reaper Wing/F-35A Wing Beddown were to occur at Tyndall AFB. However, these impacts would not result in significant cumulative impacts when considering the duration and timing of implementation of the ADAIR proposal. The ADAIR proposal at Tyndall AFB would occur over 24 months or less, and its timing would not overlap proposed future operations of the F-35/MQ-9 beddown in such a way that could result in significant noise impacts. When added to past, present, and foreseeable future action, the Proposed Action would result in an increased risk of aircraft bird and other wildlife strikes. Compliance with the Tyndall AFB BASH prevention program would reduce the potential cumulative risk of contracted sortie operations associated with aircraft bird and other wildlife conflicts. There would be no cumulative impacts on marine mammals, sea turtles, or Essential Fish Habitat because the majority of training associated with the Proposed Action, the Eglin AFB contract ADAIR Proposed Action, and the F-35A and MQ-9 Wing action in the Warning Areas would be at mid- to high altitudes, interactions between military aircraft training in the airspace and marine mammals and sea turtles while on the surface of the ocean would be highly unlikely, and there would be no substantial change in the noise environment. No cumulative effects on federal or state listed plant species, terrestrial reptiles, amphibians, fish, or invertebrates are anticipated because there would be no ground-disturbing activities from the Proposed Action. Further, no cumulative impacts on threatened and endangered species are anticipated. No significant cumulative effects on biological resources are expected.

5.4 RELATIONSHIP BETWEEN SHORT-TERM USES AND LONG-TERM PRODUCTIVITY

CEQ regulations (Section 1502.16) specify that analysis must address "…the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity." Attention should be given to impacts that narrow the range of beneficial uses of the environment in the long term or pose a long-term risk to human health or safety. This section evaluates the short-term benefits of the proposed project compared to the long-term productivity derived from not pursuing the proposed or alternative actions.

Short-term effects on the environment are generally defined as a direct or indirect consequence of a project in its immediate vicinity. For example, direct short-term effects could include localized disruptions from construction. BMPs in place for each project should reduce potential impacts or disruptions. Under the Proposed Action, these short-term uses would have a negligible cumulative effect.

The Proposed Action involves providing dedicated contract ADAIR sorties to employ adversary tactics within existing Eglin AFB airspace. There would be no short-term effects on the airspace used by ADAIR activities and therefore no adverse impact on the long-term productivity and future use of the MOAs and Warning Areas proposed for ADAIR use. The Proposed Action also includes elements affecting Tyndall AFB such as ADAIR aircraft, facilities, maintenance, and personnel. Under the Proposed Action and alternatives, there would be no new construction. Existing installation facilities would be used with some internal modifications. While other maintenance activities would be occurring in the vicinity of the Proposed Action facilities, construction associated with these modifications represent a negligible effect on the short-term use of construction labor, goods, and services. No negative effects are expected from the Proposed Action short-term use or long-term productivity.

5.5 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the effects that the uses of these resources have on future generations. Irreversible effects result primarily from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action.

The Proposed Action would use existing airspace to conduct ADAIR activities and is not expected to result in a significant irreversible and irretrievable commitment of airspace or fuel resources. The addition of ADAIR sorties and personnel to support the Proposed Action would create additional fuel consumption from daily commutes to and from Tyndall AFB. Consumption of fuel associated with the Proposed Action, in addition to the total use of available fuels, is expected to result in a negligible decrease to the overall supply of regional petroleum resources. Additionally, use of training ordnance (chaff and flares) in the proposed ADAIR airspace would result in a 11 percent increased commitment to chemicals and other ordnance materials; however, this increase is expected to be a minor demand in relation to the overall supply of chemicals and ordnance materials. No significant irreversible or irretrievable commitment of resources is anticipated from implementing the Proposed Action.

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CHAPTER 6 LIST OF PREPARERS

The following individuals assisted in the preparation of this Draft EA:

Dean Alford, PG
Vernadero Group, Inc.
Senior Geologist
M.S. Geology/Geochemistry
B.S. Geology
Years of Experience: 30
Contribution: Hazardous Materials and Wastes

Anna Banda
Versar, Inc.
Geoscientist/Copy Editor
M.S. Geology
B.S. Geology
Years of Experience: 11
Contribution: Editing, Report Production

Dan Becker, GISP
Vernadero Group, Inc.
Information Technology & Services Director
M.A. Geography
B.A. Geography
Years of Experience: 9
Contribution: GIS/Cartography

Brian Bishop
Versar, Inc.
Environmental Scientist
M.S. Environmental Science
B.S. Biology
Years of Experience: 17
Contribution: Description of the Proposed Action and Alternatives Development, Land Use, Biological Resources

Kevin Bradley
KBRWyle
Engineering Manager
B.S. Aerospace Engineering
M.S. Aerospace Engineering
Years of Experience: 23 years
Contribution: Noise

Mackenzie Caldwell Rohm
Versar, Inc.
M.A. Anthropology/Archaeology
B.A. Anthropology/Archaeology/Sociology
Years of Experience: 16
Contribution: Cultural Resources

Rahul Chettri
Versar, Inc.
Senior Air Quality Engineer
M.S. Environmental Studies
B.S. Economics
Years of Experience: 35
Contribution: Air Quality

Maggie Fulton
Vernadero Group, Inc.
Technical Editor
B.A., English
Years of Experience: 32
Contribution: Intergovernmental/Interagency Coordination for Environmental Planning, Notice of Availability

Chris Hobbs
KBRWyle
Senior Acoustician
M.S. Physics
Years of Experience: 20
Contribution: Noise

Isaac Jimenez
Versar, Inc.
B.S. Geology
Years of Experience: 2
Contribution: Air Quality

Anicka Kratina-Hathaway
Vernadero Group, Inc.
Biologist
M.S. Zoology and Physiology
B.S. Ecology and Organismal Biology
Years of Experience: 11
Contribution: Biological Resources

Radhika Narayanan
Versar, Inc.
M.S. Environmental Science
B.S. Chemistry
Years of Experience: 27
Contribution: Air Quality

Duane E. Peter, RPA
Heritage Consulting
President
M.A. Anthropology
B.A. History
Years of Experience: 40
Contribution: Cultural Resources

Thomas Phelan
KBRWyle
Director, Air Vehicle Operation Unit
B.S. Aeronautical Engineering
M.S. Aeronautical Engineering
Years of experience: 39 (Navy and Contractor)
Contribution: Airspace and Safety

Kristen Reynolds
Versar, Inc.
M.A. History
B.A. English
Years of Experience: 15
Contribution: Architectural Historian

Peggy Roberts
Versar, Inc.
Senior NEPA Project Manager
M.S. Organizational Leadership/Project Management
M.S. Public Communications & Technology
B.A. Journalism/Public Relations
Years of Experience: 25 years
Contribution: Cumulative Impacts, Land Use

Tim Sletten
Versar, Inc.
Senior Environmental Scientist
B.S. Meteorology
Years of Experience: 33
Contribution: Air Quality

Derek Stadther
KBRWyle
Acoustical Engineer
MEng. Acoustics
Years of Experience: 6
Contribution: Noise and Airspace

Christa Stumpf
Versar, Inc.
Program Manager, NEPA Planner
M.S. Forest Resource and Land Use Planning
B.S. Wildland Management
Years of Experience: 23
Contribution: Project Management, QA/QC

Eric Webb
Vernadero Group, Inc
Vice President and Technical Services Director
Ph.D. Oceanography and Coastal Sciences
M.S. Biology
B.S. Biology
Years of Experience: 23
Contribution: Program Management, Quality Control, Regulatory Interface, Socioeconomics, Transportation

Government Contributors

The following individuals contributed to this Draft EA:

Contributor	Organization/Affiliation
Crystal Darnell	USACE Mobile
Brian Peck	USACE Mobile
John Doss	AFCEC/CZN
Grace Keesling	AFCEC/CZN
Mike Ackerman	AFCEC/CZN
John Saghera	ACC/A3TO
Josh Hudson	ACC/A3TO
Sarah Amthor	ACC AFIMSC DET 8/IS
George Duda	ACC/A8BA
Donald Mattner	ACC A589/A8BG
Brent Cartagena	ACC/A8BA
Rob Anderson	ACC AMIC/PMSA
Wanda Gooden	ACC AMIC/PMSA
Kevin Stiens	ACC AQC MGMT INTEG CE/DRJ
Major Patrick Milott	ACC AFLOA/JACE-FSC
Tom Bucci	AFLOA/JACE-FSC
Paula Riley	96 CEG/CEIEA

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APPENDICES

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APPENDIX A

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

Appendix A-1

Draft Environmental Assessment Distribution Letters

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER SQUADRON (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber
Chief, Installation Management Flight
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403

Dr. Sean M. Blomquist
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City FL 32405

Dear Dr. Blomquist

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall Air Force Base (AFB), Florida. The EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA, and the Air Force NEPA regulations.

Under the Proposed Action the 325th Fighter Wing at Tyndall AFB proposes to temporarily host a contract ADAIR operation consisting of up to 12 aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and/or temporary facilities on Tyndall AFB and would utilize local Special Use Airspace. The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

The EA for the temporary location of contract ADAIR at Tyndall AFB assesses the potential environmental impacts associated with this Proposed Action, and examines the cumulative effects when combined with past, present, and any future proposals. As part of the Air Force's Environmental Impact Analysis Process, we request your input in identifying general or specific issues or areas of concern you feel should be addressed in the environmental analysis.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, please forward written issues or concerns to Tyndall AFB's Point of Contact Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, via telephone at (850) 283-4341, or via

mail at Mr. Edwin Wallace, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BARBER.DONNA.L.1029350945 Digitally signed by BARBER.DONNA.L.1029350945 Date: 2020.07.10 13:12:10 -05'00'

DONNA L. BARBER, GS-13, DAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER SQUADRON (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber
Chief, Installation Management Flight
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403

Mr. Chris Stahl
Coordinator
Office of Intergovernmental Programs
Department of Environmental Protection
3900 Commonwealth Blvd, Mail Station 47
Tallahassee FL 32399

Dear Mr. Stahl

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall Air Force Base (AFB), Florida. The EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA, and the Air Force NEPA regulations.

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mail at Mr. Edwin Wallace, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403.
Thank you in advance for your assistance in this effort.

Sincerely

BARBER.DONNA.L.1029350945 Digitally signed by BARBER.DONNA.L.1029350945 Date: 2020.07.17 15:33:00 -05'00'

DONNA L. BARBER, GS-13, DAF

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1. Draft Environmental Assessment
2. Draft Appendices

DEPARTMENT OF THE AIR FORCE
325TH CIVIL ENGINEER SQUADRON (ACC)
TYNDALL AIR FORCE BASE FLORIDA

Ms. Donna L. Barber
Chief, Installation Management Flight
325th Civil Engineer Squadron
540 Mississippi Ave
Tyndall AFB FL 32403

Dr. Timothy A. Parsons
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee FL 32399

Dear Dr. Parsons

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall Air Force Base (AFB), Florida. The EA is being prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality regulations implementing NEPA, and the Air Force NEPA regulations.

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To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, please forward written issues or concerns to Tyndall AFB's Point of Contact Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, via telephone at (850) 283-4341, or via

mail at Mr. Edwin Wallace, 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403 within 30 days of receipt of this letter. Thank you in advance for your assistance in this effort.

Sincerely

BARBER.DONNA.L.1029350945 Digitally signed by BARBER.DONNA.L.1029350945 Date: 2020.07.10 13:11:20 -05'00'

DONNA L. BARBER, GS-13, DAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

JUL 1 7 2020

Colonel Gregory M. Moseley
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

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

Dear Chairman Cypress

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the below-referenced project.

The USAF is preparing an Environmental Assessment (EA) to evaluate potential environmental consequences associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall AFB, Florida.

Contract ADAIR would consist of up to 12 fighter aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and temporary facilities on Tyndall AFB and would fly an estimated 2,400 sorties in local and existing Special Use Airspace (Attachments 1 and 2). The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including facility use and aircraft parking, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). An existing facility would be used for ADAIR operations and a temporary facility, to be erected on existing pavement, would be used for ADAIR aircraft maintenance. No ground disturbance is planned.

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. No National Register of Historic Places eligible or listed buildings or structures are located within the direct or indirect APEs for the temporary ADAIR beddown. Therefore, Tyndall AFB holds that no historic properties would be affected by the temporary beddown of contract ADAIR.

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Miccosukee Tribe of Indians of Florida in identifying these resources and any effect the undertaking will have on these properties.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, we respectfully request that you provide us with any response based on your review within 30 days, though we will accept responses provided after 30 days. Please contact me at 850-283-2668 if you would like to arrange consultation on this undertaking. If you wish to decline consultation on this matter, provide written input, or submit any questions or requests for additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

GREGORY M. MOSELEY, Colonel, USAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

Sent via email to:
kevind@miccosukeetribe.com; yalmeida@miccosukeetribe.com; hopel@miccosukeetribe.com

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

JUL 17 2020

Colonel Gregory M. Moseley
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. James Floyd
Principal Chief
The Muscogee (Creek) Nation
P.O. Box 580
Okmulgee OK 74447

Dear Principal Chief Floyd

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the below-referenced project.

The USAF is preparing an Environmental Assessment (EA) to evaluate potential environmental consequences associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall AFB, Florida.

Contract ADAIR would consist of up to 12 fighter aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and temporary facilities on Tyndall AFB and would fly an estimated 2,400 sorties in local and existing Special Use Airspace (Attachments 1 and 2). The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including facility use and aircraft parking, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). An existing facility would be used for ADAIR operations and a temporary facility, to be erected on existing pavement, would be used for ADAIR aircraft maintenance. No ground disturbance is planned.

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. No National Register of Historic Places eligible or listed buildings or

structures are located within the direct or indirect APEs for the temporary ADAIR beddown. Therefore, Tyndall AFB holds that no historic properties would be affected by the temporary beddown of contract ADAIR.

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Muscogee (Creek) Nation in identifying these resources and any effect the undertaking will have on these properties.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, we respectfully request that you provide us with any response based on your review within 30 days, though we will accept responses provided after 30 days. Please contact me at 850-283-2668 if you would like to arrange consultation on this undertaking. If you wish to decline consultation on this matter, provide written input, or submit any questions or requests for additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

GREGORY M. MOSELEY, Colonel, USAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

Sent via email to: Section106@mcn-nsn.gov; djproctor@mcn-nsn.gov; clowe@mcn-nsn.gov

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

JUL 17 2020

Colonel Gregory M. Moseley
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

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

Dear Chairwoman Bryan

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the below-referenced project.

The USAF is preparing an Environmental Assessment (EA) to evaluate potential environmental consequences associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall AFB, Florida.

Contract ADAIR would consist of up to 12 fighter aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and temporary facilities on Tyndall AFB and would fly an estimated 2,400 sorties in local and existing Special Use Airspace (Attachments 1 and 2). The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

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Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. No National Register of Historic Places eligible or listed buildings or

structures are located within the direct or indirect APEs for the temporary ADAIR beddown. Therefore, Tyndall AFB holds that no historic properties would be affected by the temporary beddown of contract ADAIR.

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Poarch Band of Creek Indians in identifying these resources and any effect the undertaking will have on these properties.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, we respectfully request that you provide us with any response based on your review within 30 days, though we will accept responses provided after 30 days. Please contact me at 850-283-2668 if you would like to arrange consultation on this undertaking. If you wish to decline consultation on this matter, provide written input, or submit any questions or requests for additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

GREGORY M. MOSELEY, Colonel, USAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

Sent via email to: THPO@pci-nsn.gov; Lhaikey@pci-nsn.gov

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

JUL 17 2020

Colonel Gregory M. Moseley
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. Gregory Chilcoat
Principal Chief
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka OK 74884

Dear Principal Chief Chilcoat

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the below-referenced project.

The USAF is preparing an Environmental Assessment (EA) to evaluate potential environmental consequences associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall AFB, Florida.

Contract ADAIR would consist of up to 12 fighter aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and temporary facilities on Tyndall AFB and would fly an estimated 2,400 sorties in local and existing Special Use Airspace (Attachments 1 and 2). The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including facility use and aircraft parking, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). An existing facility would be used for ADAIR operations and a temporary facility, to be erected on existing pavement, would be used for ADAIR aircraft maintenance. No ground disturbance is planned.

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structures are located within the direct or indirect APEs for the temporary ADAIR beddown. Therefore, Tyndall AFB holds that no historic properties would be affected by the temporary beddown of contract ADAIR.

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Seminole Nation of Oklahoma in identifying these resources and any effect the undertaking will have on these properties.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, we respectfully request that you provide us with any response based on your review within 30 days, though we will accept responses provided after 30 days. Please contact me at 850-283-2668 if you would like to arrange consultation on this undertaking. If you wish to decline consultation on this matter, provide written input, or submit any questions or requests for additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

GREGORY M. MOSELEY, Colonel, USAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

Sent via email to: Lincoln.s@sno-nsn.gov, Franks.D@sno-nsn.gov

DEPARTMENT OF THE AIR FORCE
325TH FIGHTER WING (ACC)
TYNDALL AIR FORCE BASE FLORIDA

JUL 17 2020

Colonel Gregory M. Moseley
Commander
325th Fighter Wing
501 Airey Avenue, Suite 1
Tyndall AFB FL 32403-5549

Mr. Marcellus Osceola Jr.
Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood FL 33024

Dear Chairman Osceola

In accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, the United States Air Force (USAF) is providing information for your review and inviting your tribe to engage in government-to-government consultation regarding the below-referenced project.

The USAF is preparing an Environmental Assessment (EA) to evaluate potential environmental consequences associated with the temporary beddown of contract Adversary Air (ADAIR) at Tyndall AFB, Florida.

Contract ADAIR would consist of up to 12 fighter aircraft supported by up to 78 contracted maintainers and 15 contracted pilots. ADAIR would use existing and temporary facilities on Tyndall AFB and would fly an estimated 2,400 sorties in local and existing Special Use Airspace (Attachments 1 and 2). The ADAIR operation would remain at Tyndall AFB for up to 24 months while the Air Force analyzes a permanent location for the operation. The proposed contract ADAIR would support training for Air Force fighter aircraft stationed at Eglin AFB, Florida.

For Tyndall AFB, the Area of Potential Effects (APE) for this undertaking is defined as the physical boundaries of the project area within Tyndall AFB, including facility use and aircraft parking, as well as areas that will be indirectly affected (noise, vibration, and aesthetics of aircraft operations). An existing facility would be used for ADAIR operations and a temporary facility, to be erected on existing pavement, would be used for ADAIR aircraft maintenance. No ground disturbance is planned.

Indirect impacts to historic structures due to aircraft operations would not occur for the Proposed Action. No National Register of Historic Places eligible or listed buildings or

structures are located within the direct or indirect APEs for the temporary ADAIR beddown. Therefore, Tyndall AFB holds that no historic properties would be affected by the temporary beddown of contract ADAIR.

Tyndall AFB is not aware of any historic properties of religious or cultural significance located within the APE. However, we request the assistance of the Seminole Tribe of Florida in identifying these resources and any effect the undertaking will have on these properties.

To ensure the Air Force has sufficient time to consider your input in the preparation of the Final EA, we respectfully request that you provide us with any response based on your review within 30 days, though we will accept responses provided after 30 days. Please contact me at 850-283-2668 if you would like to arrange consultation on this undertaking. If you wish to decline consultation on this matter, provide written input, or submit any questions or requests for additional information, please contact Tyndall AFB's Point of Contact, Mr. Edwin Wallace, via email at edwin.wallace.1@us.af.mil, or via telephone at (850) 283-4346. Thank you for your assistance with this undertaking.

Sincerely

GREGORY M. MOSELEY, Colonel, USAF

2 Attachments:
1. Draft Environmental Assessment
2. Draft Appendices

Sent via email to: THPOCompliance@semtribe.com; Annemullins@semtribe.com; Victoriamenchaca@semtribe.com

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

Mr. Bruce Hagedorn
Chief, Eglin Natural Resources
96 CEG/CEIEA
501 De Leon Street, Suite 101
Eglin AFB, FL 32542-5133

1 AUG 2019

Ms. Cathy Tortorici
Chief, ESA Interagency Cooperation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, 13th Floor
Silver Spring, MD 20910

Dear Ms. Tortorici:

This letter is being submitted to reinitiate consultation under Section 7 of the Endangered Species Act (ESA) for the Eglin Gulf Test and Training Range (EGTTR) Programmatic Biological Opinion (PBO) and Conference Report (Consultation No. FPR-2016-9151). The PBO was issued to Eglin Air Force Base (AFB) on January 13, 2017. Since then, two new species with the potential to occur in the EGTTR have been listed under the ESA: giant manta ray (*Manta birostris*), and oceanic whitetip shark (*Carcharinus lonigmanus*). The U.S. Air Force is requesting the National Marine Fisheries Service (NMFS) to amend the EGTTR PBO to include effects determinations for the giant manta ray and oceanic whitetip shark.

Proposed Action

Eglin AFB is currently developing a Supplemental Environmental Assessment (EA) for the EGTTR that would expand the location of live weapon drops in the EGTTR. The Eglin Natural Resources Office coordinated with the ESA Interagency Cooperation Division regarding this change in the proposed action and determined that the proposed expansion area would not trigger re-initiation of formal consultation under the ESA, for ESA-listed marine mammals and sea turtles. NMFS concurred with Eglin's determination on 3 July 2019 by email.

In addition, the Air Force is proposing a new activity for Combat Air Force Adversary Air (CAF ADAIR) missions, which primarily includes the release of chaff and flares into the EGTTR during aircraft operations. CAF ADAIR aircraft provide air-to-air combat simulation for U.S. and Allied air forces. The training uses electronic engagement methods, and will limit its release of materials into the marine environment to the aforementioned expendables. CAF ADAIR missions will operate from the surface to unlimited altitudes over the Gulf of Mexico, but will not use any explosives or live or inert munitions.

The amounts of chaff and flares proposed under CAF ADAIR would not exceed limits previously analyzed in the 2004 EGTTR BO (Consultation No. F/SER/2003/00201) for air-to-air testing and training activities or in the 2017 EGTTR PBO (Consultation No. FPR-2016-9151). Therefore, the analysis in this letter will consider the potential effects of all testing and training activities in the EGTTR on the newly ESA-listed species.

1

Species Descriptions

Giant Manta Ray

NMFS published a final rule to list the giant manta ray as threatened under the ESA on February 21, 2018 (83 Federal Register [FR] 2916). The giant manta ray (*Manta birostris*) is the world's largest ray with a wingspan of up to 29 feet. They are filter feeders and eat large quantities of zooplankton. Giant manta rays are slow-growing, migratory animals with small, highly fragmented populations that are sparsely distributed across the world. This species is found worldwide in tropical, subtropical and temperate bodies of water and is most likely to be found offshore, in oceanic waters, and near productive coastlines. Giant manta rays have been observed in estuarine waters near oceanic inlets, potentially using these waters as nursery grounds. Information on global distribution and population sizes is lacking. Regional population sizes are small, ranging from around 100 to 1,500 individuals, and in areas subject to fishing, have significantly declined. Overall, given their life history traits, particularly their low reproductive output, giant manta ray populations are vulnerable to depletions, with low likelihood of recovery. Additional research is needed to better understand the population structure and global distribution of this species. Giant manta ray occurrence in the Gulf of Mexico is predominantly in the southern and northwest portion of the Gulf, specifically in offshore waters of the Yucatan Peninsula and Flower Garden Banks National Marine Sanctuary (NMFS, 2017a). Therefore, giant manta ray occurrence in the EGTTR is possible, but is not expected to be in high abundance or regularity.

Oceanic Whitetip Shark

NMFS published a final rule to list the oceanic whitetip shark as threatened under the ESA on March 1, 2018 (83 FR 4153). The oceanic whitetip (*Carcharinus lonigmanus*) is a large shark found in tropical and subtropical oceans throughout the world. They are a long-lived, late-maturing species that display low to moderate reproductive output. Oceanic whitetips are a pelagic species, generally remaining offshore in the open ocean, on the outer continental shelf, or around oceanic islands in water depths greater than 600 feet. They live from the surface of the water to at least 498 feet deep, but show a strong preference for the surface mixing layer in warm waters and are therefore a surface-dwelling shark. The oceanic whitetip is considered a top predator, feeding opportunistically on bony fishes and cephalopods such as squid. However, they also reportedly feed on large pelagic sportfish (e.g. tuna, marlin), sea birds, other sharks and rays, marine mammals and even garbage. The primary threat to the oceanic whitetip shark is incidental bycatch in commercial fisheries. Because of their preferred distribution in warm, tropical waters, and their tendency to remain at the surface, this species has high encounter and mortality rates in fisheries throughout their range. Juvenile oceanic whitetip sharks have been tracked in the northeastern Gulf of Mexico and essential fish habitat has been designated offshore of the Florida/Alabama border and extends west towards Texas; however there currently is no information available regarding habitat utilization of these specific areas (NMFS, 2017b). Given their habitat preference and proximity of designated essential fish habitat in the northeastern Gulf, oceanic whitetip sharks may occur regularly in the EGTTR.

Effects Determination

Stressors from testing and training activities conducted in the EGTTR include the release of chaff and flares, inert weapons, and live detonations. Potential impacts to protected species resulting from these activities include: (1) ingestion of munition debris (e.g. chaff and flares, and target fragments), (2) acoustic impacts from detonations, and (3) exposure to secondary stressors (e.g. explosion byproducts, metals, and chemicals).

Ingestion Impacts

Air-to-surface and some air-to-air activities in the EGTTR would release various types of military debris including inert weapons, live weapons, chaff, and flares. Giant manta rays do not spend considerable amounts of time at the water surface, therefore direct impacts from weapon releases are not likely. Oceanic whitetip sharks have a higher tendency to occur near the water surface, however the probability for an individual shark to be present near or at the water surface at the same time and location where these items are released from aircraft during missions is considered negligible. As a result, direct impacts to oceanic whitetip sharks are not likely to occur. After hitting the water surface, larger items, such as inert weapons and destroyed targets, would sink through the water column and settle to the seafloor. Smaller items including chaff, smaller target debris, and munitions casings, may temporarily float or remain suspended in the water column for longer periods of time before sinking or being transported by waves and currents. Giant manta rays feed in the water column and the potential for debris ingestion would therefore only be associated with items temporarily floating within the water column or as items slowly sink to the bottom. Oceanic whitetip sharks similarly feed mostly in the water column, but also consume flotsam located on the surface. Given the size of the EGTTR and the frequency of expendable-releasing missions that remains unchanged from the previous PBO analyses, the likelihood for a giant manta ray or oceanic whitetip shark to encounter an expended item is low. Moreover, a possible encounter would not necessarily lead to ingestion. In the rare event an item is ingested, relatively small debris pieces could pass through the digestive system without adverse effects. The potential for a giant manta ray or oceanic whitetip shark to encounter a large item, ingest it, and experience physical harm is negligible.

Acoustic Impacts

Effects from acoustic sources (e.g. explosives) on the giant manta ray and the oceanic whitetip shark would be dependent on a number of factors, including the proximity of the animal to the sound source, and the duration, frequency, and intensity of the sound. Giant manta ray aggregation sites are not present in the EGTTR and any occurrence within this area would therefore likely be of a solitary individual. Additionally, giant manta rays do not regularly occur within or near surface waters, further reducing probability of a possible encounter during a live weapons release. Oceanic whitetip sharks may occur within the EGTTR and may occupy surface waters; however, the EGTTR lies shoreward of the typical depth range for this species. While few individuals may occur in relatively shallow water, the potential for an oceanic whitetip shark to co-occur with EGTTR testing and training missions involving live weapon releases based on previously analyzed mission tempos is negligible. Therefore, giant manta rays and oceanic whitetip sharks are not expected to be exposed to acoustic impacts associated with live weapons detonation during testing and training activities in the EGTTR.

Impacts from Secondary Stressors

Secondary stressors associated with explosive ordnance activities could pose indirect impacts to giant manta rays and oceanic whitetip sharks through habitat degradation, habitat alteration, or an effect on prey availability. Effects to habitat and prey availability may result from explosives, explosion byproducts and unexploded ordnance, metals and chemicals. Explosion byproducts are not toxic to marine organisms at realistic exposure levels. Relatively low solubility of most explosives and their degradation products means that concentrations of these contaminants in the marine environment would be relatively low, reducing potential availability for uptake from within the water column. Furthermore, these low concentration levels of contaminants would be easily diluted through currents and wave action. Giant manta rays and oceanic whitetip sharks could be impacted by the effects of chemical materials and metals deposited into the water; however, these materials would have negligible effects on water quality and would not result in degradation of the physical marine environment. Therefore, no impacts to giant manta rays or oceanic whitetip sharks would result from secondary stressors such as water quality or habitat degradation.

Conclusions

Based on this analysis, Eglin Natural Resources has determined that testing and training activities in the EGTTR **may affect, but are not likely to adversely affect** the giant manta ray and the oceanic whitetip shark. *Adherence to the mitigation measures outlined in Chapter 6.3 of the 2017 EGTTR PBO is expected to significantly reduce the potential for adverse impacts to these ESA-listed species.*

If you have any questions regarding this amendment to the Programmatic Biological Opinion, please do not hesitate to contact either Mr. Rodney Felix at (850) 883-1153 or myself at (850) 882-8391.

Sincerely,

Bruce Hagedorn

BRUCE W. HAGEDORN, NH-03
Chief, Natural Resources Office
Eglin AFB, Florida

References

NMFS. (2017a). *Endangered Species Act Status Review Report: Giant Manta Ray (Manta birostris) and Reef Manta Ray (Manta alfredi).* Silver Spring, MD: NMFS.
NMFS. (2017b). *Endangered Species Act Status Review Report: Oceanic Whitetip Shark (Carcharhinus longimanus).* Silver Spring, MD: NMFS.

Interagency and Intergovernmental Coordination and Consultations Mailing List

Mr. Chris Stahl, Coordinator
Office of Intergovernmental Programs
Department of Environmental Protection
3900 Commonwealth Blvd, Mail Station 47
Tallahassee FL 32399

Dr. Timothy A. Parsons
State Historic Preservation Officer
Division of Historical Resources
500 South Bronough Street
Tallahassee FL 32399

Dr. Sean M. Blomquist
U.S. Fish and Wildlife Service
1601 Balboa Avenue
Panama City FL 32405

Ms. Cathy Tortorici
Chief, ESA Interagency Cooperation Division
Office of Protected Resources
National Marine Fisheries Service
1315 East-West Highway, 13th Floor
Silver Spring, MD 20910

Mr. James Floyd
Principal Chief
The Muscogee (Creek) Nation
P.O. Box 580
Okmulgee OK 74447

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

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

Mr. Marcellus Osceola Jr.
Chairman
Seminole Tribe of Florida
6300 Stirling Road
Hollywood FL 33024

Mr. Gregory Chilcoat
Principal Chief
Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka OK 74884

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

Appendix A-2

Draft Environmental Assessment Notice of Availability

27458
NOTICE OF AVAILABILITY

Draft Environmental Assessment for Combat Air Forces Contracted Adversary Air Temporary Operations at Tyndall Air Force Base, Florida

A Draft Environmental Assessment (EA) and proposed Finding of Significant Impact (FONSI) have been prepared by the US Air Force to analyze the impacts of providing dedicated contract Adversary Air (ADAIR) sorties for Combat Air Forces training at Tyndall Air Force Base (AFB), Florida.

The Proposed Action is to contract the support of approximately 2,320 ADAIR sorties annually using 12 contractor-owned and contractor-operated aircraft. Contract ADAIR would support the 33d Fighter Wing at Eglin AFB and the 325th Fighter Wing temporarily operating from Eglin AFB. Aircraft would depart from Tyndall AFB, transit from Tyndall to military special use airspace, perform ADAIR training, transit back, and land at Tyndall AFB. Training activities would use existing special use airspace near Eglin AFB and Tyndall AFB. Tyndall AFB has existing facilities to support the Proposed Action that are available for use and require minimal modification. The proposed action would be temporary in nature, lasting up to 24 months and ending prior to the proposed beddown of F-35A and MQ-9 aircraft at Tyndall AFB. This would not affect the environmental conditions portrayed in the draft EIS for F-35A Wing Beddown at Tyndall AFB and MQ-9 Wing Beddown at Tyndall AFB or Vandenberg AFB.

This Draft EA and proposed FONSI are provided for public comment in accordance with the National Environmental Policy Act (NEPA), the President's Council on Environmental Quality NEPA Regulations (40 CFR §§1500-1508), and 32 CFR §989, Environmental Impact Analysis Process (EIAP). The EIAP provides an opportunity for public input on Air Force decision-making, allows the public to offer inputs on alternative ways for the Air Force to accomplish what it is proposing, and solicits comments on the Air Force's analysis of environmental effects.

The News Herald

501 W. 11th Street
P.O. Box 1940, Panama City, FL 32401
Published Daily
Panama City, Bay County, Florida

State of Florida
County of Bay

Before the undersigned authority personally appeared Karen Glenn, who on oath says that she is a Legal Advertising Representative of The News Herald, a newspaper published at Panama City in Bay County, Florida; that the attached copy of advertisement, being a Legal Advertisement **#27458** in the matter of **NOTICE OF AVAILABILITY - TYNDALL AIR FORCE BASE** in the Bay County Court, was published in said newspaper in the issue of **August 2, 3, 2020**.

Affiant further says that the said The News Herald is a newspaper published at Panama City, in said Bay County, Florida, *is a direct successor of the Panama City News* and that the said newspaper, *together with its direct predecessor*, has heretofore been continuously published in said Bay County, Florida, each day *(except that the predecessor, Panama City News, was not published on Sundays)* and has been entered as periodicals matter at the post office in Panama City, in said Bay County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement, and affiant further says that (s)he has neither paid nor promised any person, firm or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in said newspaper.

Karen Glenn

State of Florida
County of Bay
Sworn to and subscribed before me this **3rd** day of **August**, A.D., **2020**. By Karen Glenn, Legal Advertising Representative of The News Herald, who is personally known to me or has produced N/A as identification.

Elizabeth J Kirkland
Notary Public, State of Florida at Large

ELIZABETH J KIRKLAND
Notary Public – State of Florida
Commission # GG 092307
My Comm. Expires Jun 16, 2021

The Draft EA and proposed FONSI are available at the following location:
• Bay County Public Library, 898 West 11th Street, Panama City, Florida 32401

An electronic copy of the Draft EA, the proposed FONSI and the Draft EA appendices can also be found on the Tyndall Air Force Base Website:
• Draft EA and FONSI: https://www.tyndall.af.mil/Portals/107/documents/Environmental Impact Assessments/Atch 1 Temp ADAIR at Tyndal Draft EA.pdf?ver=2020-07-01-101219-853

• Appendices: //www.tyndall.af.mil/Portals/107/documents/Environmental Impact Assessments/Atch 2 Temp ADAIR at Tyndall Draft EA Appendices.pdf?ver=2020-07-01-101305-010

Please provide any comments within 30 days from the date of this Notice of Availability. Please mail or e-mail comments or requests for information to Mr. Edwin Wallace at 325 CES/CEIE, 540 Mississippi Ave, Tyndall AFB FL 32403-501 or by email at edwin.wallace.1@us.af.mil, telephone (850) 283-4346.

The Air Force is aware of the potential impact of the ongoing coronavirus (COVID-19) pandemic on the usual methods of access to information and ability to communicate, such as the mass closure of local public libraries and challenges with the sufficiency of an increasingly overburdened internet. The Air Force seeks to implement appropriate additional measures to ensure that the public and all interested stakeholders have the opportunity to participate fully in this EA process. Accordingly, please do not hesitate to contact us directly at the email address or telephone number provided above; we are available to discuss and help resolve issues involving access to the Draft EA and Proposed FONSI or the ability to comment.

PRIVACY ADVISORY NOTICE

Public commenting allows the Air Force to make better, informed decisions. Letters or other written or oral comments provided may be published in the EA. As required by law, comments provided will be addressed in the EA and made available to the public. Providing personal information is voluntary. Any personal information provided will be used only to identify your desire to make a statement during the public comment portion of any public meetings or hearings or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of EA; however, only the names of the individuals making comments and specific comments will be disclosed. Personal home addresses and phone numbers will not be published in the EA.
Pub: August 2, 3, 2020

Appendix A-3

Agency and Government-to-Government Comments

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Sent: Thursday, August 27, 2020 1:48 PM
To: MATTNER, DONALD F JR GS-13 USAF ACC ACC A589/A8BG [redacted]
Subject: FW: [Non-DoD Source] Re: [EXTERNAL] FW: Temporary Bed-down ADAIR Draft EA Agency Letter

Don,

Below are comments from USFWS for the ADAIR EA.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
540 Mississippi Ave
Tyndall Air Force Base, FL 32403
[redacted]

"EXEMPT FROM MANDATORY DISCLOSURE under FOIA, Exemption 5, deliberative process applies. Further distribution is prohibited without the approval of AFCEC/CZN or SAF/IEIP."

From: Yarbrough, Lisa [redacted]
Sent: Thursday, August 27, 2020 12:33 PM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Cc: Lang, Paul [redacted]
Subject: [Non-DoD Source] Re: [EXTERNAL] FW: Temporary Bed-down ADAIR Draft EA Agency Letter

Mr. Wallace,
The US Fish and Wildlife Service does not have any comments at this time. Thank you for the opportunity to review the Temporary Bed-down ADAIR Draft EA.
Please let us know if you have any questions or comments.

Thanks,
Lisa Yarbrough
Fish and Wildlife Biologist
Panama City Ecological Services Field Office
1601 Balboa Ave, Panama City FL
[redacted]

From: Lang, Paul [redacted]
Sent: Wednesday, July 22, 2020 3:32 PM
To: Yarbrough, Lisa [redacted]
Subject: Fw: [EXTERNAL] FW: Temporary Bed-down ADAIR Draft EA Agency Letter

Here is the email that I received from Mr. Wallace regarding EA for ADAIR at Tyndall AFB. I uploaded the files to our Sec 7 Teams channel under TyndallAFB_ADAIR_EA

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Sent: Wednesday, July 22, 2020 12:56
To: Lang, Paul [redacted]
Subject: [EXTERNAL] FW: Temporary Bed-down ADAIR Draft EA Agency Letter

This email has been received from outside of DOI - Use caution before clicking on links, opening attachments, or responding.

From: State_Clearinghouse [redacted]
Sent: Wednesday, July 22, 2020 10:57 AM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Cc: State_Clearinghouse [redacted]; MATTNER, DONALD F JR GS-13 USAF ACC ACC A589/A8BG [redacted]; CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE [redacted]
Subject: [Non-DoD Source] RE: Temporary Bed-down ADAIR Draft EA Agency Letter

While it is covered by EO 12372, the Florida State Clearinghouse does not select the project for review. You may proceed with your project.

Please continue to send future electronic requests directly to the State Clearinghouse email address, State.Clearinghouse@FloridaDEP.gov

Good Luck.

Chris Stahl

Chris Stahl, Coordinator
Florida State Clearinghouse
Florida Department of Environmental Protection
3800 Commonwealth Blvd., M.S. 47
Tallahassee, FL 32399-2400
[redacted]

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Sent: Tuesday, July 21, 2020 12:00 PM
To: Stahl, Chris [redacted]
Cc: State_Clearinghouse [redacted] MATTNER, DONALD F JR GS-13 USAF ACC ACC A589/A8BG [redacted] CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE [redacted]
Subject: Temporary Bed-down ADAIR Draft EA Agency Letter

Mr. Stahl,

The Draft Environmental Assessment for the Temporary Bed-down of Adversary Aircraft (ADAIR) at Tyndall AFB, FL is being submitted for review by the State Clearinghouse. Due to the size of the documents you will be receiving them through the DOD SAFE website for download. Please let me know if you have any questions.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
540 Mississippi Ave
Tyndall Air Force Base, FL 32403

[redacted]

"EXEMPT FROM MANDATORY DISCLOSURE under FOIA, Exemption 5, deliberative process applies. Further distribution is prohibited without the approval of AFCEC/CZN or SAF/IEIP."

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Sent: Tuesday, September 1, 2020 8:20 AM
To: MATTNER, DONALD F JR GS-13 USAF ACC ACC A589/A8BG [redacted]
Subject: FW: FOUO\\ Adversary Air (ADAIR) Temporary Beddown, Tyndall Air Force Base, Bay County, Florida

Don,

Please see response below from Muscogee (Creek) Nation.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
540 Mississippi Ave
Tyndall Air Force Base, FL 32403
[redacted]

From: Section106 [redacted]
Sent: Monday, August 31, 2020 4:24 PM
To: CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE [redacted]
Subject: [Non-DoD Source] Re: FOUO\\ Adversary Air (ADAIR) Temporary Beddown, Tyndall Air Force Base, Bay County, Florida

Good afternoon Mr. Cintron,

The Muscogee Nation has received correspondence regarding the proposed ADAIR temporary beddown located at Tyndall AFB in Bay County, Florida. Bay County is located within the Muscogee (Creek) Nation's historic area of interest and is of importance to us. After review, the Muscogee Nation is unaware of any Muscogee sacred sites, burial grounds, or significant cultural resources located within the immediate project. Since no ground disturbance is planned, the Muscogee Nation concurs that there should be **no effects to any known historic propeties** and that work should continue as planned. However, due to the historic presence of Muscogee people in the project areas, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur, the Muscogee (Creek) Nation requests that all work cease and our office as well as other appropriate agencies be notified immediately. This stipulation should be implemented into the project plans to ensure that contractors are aware of it. Please feel free to contact me if there are any questions or concerns.

Thank you,

Robin Soweka Jr.
Historic and Cultural Preservation Department | Cultural Resource Specialist
Muscogee (Creek) Nation
P.O. Box 580 | Okmulgee, OK 74447
[redacted]
http://www.muscogeenation-nsn.gov/

From: HOWELL, PENNY R GS-14 USAF AFMC AFCEC/CZOE
Sent: Thursday, July 30, 2020 4:59 PM
To: Section106; David J. Proctor; Corain Lowe
Cc: CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE; WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC; HARRACH, ILARIA GS-12 USAF AFCEC AFCEC/CZOE
Subject: FOUO\\ Adversary Air (ADAIR) Temporary Beddown, Tyndall Air Force Base, Bay County, Florida

Dear Principal Chief Floyd,

On behalf of Tyndall AFB, attached is a letter of invitation to participate in consultation for the proposed undertaking of the ADAIR temporary beddown. Any comments or questions can be directed to our point of contact, Mr. Edwin Wallace at [redacted] or [redacted]; Mr. Jose Cintron at [redacted] or [redacted].

Very respectfully

RENEE HOWELL, GS-14, M.A.
Chief, Eglin Installation Support Section
Air Force Civil Engineer Center
DSN 872-8399; Comm 850-882-8399
[redacted]

From: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Sent: Wednesday, September 2, 2020 11:05 AM
To: MATTNER, DONALD F JR GS-13 USAF ACC ACC A589/A8BG [redacted]
Subject: FW: Tyndall AFB Temporary Beddown of contract Adversary Air (ADAIR), Bay County FL

Don,

Just received a response from Seminole Tribe.

Edwin Wallace, GS-12, DAF
Program Manager LBP/Asbestos,
NEPA
325 CES/CEIEC
540 Mississippi Ave
Tyndall Air Force Base, FL 32403
[redacted]

"EXEMPT FROM MANDATORY DISCLOSURE under FOIA, Exemption 5, deliberative process applies. Further distribution is prohibited without the approval of AFCEC/CZN or SAF/IEIP."

From: Victoria Menchaca [redacted]
Sent: Wednesday, September 2, 2020 9:53 AM
To: WALLACE, EDWIN B GS-12 USAF ACC 325 CES/CEIEC [redacted]
Cc: CINTRON, JOSE J GS-12 USAF ACC 325 CES/CEIE [redacted]; HARRACH, ILARIA GS-12 USAF AFCEC AFCEC/CZOE [redacted]; MOSS, JENNIFER E CTR USAF ACC 325 CES/CEIEA [redacted]
Subject: [Non-DoD Source] Tyndall AFB Temporary Beddown of contract Adversary Air (ADAIR), Bay County FL

SEMINOLE TRIBE OF FLORIDA
TRIBAL HISTORIC PRESERVATION OFFICE

TRIBAL HISTORIC
PRESERVATION OFFICE

SEMINOLE TRIBE OF FLORIDA

30290 JOSIE BILLIE HIGHWAY
PMB 1004
CLEWISTON, FL 33440

THPO PHONE: (863) 983-6549
FAX: (863) 902-1117

THPO WEBSITE: WWW.STOFTHPO.COM

TRIBAL OFFICERS

MARCELLUS W. OSCEOLA JR.
CHAIRMAN

MITCHELL CYPRESS
VICE CHAIRMAN

LAVONNE ROSE
SECRETARY

PETER A. HAHN
TREASURER

September 02, 2020

Edwin Wallace
Tyndall AFB
[redacted]

Subject: Tyndall AFB Temporary Beddown of contract Adversary Air (ADAIR), Bay County FL
THPO #: 0032624

Dear Mr. Wallace,

Thank you for contacting the Seminole Tribe of Florida – Tribal Historic Preservation Office (STOF-THPO) regarding the Tyndall AFB Temporary Beddown of contract Adversary Air (ADAIR), Bay County FL. The proposed undertaking does fall within the STOF Area of Interest. We have reviewed the documents provided and completed our assessment pursuant to Section 106 of the National Historic Preservation Act and its implementing authority, 36 CFR 800. Based on the project having no ground disturbance, we have no objections at this time. However, please notify us if any archaeological, historical, or burial resources are inadvertently discovered.

Sincerely,

Victoria L. Menchaca MA, RPA
Compliance Review Specialist
STOF-THPO, Compliance Review Section
30290 Josie Billie Hwy, PMB 1004
Clewiston, FL 33440
[redacted]

APPENDIX B

NOISE

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Appendix B-1

Sound, Noise, and Potential Effects

Located in Administrative Record

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Appendix B-2

Noise Modeling

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7.1.1.1 B.2 Noise Modeling

The following sections describe input data used in the noise modeling process. These data were developed in coordination with the Air Force Air Combat Command (ACC), Air Force Civil Engineer Center, and Tyndall Air Force Base (AFB) personnel.

B.2.1 Airfield Operations

The first step in estimating the effects of the contract ADAIR action was to determine the baseline operations at Tyndall AFB. The baseline operations were identified through the 2016 Air Installations Compatible Use Zones (AICUZ) Study. The AICUZ study did a thorough evaluation of the operations at Tyndall AFB before Hurricane Michael. The aircraft operations identified from that study were determined appropriate by the Air Force for use as the baseline for contract ADAIR. The baseline has a total of 66,360 operations at the airfield. **Table B-5** contains the breakout of those operations by aircraft type and organization. **Table B-6** contains the operations to be modeled for the baseline as well as the contract ADAIR aircraft operations.

A SORTIE IS A SINGLE FLIGHT, BY ONE AIRCRAFT, FROM TAKEOFF TO LANDING WHILE A SORTIE-OPERATION IS THE USE OF ONE AIRSPACE UNIT (E.G., MILITARY OPERATIONS AREA) BY ONE AIRCRAFT. THE NUMBER OF SORTIE-OPERATIONS IS USED TO QUANTIFY THE NUMBER OF USES BY AIRCRAFT AND TO ACCURATELY MEASURE POTENTIAL IMPACTS (E.G., NOISE, AIR QUALITY, AND SAFETY IMPACTS). A SORTIE-OPERATION IS NOT A MEASURE OF HOW LONG AN AIRCRAFT USES AN AIRSPACE UNIT, NOR DOES IT INDICATE THE NUMBER OF AIRCRAFT IN AN AIRSPACE UNIT DURING A GIVEN PERIOD; IT IS A MEASUREMENT FOR THE NUMBER OF TIMES A SINGLE AIRCRAFT USES A PARTICULAR AIRSPACE UNIT.

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Table B-5
Baseline Operations at Tyndall Air Force Base

Category	Squadron / Unit / Group	Aircraft	Modeled Type (if different) or engine designation	AB Departure			Standard/MIL Departure			Overhead Arrivals			Straight In Arrivals			Closed Pattern[1]			Total		
				Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	95 FS	F-22A		340	2	342	3059	15	3074	2549	13	2562	850	4	854	342	2	344	7138	36	7174
	2 FTS	T-38A		5314	54	5368	-	-	-	1063	11	1074	4251	43	4294	1063	11	1074	11691	119	11810
	43 FS	F-22A		437	2	439	3933	20	3953	1311	7	1318	3059	15	3074	21850	110	21960	30590	154	30744
	53 WEG	DF-16/QF-16	F-16C	465	-	465	285	-	285	304	3	307	442	1	443	702	3	705	2198	7	2205
		E-9	DHC-8*	-	-	-	220	-	220	22	-	22	196	2	198	-	-	-	438	2	440
	337 ACS	MU-2	Cessna 441	-	-	-	1932	20	1952	-	-	-	1932	20	1952	429	4	433	4293	44	4337
Transient	33 FW[2]	F-35A		1	-	1	34	-	34	4	-	4	31	-	31	6830	-	6830	6900	-	6900
	Fighter	F-15E	F-15E (F100-PW-220)	264	5	269	-	-	-	-	-	-	264	5	269	59	9	68	587	19	606
		F-16C	F100-PW-220	198	2	200	-	-	-	-	-	-	198	2	200	-	-	-	396	4	400
		FA-18	FA-18E/F	55	-	55	-	-	-	-	-	-	55	-	55	-	-	-	110	-	110
		F-22A		197	2	199	-	-	-	-	-	-	197	2	199	-	-	-	394	4	398
		T-38	T-38C	109	1	110	-	-	-	-	-	-	109	1	110	218	2	220	436	4	440
	Large Cargo	C-17		-	-	-	15	-	15	-	-	-	15	-	15	-	-	-	30	-	30
		C-5	C-5A	-	-	-	4	-	4	-	-	-	4	-	4	-	-	-	8	-	8
	Tanker	KC-10	KC-10A	-	-	-	24	4	28	-	-	-	24	4	28	-	-	-	48	8	56
		KC-135R		-	-	-	79	2	81	-	-	-	79	2	81	-	-	-	158	4	162
	Small Jet	C-21	C-21A	-	-	-	46	1	47	-	-	-	46	1	47	-	-	-	92	2	94
	Jet Airliner	B-757	B-757-200-RR	-	-	-	32	-	32	-	-	-	32	-	32	-	-	-	64	-	64
	4-eng Prop	C-130	C-130H&N&P	-	-	-	59	-	59	-	-	-	59	-	59	-	-	-	118	-	118
	2-eng Prop	C-12		-	-	-	48	1	49	-	-	-	48	1	49	-	-	-	96	2	98
	1-eng Prop	T-41		-	-	-	13	-	13	-	-	-	13	-	13	-	-	-	26	-	26
		T-6		-	-	-	17	3	20	-	-	-	17	3	20	-	-	-	34	6	40
	Helicopter	H-60	UH-60A	-	-	-	48	3	51	-	-	-	48	3	51	-	-	-	96	6	102
Based Totals				6556	58	6614	9429	55	9484	5249	34	5283	10730	85	10815	24384	130	24514	56348	362	56710
Transient Totals				824	10	834	419	14	433	4	0	4	1239	24	1263	7107	11	7118	9593	59	9652
Grand Totals				**7380**	**68**	**7448**	**9848**	**69**	**9917**	**5253**	**34**	**5287**	**11969**	**109**	**12078**	**31491**	**141**	**31632**	**65941**	**421**	**66362**

Notes:

0) All operations shown to the nearest integer

1) Each circuit counted as two operations

2) Actual A/B departure and overhead arrival percentages are 1% and 10%, respectively. Operations shown are rounded to a non-zero integer. Noise modeling utilized the exact percentage.

Table B-6
Baseline Training Operations at Tyndall Air Force Base Plus Contract Adversary Air Operations

Category	Squadron / Unit / Group	Aircraft	Modeled Type (if different) or engine designation	AB Departure			Standard/MIL Departure			Overhead Arrivals			Straight In Arrivals			Closed Pattern[1]			Total		
				Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total	Day (0700-2200)	Night (2200-0700)	Total
Based	95 FS	F-22A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2 FTS	T-38A		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	43 FS	F-22A		5	-	5	43	-	43	-	-	-	1407	7	1414	10051	51	10102	11506	58	11564
	53 WEG	DF-16/QF-16	F-16C	465	-	465	285	-	285	304	3	307	442	1	443	702	3	705	2198	7	2205
		E-9	DHC-8*	-	-	-	220	-	220	22	-	22	196	2	198	-	-	-	438	2	440
	337 ACS	MU-2	Cessna 441	-	-	-	1932	20	1952	-	-	-	1932	20	1952	429	4	433	4293	44	4337
	ADAIR	CAT C		2400	-	2400	-	-	-	2040	-	2040	360	-	360	648	-	648	5448	-	5448
Transient	33 FW[2]	F-35A		1	-	1	34	-	34	4	-	4	31	-	31	6830	-	6830	6900	-	6900
	Fighter	F-15E	F-15E (F100-PW-220)	264	5	269	-	-	-	-	-	-	264	5	269	59	9	68	587	19	606
		F-16C	F100-PW-220	198	2	200	-	-	-	-	-	-	198	2	200	-	-	-	396	4	400
		FA-18	FA-18E/F	55	-	55	-	-	-	-	-	-	55	-	55	-	-	-	110	-	110
		F-22A		249	2	251	-	-	-	-	-	-	249	2	251	-	-	-	498	4	502
		T-38	T-38C	109	1	110	-	-	-	-	-	-	109	1	110	218	2	220	436	4	440
	Large Cargo	C-17		-	-	-	3	-	3	-	-	-	3	-	3	-	-	-	6	-	6
		C-5	C-5A	-	-	-	1	-	1	-	-	-	1	-	1	-	-	-	2	-	2
	Tanker	KC-10	KC-10A	-	-	-	5	1	6	-	-	-	5	1	6	-	-	-	10	2	12
		KC-135R		-	-	-	16	-	17	-	-	-	16	1	17	-	-	-	32	2	34
	Small Jet	C-21	C-21A	-	-	-	46	1	47	-	-	-	46	1	47	-	-	-	92	2	94
	Jet Airliner	B-757	B-757-200-RR	-	-	-	6	-	6	-	-	-	6	-	6	-	-	-	12	-	12
	4-eng Prop	C-130	C-130H&N&P	-	-	-	12	-	12	-	-	-	12	-	12	-	-	-	24	-	24
	2-eng Prop	C-12		-	-	-	48	1	49	-	-	-	48	1	49	-	-	-	96	2	98
	1-eng Prop	T-41		-	-	-	13	-	13	-	-	-	13	-	13	-	-	-	26	-	26
		T-6		-	-	-	17	3	20	-	-	-	17	3	20	-	-	-	34	6	40
	Helicopter	H-60	UH-60A	-	-	-	48	3	51	-	-	-	48	3	51	-	-	-	96	6	102
Based Totals				2870	0	2870	2480	20	2500	2366	3	2369	4337	30	4367	11830	58	11888	23883	111	23994
Transient Totals				876	10	886	248	10	258	4	0	4	1121	20	1140	7107	11	7118	9356	51	9406
Grand Totals				**3746**	**10**	**3756**	**2728**	**30**	**2758**	**2370**	**3**	**2373**	**5458**	**50**	**5507**	**18937**	**69**	**19006**	**33239**	**161**	**33400**

Notes:

1) Each circuit counted as two operations

2) Actual A/B departure and overhead arrival percentages are 1% and 10%, respectively. Operations shown are rounded to a non-zero integer. Noise modeling will use the exact percentage.

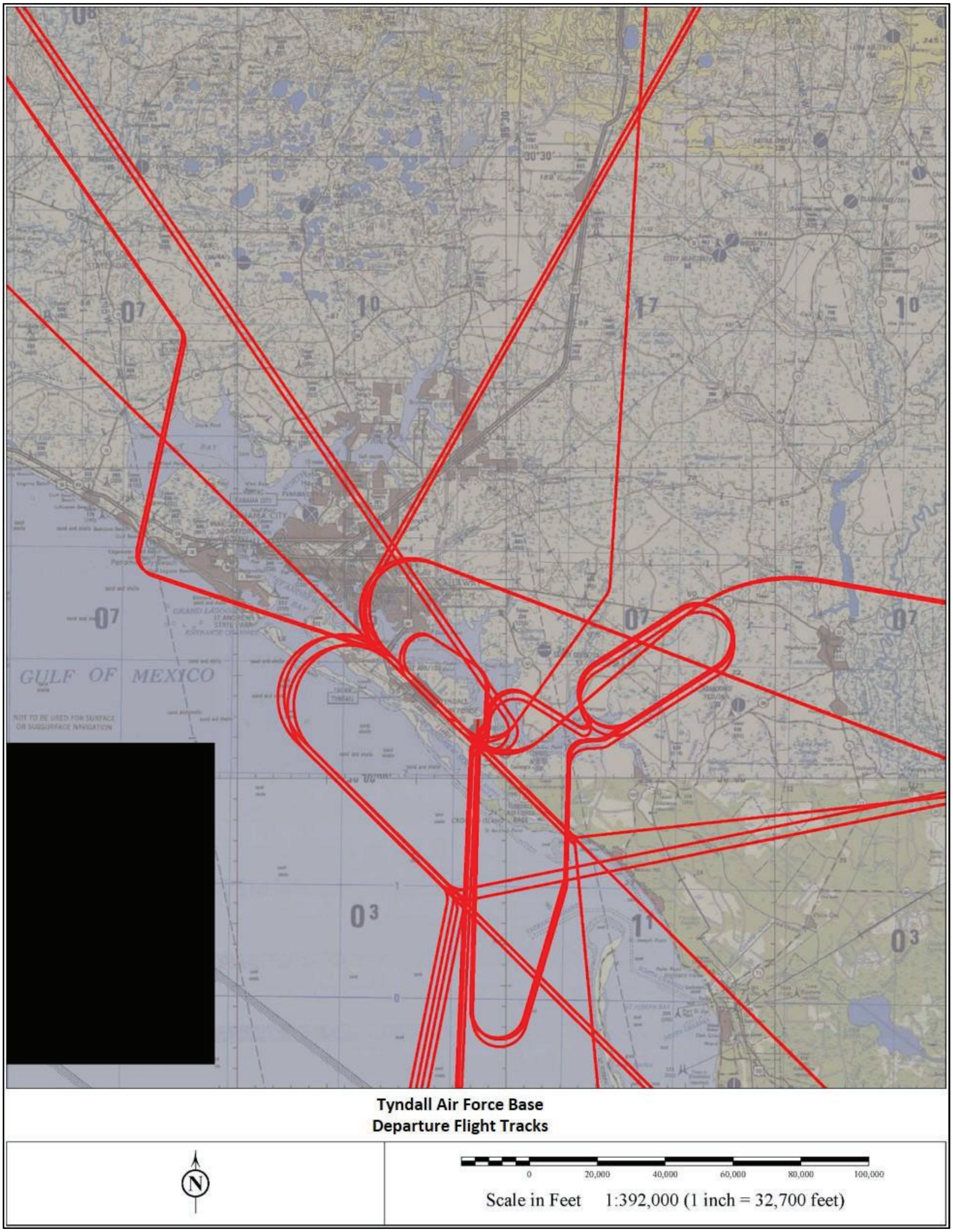
3) ADAIR operations apply only to the Proposed Action in scenarios to be modeled as F-18 E/F, F-16C, or F-16A for High , Medium , and Low Noise Category C Proposed Action Scenarios, respectively.

B.2.2 Runway and Flight Track Use

This section describes the flight tracks used by the aircraft operating out of Tyndall AFB as well as the runway utilization. For the purposes of this analysis, operations are based on pre-hurricane conditions. Utilization percentages are provided for each runway in **Table B-7**. Flight track maps for all aircraft are presented on **Figure B-13** (departures), **Figure B-14** (arrivals), and **Figure B-15** (closed patterns). Closed pattern flight track represent aircraft patterns that depart and arrive on the same runway. Example flight profiles that use closed pattern flight tracks are simulated flame out and visual flight rules pattern profiles.

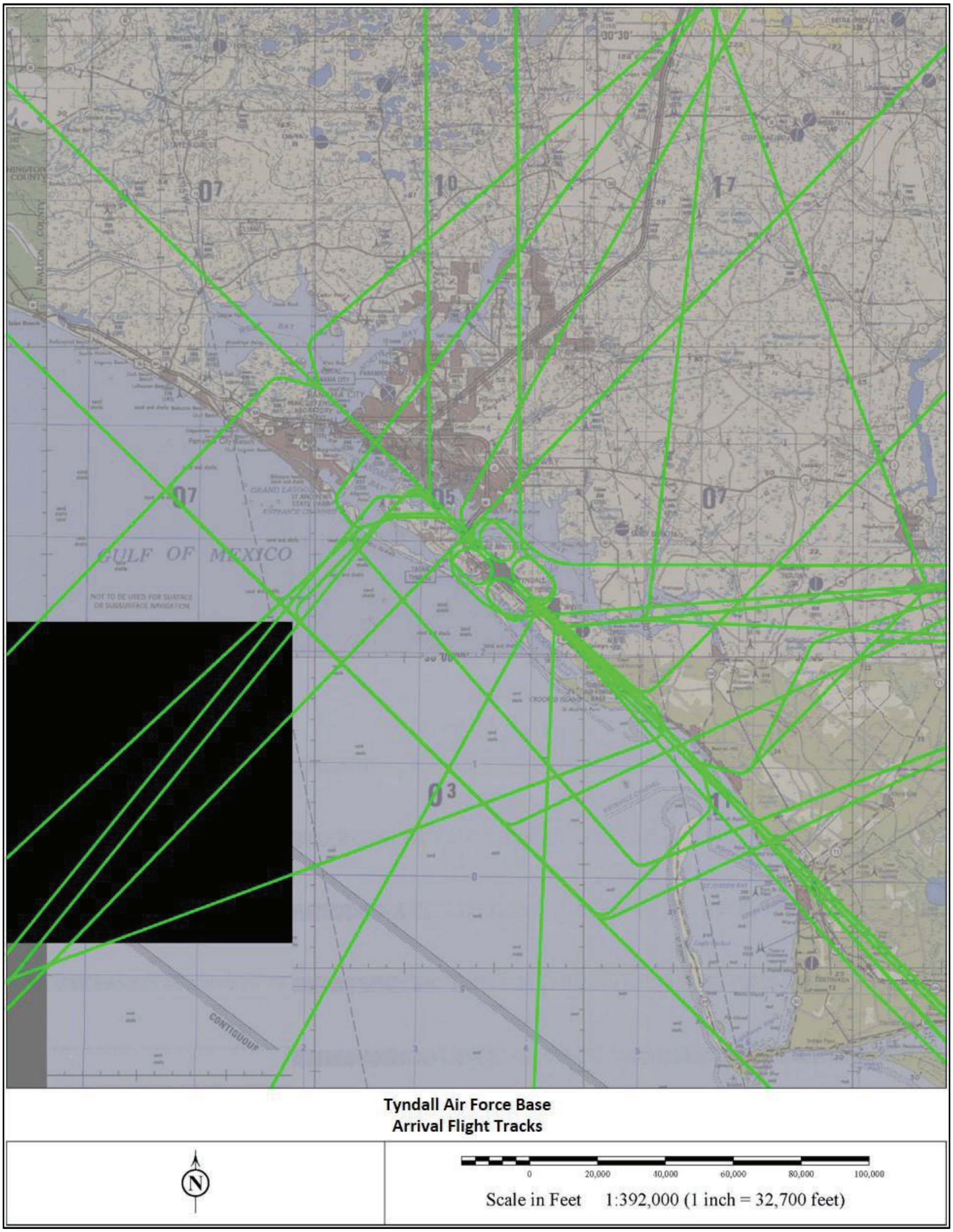
Table B-7
Runway Usage for Based Aircraft at Tyndall Air Force Base

Operation Type	Runway Direction	%	L/R	Based					Transient		Based			
											DF-16/QF-16 53 WEG			
				T-38A 2 FTS	F-22 95 FS	F22 43FS	E-9 53 WEG	MU-2 337 ACS	F-35A	Other	Runway Direction	%	L/R	%
Arrival	14	43%	14L	91%	84%	90%	68%	46%	100%	100%	14	25%	14L	41%
			14R	9%	16%	10%	32%	54%	-	-			14R	59%
	32	57%	32L	9%	16%	10%	33%	54%	-	-	32	33%	32L	60%
			32R	91%	84%	90%	67%	46%	100%	100%			32R	40%
	1	-	-	-	-	-	-	-	-	-	1	42%	-	-
Closed Pattern	14	43%	14L	91%	80%	80%	-	100%	80%	100%	14	17%	14L	38%
			14R	9%	20%	20%	-	-	20%	-			14R	62%
	32	57%	32L	9%	20%	20%	-	-	20%	-	32	23%	32L	62%
			32R	91%	80%	80%	-	100%	80%	100%			32R	38%
	1	-	-	-	-	-	-	-	-	-	1	60%	-	-
Departure	14	43%	14L	98%	30%	30%	60%	10%	-	-	14	25%	14L	10%
			14R	2%	70%	70%	40%	90%	100%	100%			14R	90%
	32	57%	32L	2%	70%	70%	39%	90%	100%	100%	32	33%	32L	90%
			32R	98%	30%	30%	61%	10%	-	-			32R	10%
	19	-	-	-	-	-	-	-	-	-	19	42%	-	-



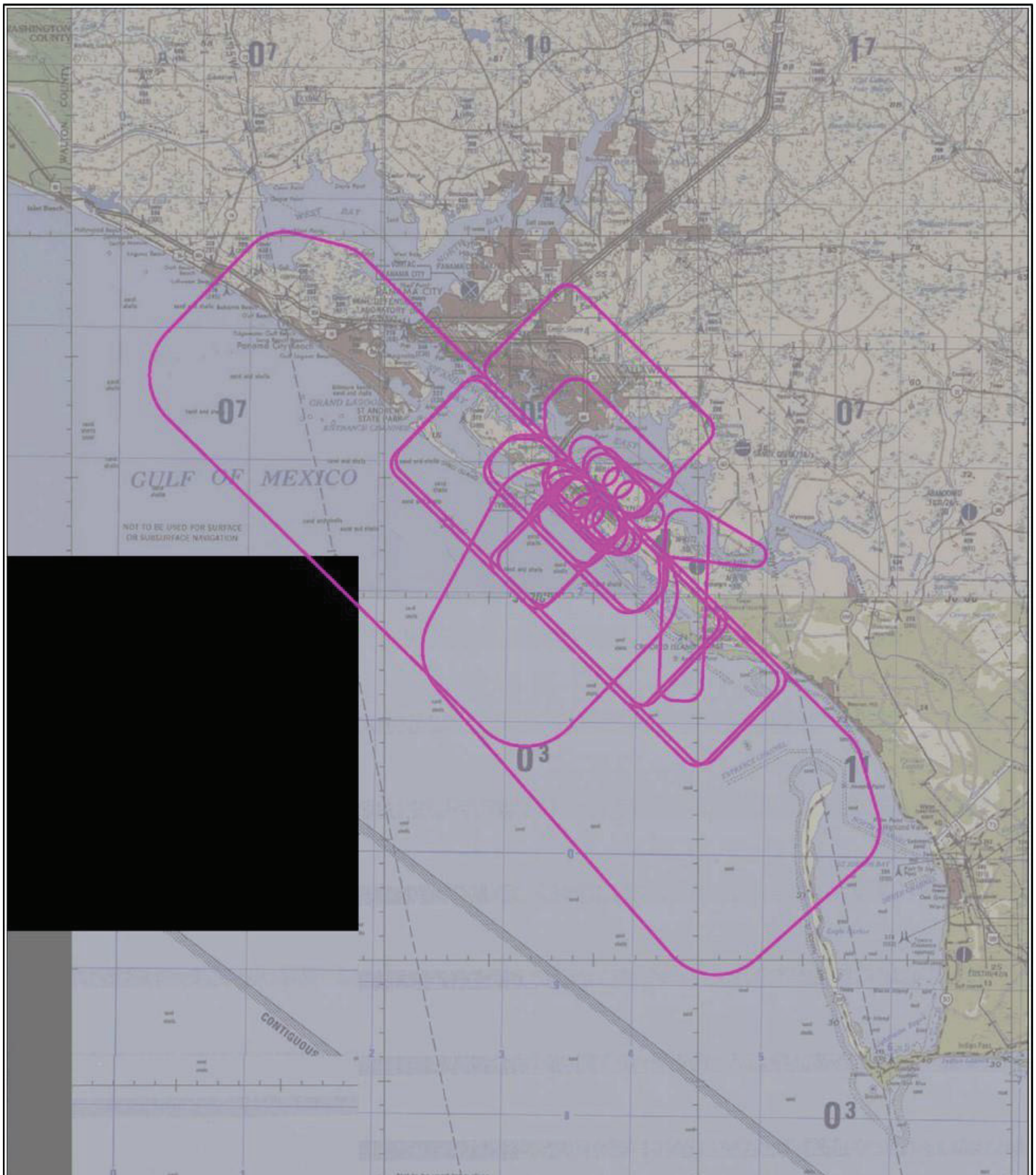
Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Figure B-13. Departure Flight Tracks at Tyndall Air Force Base.

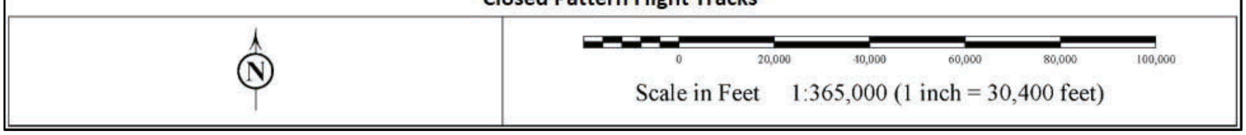


Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Figure B-14. Arrival Flight Tracks at Tyndall Air Force Base.



Tyndall Air Force Base
Closed Pattern Flight Tracks



Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Figure B-15. Closed Pattern Flight Tracks at Tyndall Air Force Base.

B.2.3 Flight Profiles and Aircraft

The ADAIR program would locate contractor aircraft at Tyndall AFB with the appropriate capabilities to provide contracted ADAIR support for Eglin AFB.. The Air Force identified three categories of aircraft with differing capabilities (A, B, and C) on the contract. Tyndall AFB is designated a Category C location. To fulfill the requirements of a category a contractor could provide a variety of aircraft with the appropriate specifications. Because the type of aircraft for contract ADAIR are not known at this time, representative noise surrogates were selected for the lowest through highest potential noise emission scenarios for the aircraft that contractors may select to provide for each of the categories. To model a given noise scenario for a certain category, all contract ADAIR flight operations were assigned to the surrogate. All three scenarios for Category C were modeled separately in the final analysis for Tyndall AFB. The surrogates for Category C are presented in **Table B-8.**

Table B-8
Aircraft Scenarios

Category	High Noise Scenario	Medium Noise Scenario	Low Noise Scenario
C	Eurofighter Typhoon (F-18E/F surrogate)	Dassault Mirage (F-16C F100-PW-220 Engine surrogate)	JAS 39 Gripen (F-16A F100-PW-100 Engine surrogate)

This section details the representative profiles for the aircraft with the most operations that were based at Tyndall AFB prior to the hurricane. This includes the F-22A aircraft of the 95 and 42 FSs and the T-38As of the 2 FTS. Also included are the representative profiles for the proposed contract ADAIR aircraft for Category C. The Category C aircraft are modeled as the F-16A with a F100-PW-100 engine for the Low Noise Scenario, the F-16C with the F100-PW-220 engine for the Medium Noise Scenario, and the F-18E/F for the High Noise Scenario. Because it is unknown which aircraft type or combination thereof that the contractor would bring to Tyndall AFB, each scenario is modeled separately as if it were the only aircraft in the contract ADAIR inventory.

Representative profiles provide the speed and power setting of each type of aircraft as a function of distance along the flight track for the representative maneuvers. For modeling purposes, the appropriate profile is used for all flight tracks that conform to that maneuver type. For example, all overhead break arrival tracks utilize the representative profile for modeling that maneuver.

The operations tables (**Tables B-5** and **B-6**) can be used with the runway usage table (**Table B-7**) to understand the distribution of the following representative profiles that will be modeled on tracks associated with each runway.

B.2.3.1 Based Aircraft Representative Flight Profiles

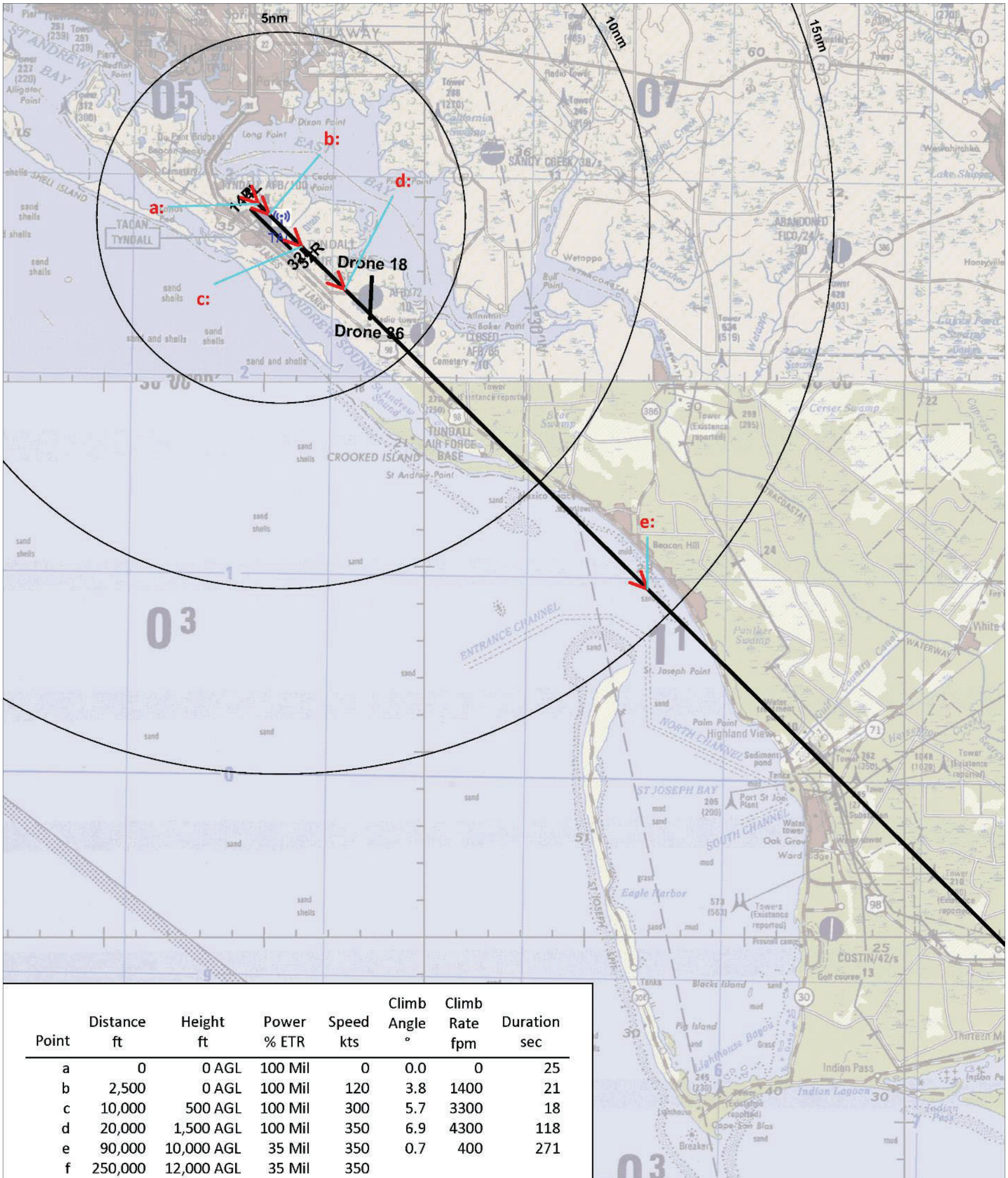
7.1.1.1.1.1.1 Flight Profiles for 95th and 43d Fighter Squadrons' F-22As

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	150 Max A/B	0	0.0	0	16
b	2,000	0 AGL	150 A/B Est	150	2.9	1100	11
c	6,000	200 AGL	150 A/B Est	300	13.0	8600	16
d	16,000	2,500 AGL	150 Mil	440	18.2	13200	66
e	60,000	17,000 AGL	35 Min	350	0.0	0	237
f	200,000	17,000 AGL	35 Min	350			

Flight Profile 2dF22_4L470AB
AICUZ departure to 470 Afterburner

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:186,000 (1 inch = 15,500 feet)

N



Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Mil	0	0.0	0	25
b	2,500	0 AGL	100 Mil	120	3.8	1400	21
c	10,000	500 AGL	100 Mil	300	5.7	3300	18
d	20,000	1,500 AGL	100 Mil	350	6.9	4300	118
e	90,000	10,000 AGL	35 Mil	350	0.7	400	271
f	250,000	12,000 AGL	35 Mil	350			

Flight Profile 2dF22_4L470Mil
AICUZ departure to 470 Mil Power

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000

Scale in Feet 1:233,000 (1 inch = 19,400 feet)

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	299,999	17,000 AGL	33 Approach	300	-4.1	-2200	415
b	90,000	2,100 AGL	33 Approach	300	0.0	0	77
c	51,000	2,100 AGL	30 Approach	300	-2.1	-1100	27
d	37,133	1,600 AGL	27 Approach	300	0.0	0	27
e	24,566	1,600 AGL	27 Approach	250	0.0	0	17
f	18,566	1,600 AGL	27 Approach	180	-5.9	-1700	46
g	6,000	300 AGL	26.8 Approach	145	-2.4	-600	25
h	0	50 AGL	26.8 Approach	145			

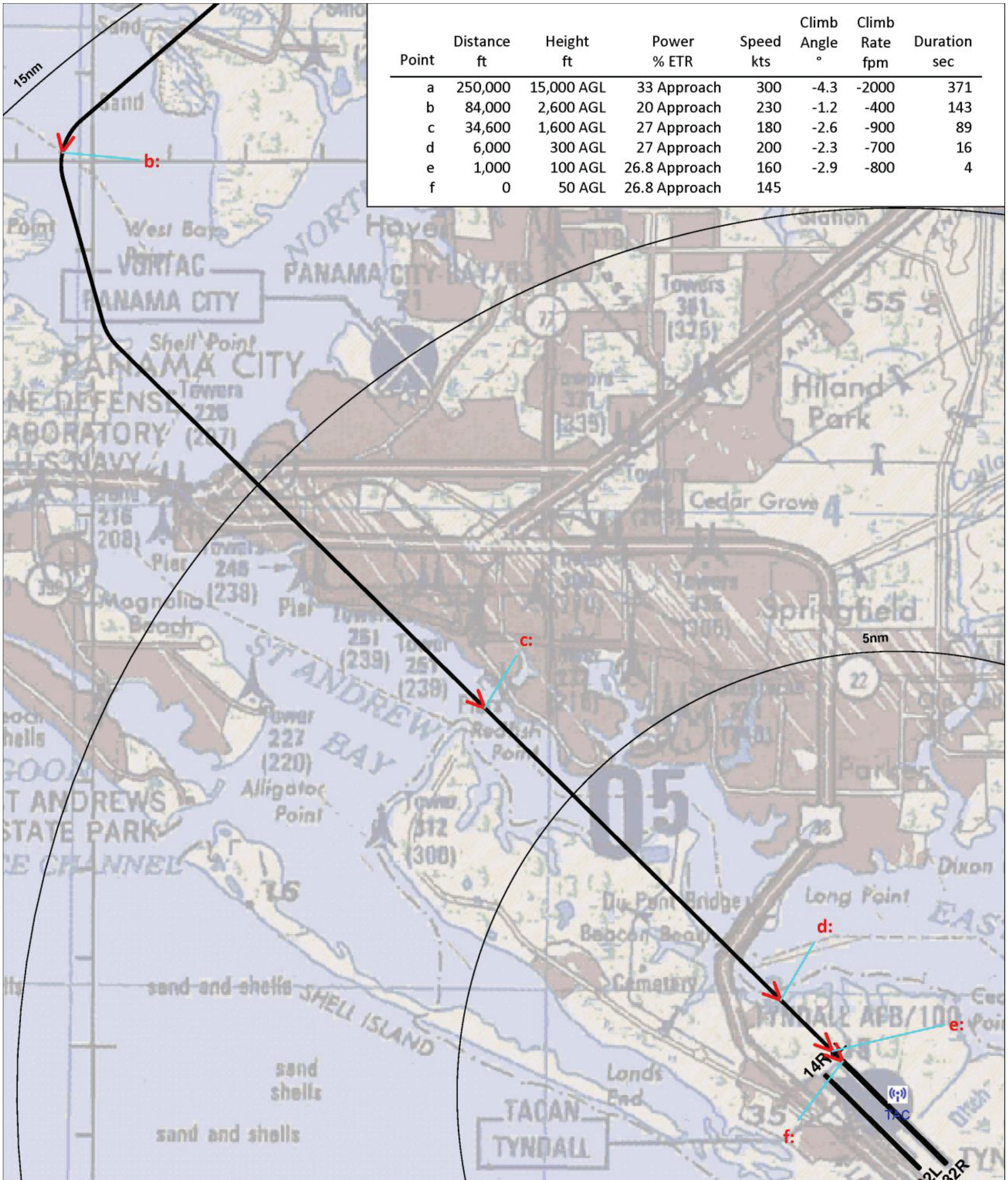
Flight Profile 2dF22_2ROH470
AICUZ Overhead from 470

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:80,200 (1 inch = 6,690 feet)

N

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	33 Approach	300	-4.3	-2000	371
b	84,000	2,600 AGL	20 Approach	230	-1.2	-400	143
c	34,600	1,600 AGL	27 Approach	180	-2.6	-900	89
d	6,000	300 AGL	27 Approach	200	-2.3	-700	16
e	1,000	100 AGL	26.8 Approach	160	-2.9	-800	4
f	0	50 AGL	26.8 Approach	145			

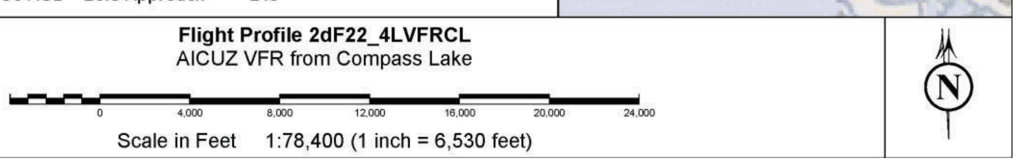


Flight Profile 2dF22_4LILSCL
AICUZ ILS from Compass Lake

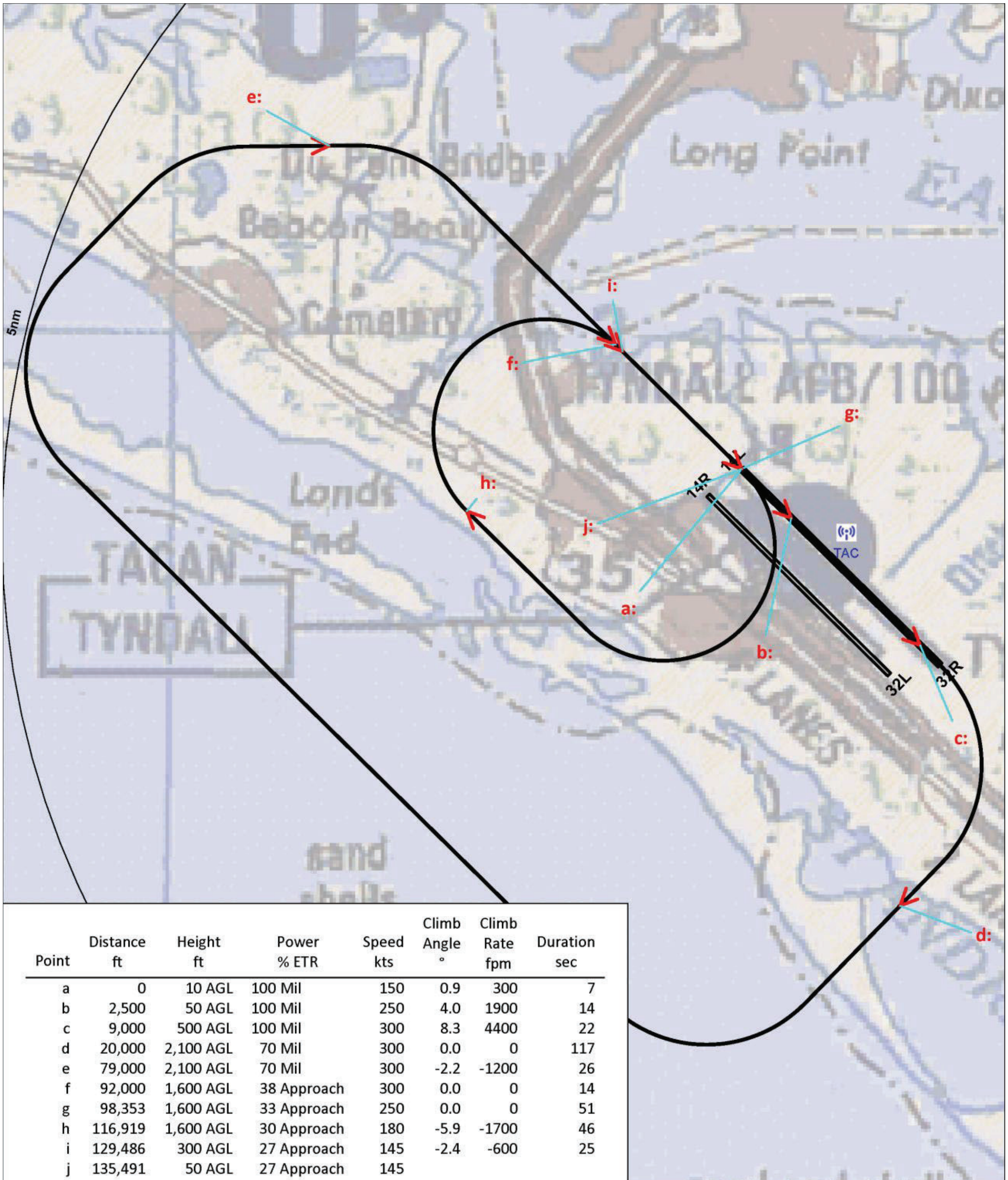
Scale in Feet 1:97,600 (1 inch = 8,130 feet)

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	33 Approach	300	-4.3	-2000	371
b	84,000	2,600 AGL	20 Approach	230	-1.4	-500	120
c	42,312	1,600 AGL	27 Approach	180	0.0	0	48
d	27,750	1,600 AGL	27 Approach	180	-3.4	-1200	68
e	6,000	300 AGL	27 Approach	200	-2.3	-700	16
f	1,000	100 AGL	26.8 Approach	160	-2.9	-800	4
g	0	50 AGL	26.8 Approach	145			

Flight Profile 2dF22_4LVFRCL
AICUZ VFR from Compass Lake



Scale in Feet 1:78,400 (1 inch = 6,530 feet)



Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	10 AGL	100 Mil	150	0.9	300	7
b	2,500	50 AGL	100 Mil	250	4.0	1900	14
c	9,000	500 AGL	100 Mil	300	8.3	4400	22
d	20,000	2,100 AGL	70 Mil	300	0.0	0	117
e	79,000	2,100 AGL	70 Mil	300	-2.2	-1200	26
f	92,000	1,600 AGL	38 Approach	300	0.0	0	14
g	98,353	1,600 AGL	33 Approach	250	0.0	0	51
h	116,919	1,600 AGL	30 Approach	180	-5.9	-1700	46
i	129,486	300 AGL	27 Approach	145	-2.4	-600	25
j	135,491	50 AGL	27 Approach	145			

Flight Profile 2dF22_4LClosedOHSW
AICUZ Closed with Overhead

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:50,900 (1 inch = 4,240 feet)

N

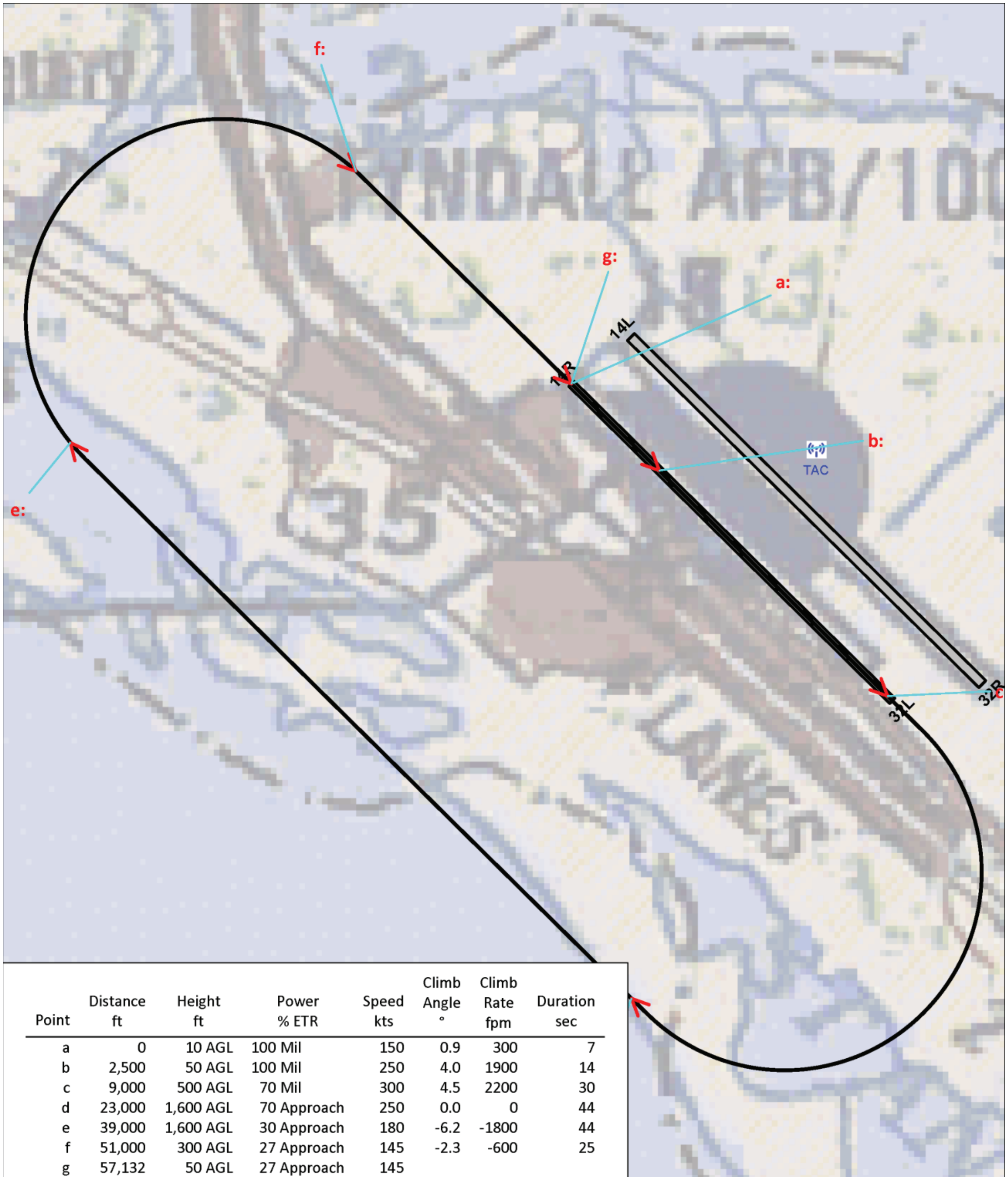
Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	10 AGL	100 Mil	150	0.9	300	7
b	2,500	50 AGL	100 Mil	250	4.0	1800	15
c	9,000	500 AGL	100 Mil	250	3.9	1700	73
d	40,000	2,600 AGL	70 Mil	250	0.0	0	148
e	100,000	2,600 AGL	38 Approach	230	-2.2	-700	92
f	129,133	1,500 AGL	33 Approach	145	-2.3	-600	123
g	159,133	300 AGL	27 Approach	145	-2.4	-600	25
h	165,133	50 AGL	26.8 Approach	145			

Flight Profile 2dF22_4LGCA
AICUZ GCA Box

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:85,300 (1 inch = 7,110 feet)

N

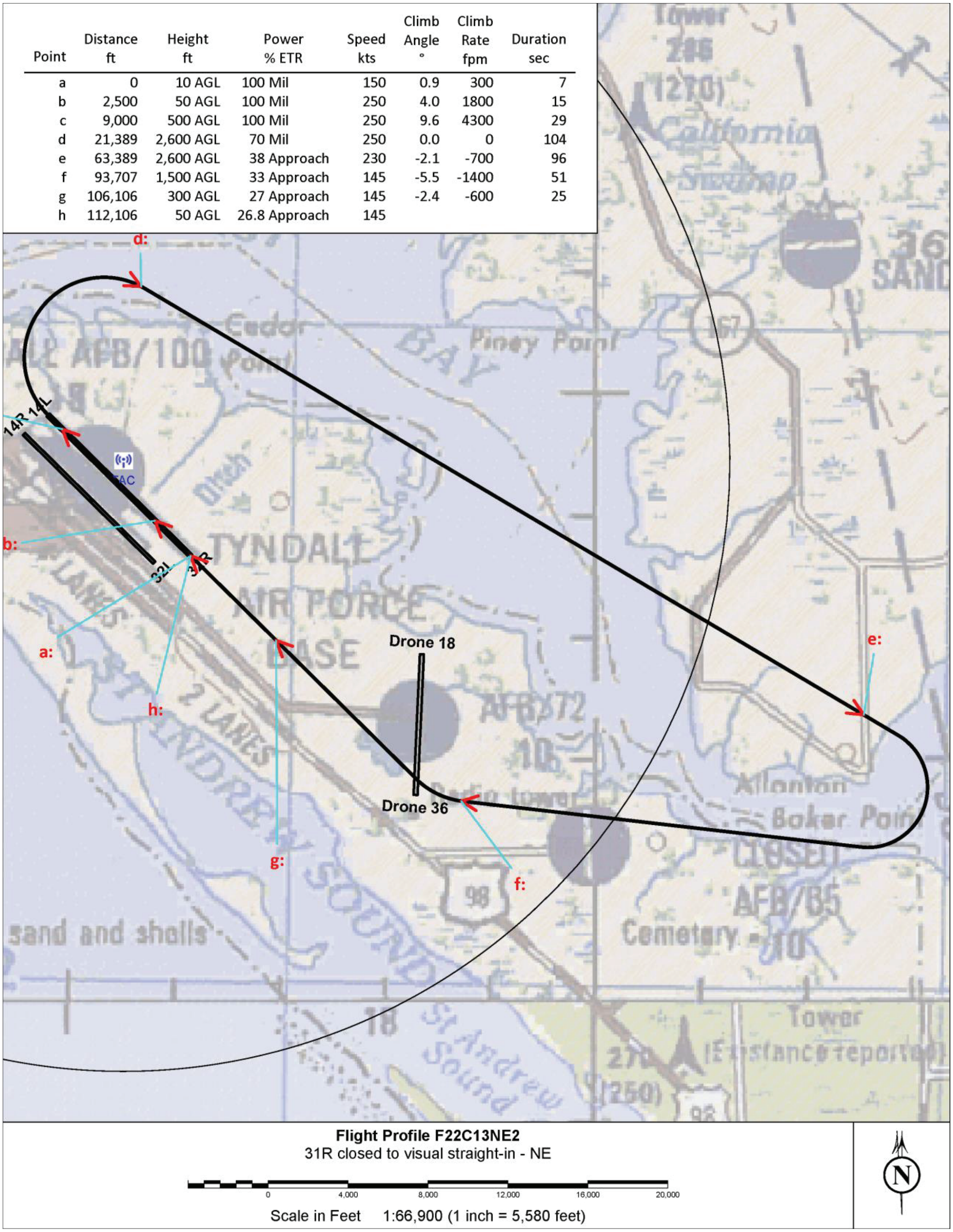


Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	10 AGL	100 Mil	150	0.9	300	7
b	2,500	50 AGL	100 Mil	250	4.0	1900	14
c	9,000	500 AGL	70 Mil	300	4.5	2200	30
d	23,000	1,600 AGL	70 Approach	250	0.0	0	44
e	39,000	1,600 AGL	30 Approach	180	-6.2	-1800	44
f	51,000	300 AGL	27 Approach	145	-2.3	-600	25
g	57,132	50 AGL	27 Approach	145			

Flight Profile 2dF22_4RVFR
AICUZ VFR Pattern

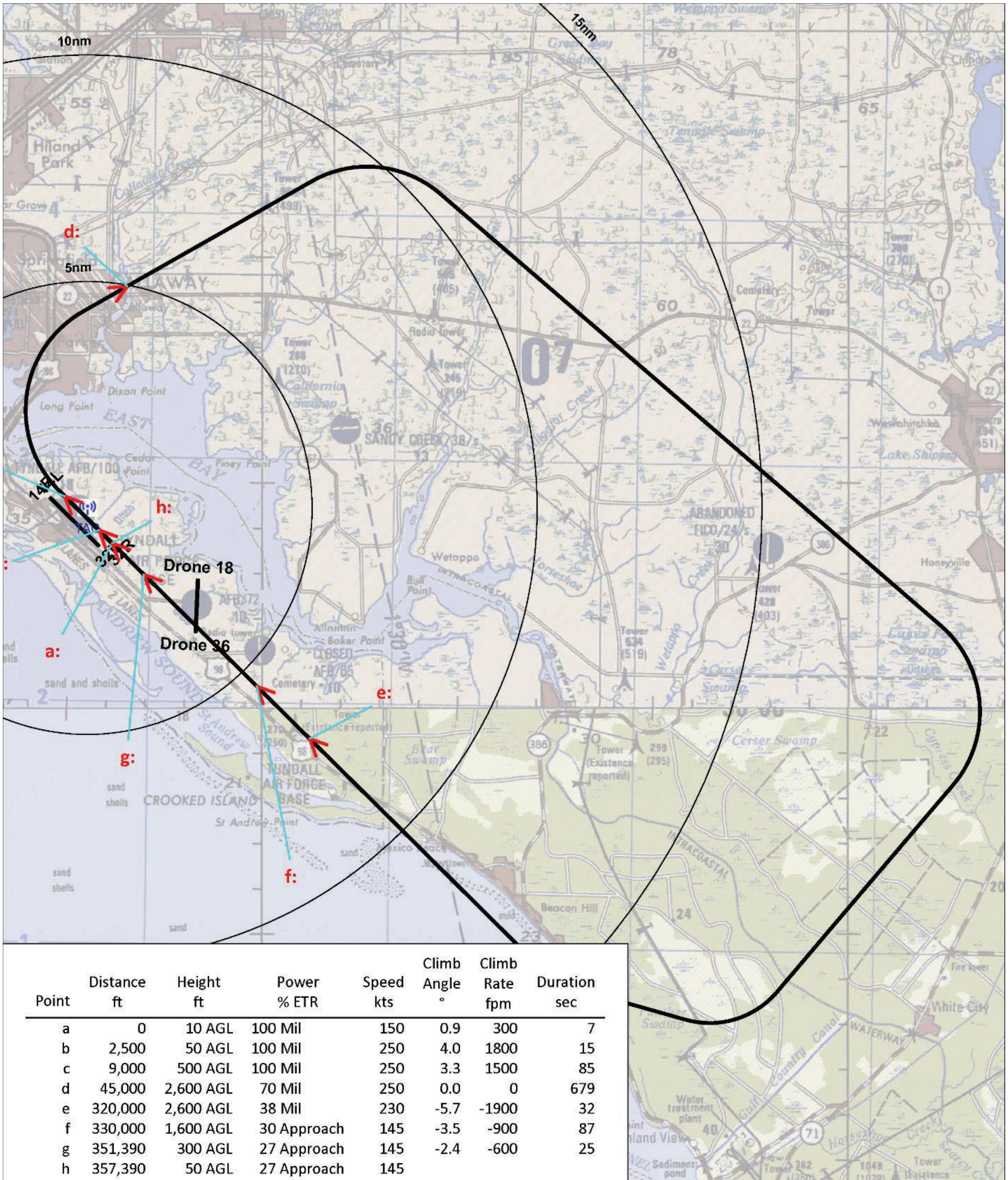
Scale in Feet 1:28,700 (1 inch = 2,390 feet)

Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	10 AGL	100 Mil	150	0.9	300	7
b	2,500	50 AGL	100 Mil	250	4.0	1800	15
c	9,000	500 AGL	100 Mil	250	9.6	4300	29
d	21,389	2,600 AGL	70 Mil	250	0.0	0	104
e	63,389	2,600 AGL	38 Approach	230	-2.1	-700	96
f	93,707	1,500 AGL	33 Approach	145	-5.5	-1400	51
g	106,106	300 AGL	27 Approach	145	-2.4	-600	25
h	112,106	50 AGL	26.8 Approach	145			



Flight Profile F22C13NE2
31R closed to visual straight-in - NE

Scale in Feet 1:66,900 (1 inch = 5,580 feet)



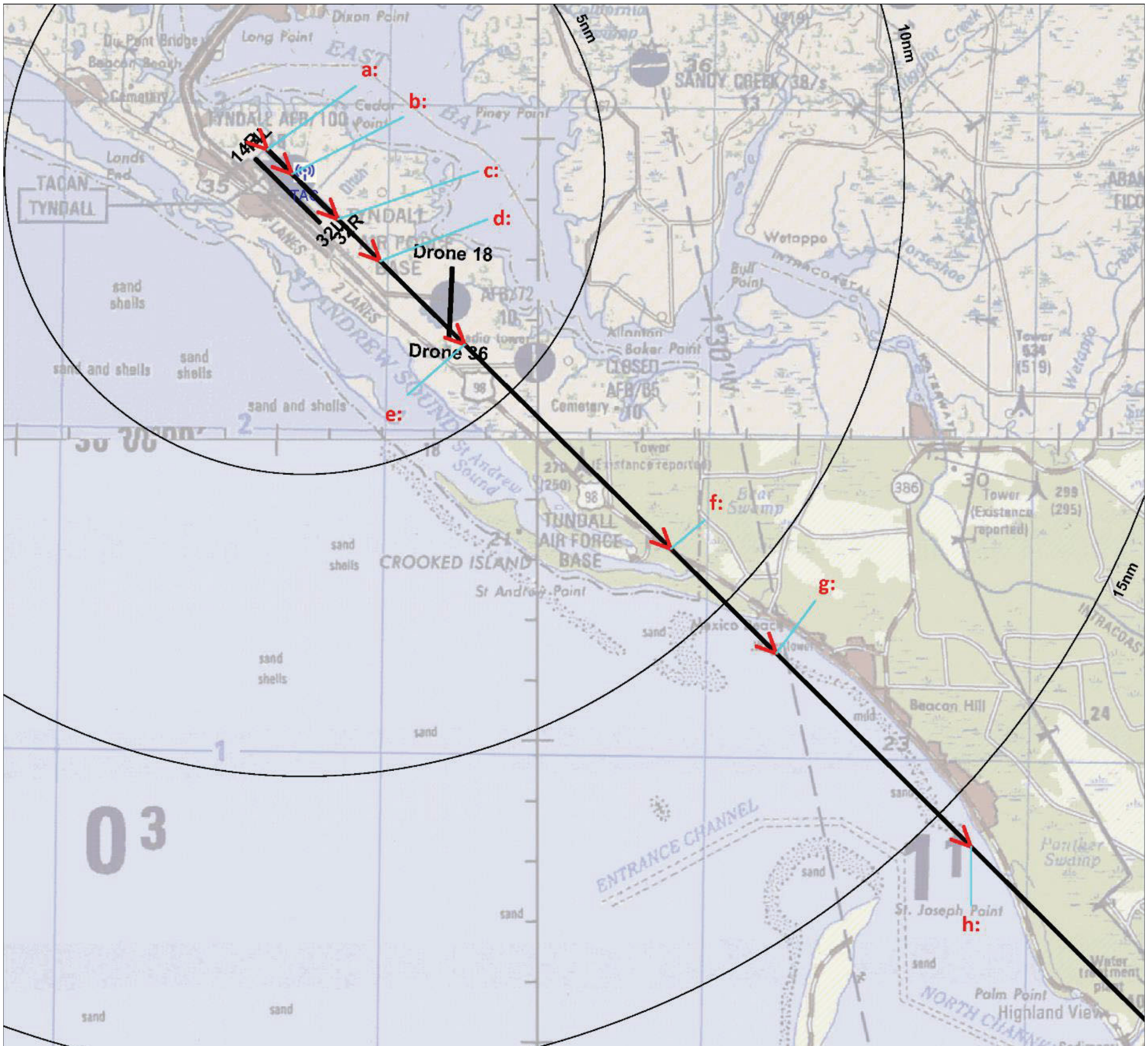
Point	Distance ft	Height ft	Power % ETR	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	10 AGL	100 Mil	150	0.9	300	7
b	2,500	50 AGL	100 Mil	250	4.0	1800	15
c	9,000	500 AGL	100 Mil	250	3.3	1500	85
d	45,000	2,600 AGL	70 Mil	250	0.0	0	679
e	320,000	2,600 AGL	38 Mil	230	-5.7	-1900	32
f	330,000	1,600 AGL	30 Approach	145	-3.5	-900	87
g	351,390	300 AGL	27 Approach	145	-2.4	-600	25
h	357,390	50 AGL	27 Approach	145			

Flight Profile F22C14NE2
31R (1RC1) radar - NE

0 10,000 20,000 30,000 40,000 50,000 60,000
Scale in Feet 1:191,000 (1 inch = 15,900 feet)

N

7.1.1.1.1.1.2 Flight Profiles for 2d FTS T-38-As



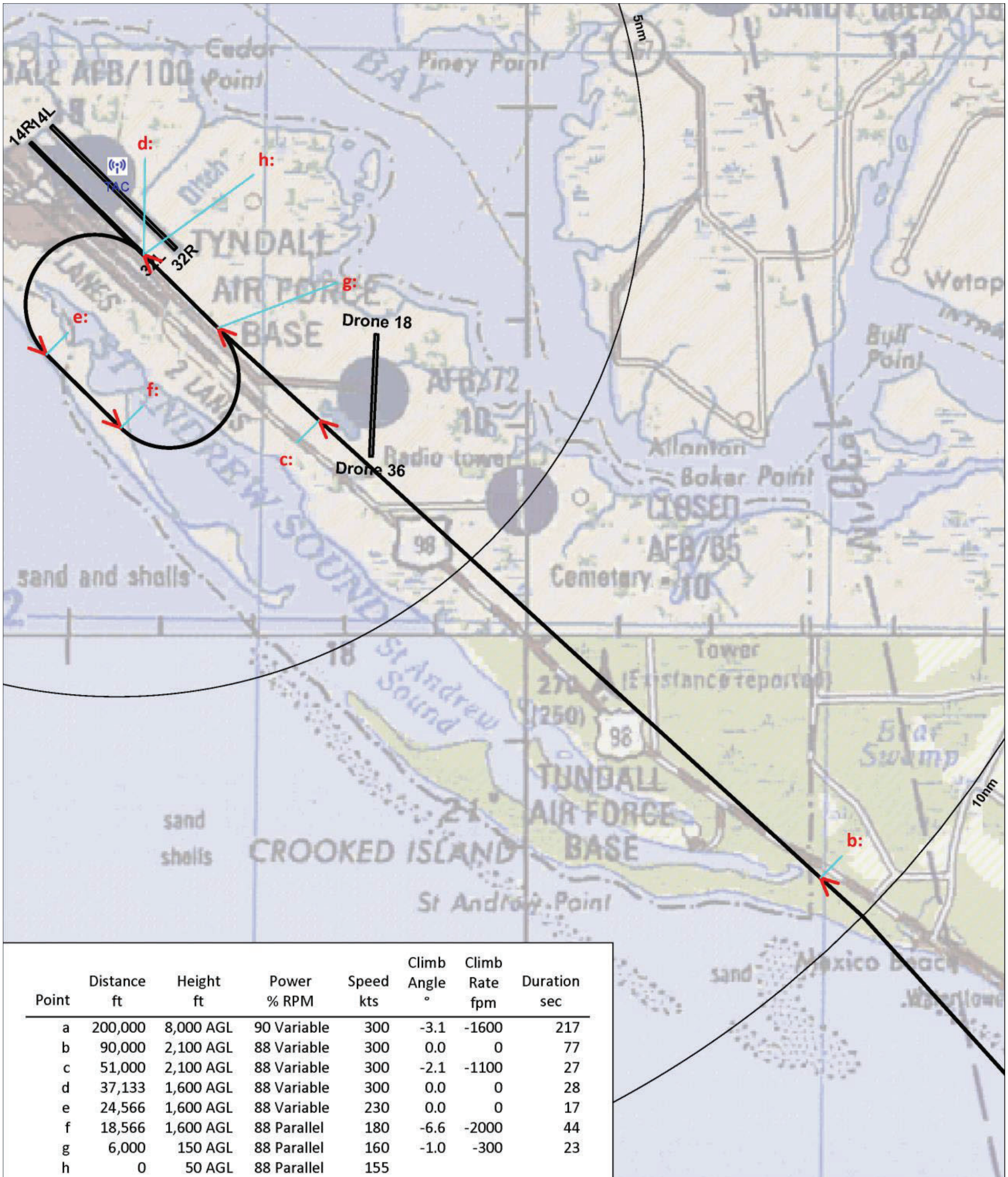
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Max A/B	0	0.0	0	26
b	3,500	0 AGL	100 Afterburner	160	5.7	2100	19
c	10,000	650 AGL	100 Variable	250	8.1	3900	13
d	16,000	1,500 AGL	100 Variable	300	7.1	3800	24
e	28,000	3,000 AGL	100 Variable	300	7.8	4100	58
f	57,300	7,000 AGL	100 Variable	300	7.6	4100	30
g	72,300	9,000 AGL	100 Variable	300	8.2	4400	55
h	100,000	13,000 AGL	100 Variable	300	4.0	2100	197
i	200,000	20,000 AGL	96 Variable	300			

Flight Profile T38_4L470AB
AICUZ departure to 470 Afterburner

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:163,000 (1 inch = 13,600 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	8,000 AGL	90 Variable	300	-3.1	-1600	217
b	90,000	2,100 AGL	88 Variable	300	0.0	0	77
c	51,000	2,100 AGL	88 Variable	300	-2.1	-1100	27
d	37,133	1,600 AGL	88 Variable	300	0.0	0	28
e	24,566	1,600 AGL	88 Variable	230	0.0	0	17
f	18,566	1,600 AGL	88 Parallel	180	-6.6	-2000	44
g	6,000	150 AGL	88 Parallel	160	-1.0	-300	23
h	0	50 AGL	88 Parallel	155			

Flight Profile T38_2LOH470
AICUZ Overhead from 470

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:81,400 (1 inch = 6,790 feet)

N

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	8,000 AGL	90 Variable	250	-2.7	-1200	274
b	86,900	2,600 AGL	88 Variable	240	-1.1	-400	155
c	34,600	1,600 AGL	88 Parallel	160	-2.6	-700	106
d	6,000	300 AGL	92 Parallel	160	-2.4	-700	23
e	0	50 AGL	88 Parallel	155			

Flight Profile T38_4LILS151
AICUZ ILS from 151

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:117,000 (1 inch = 9,790 feet)

N

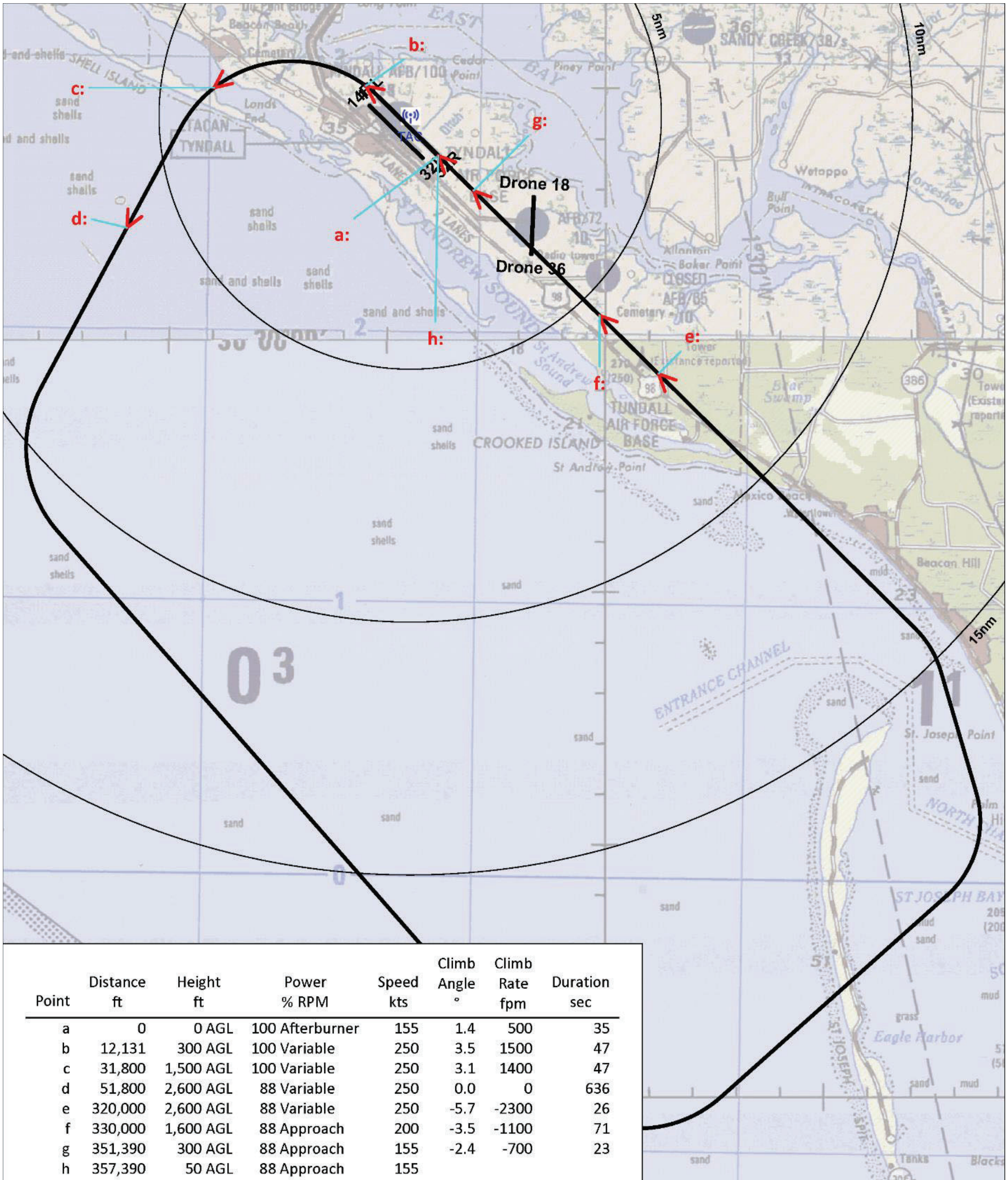
Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	200,000	8,000 AGL	90 Variable	250	-2.2	-1000	337
b	60,760	2,600 AGL	88 Variable	240	-4.0	-1400	43
c	46,350	1,600 AGL	92 Parallel	160	0.0	0	74
d	26,300	1,600 AGL	92 Parallel	160	-3.4	-900	99
e	0	50 AGL	88 Parallel	155			

Flight Profile T38_4LVFR470
AICUZ VFR from 470

Scale in Feet 1:95,800 (1 inch = 7,980 feet)

Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.



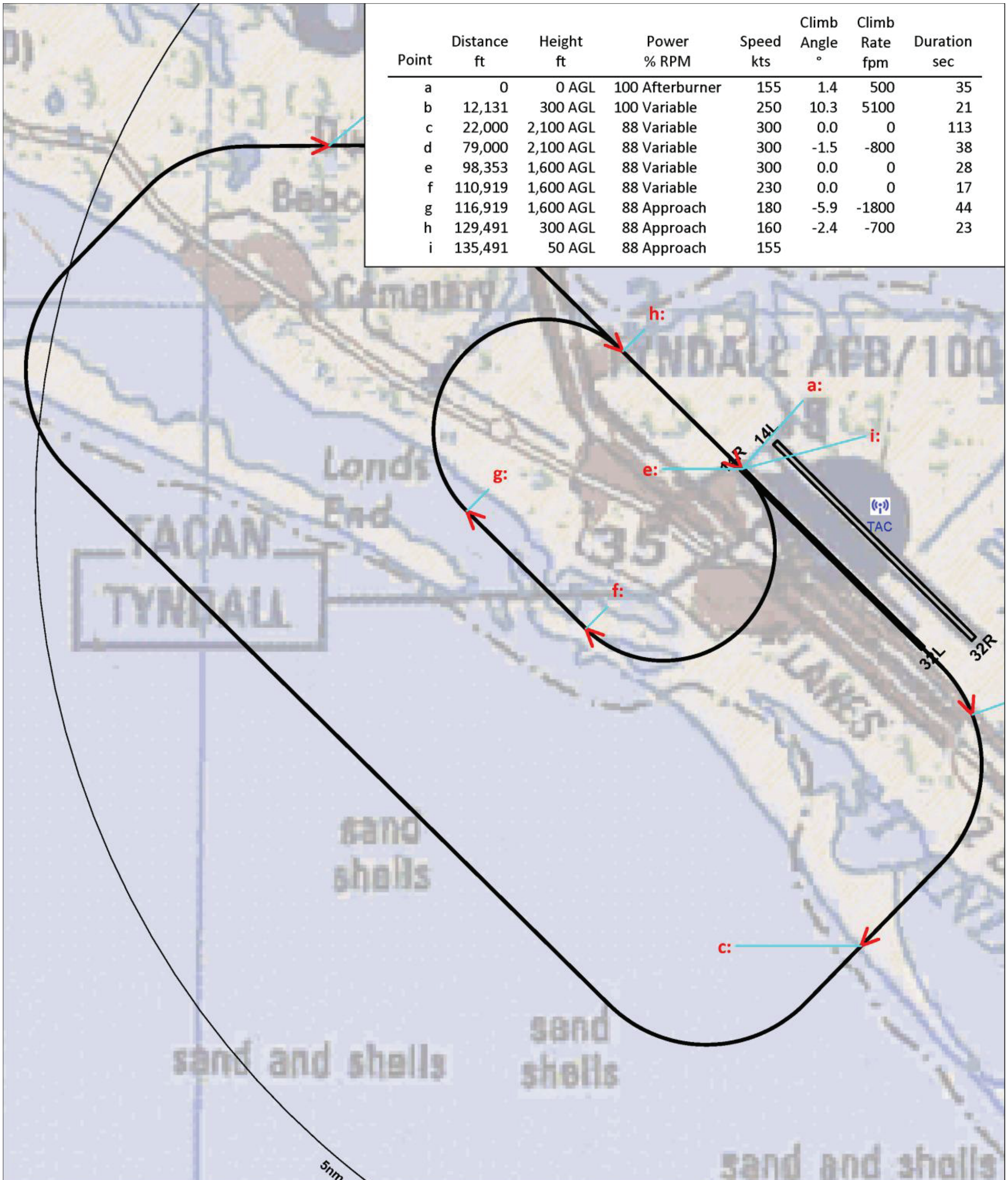
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Afterburner	155	1.4	500	35
b	12,131	300 AGL	100 Variable	250	3.5	1500	47
c	31,800	1,500 AGL	100 Variable	250	3.1	1400	47
d	51,800	2,600 AGL	88 Variable	250	0.0	0	636
e	320,000	2,600 AGL	88 Variable	250	-5.7	-2300	26
f	330,000	1,600 AGL	88 Approach	200	-3.5	-1100	71
g	351,390	300 AGL	88 Approach	155	-2.4	-700	23
h	357,390	50 AGL	88 Approach	155			

Flight Profile T38_2RRAD
AICUZ Radar Pattern

0 10,000 20,000 30,000 40,000 50,000

Scale in Feet 1:171,000 (1 inch = 14,200 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Afterburner	155	1.4	500	35
b	12,131	300 AGL	100 Variable	250	10.3	5100	21
c	22,000	2,100 AGL	88 Variable	300	0.0	0	113
d	79,000	2,100 AGL	88 Variable	300	-1.5	-800	38
e	98,353	1,600 AGL	88 Variable	300	0.0	0	28
f	110,919	1,600 AGL	88 Variable	230	0.0	0	17
g	116,919	1,600 AGL	88 Approach	180	-5.9	-1800	44
h	129,491	300 AGL	88 Approach	160	-2.4	-700	23
i	135,491	50 AGL	88 Approach	155			

Flight Profile T38_4RClosedOH
AICUZ Closed with Overhead

Scale in Feet 1:50,900 (1 inch = 4,240 feet)

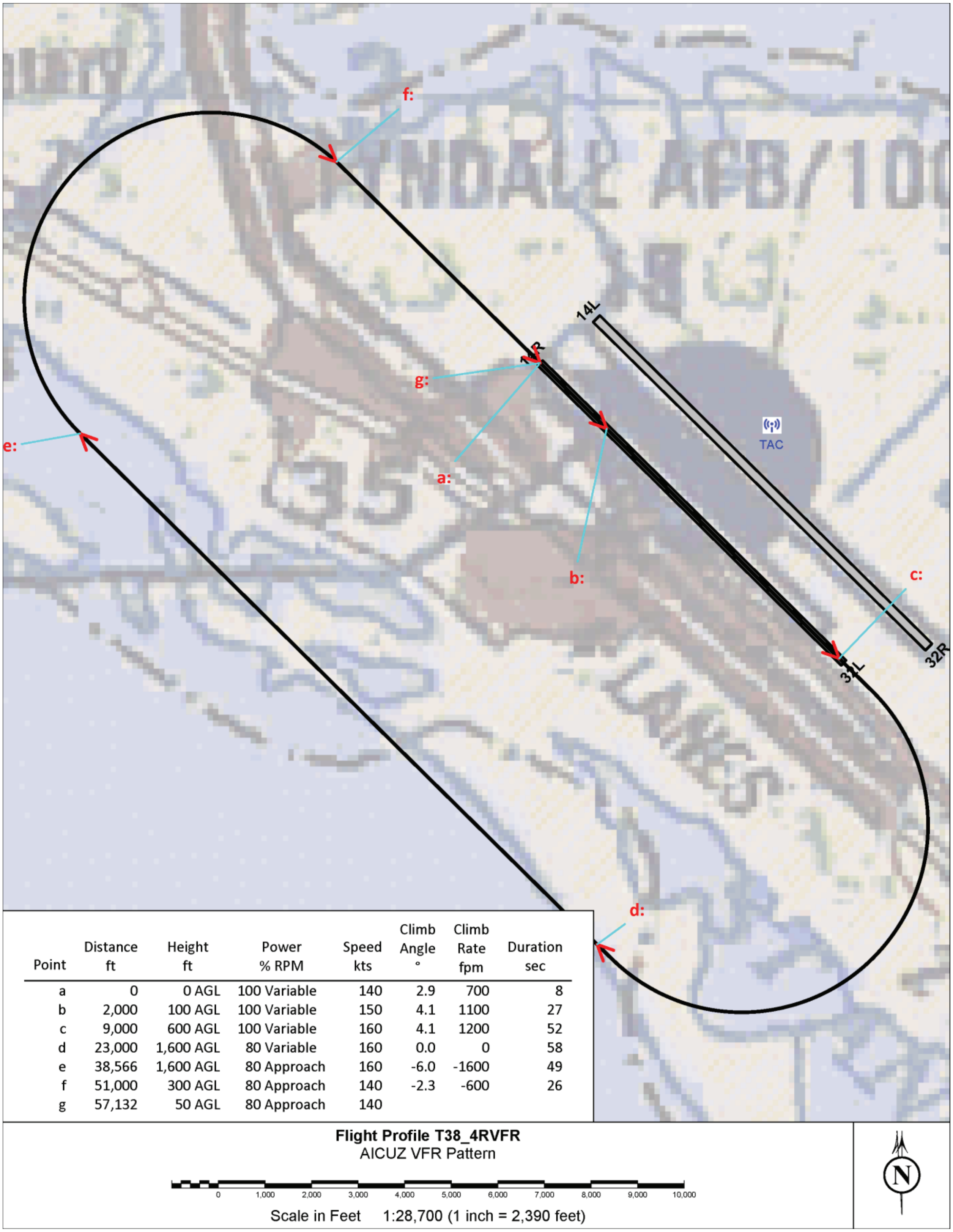
Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Afterburner	155	1.4	500	35
b	12,131	300 AGL	100 Variable	250	6.9	3100	23
c	22,000	1,500 AGL	100 Variable	250	3.5	1500	43
d	40,000	2,600 AGL	88 Variable	250	0.0	0	142
e	100,000	2,600 AGL	88 Variable	250	-2.0	-800	77
f	129,133	1,600 AGL	88 Approach	200	-2.5	-800	100
g	159,133	300 AGL	88 Approach	155	-2.4	-700	23
h	165,133	50 AGL	88 Approach	155			

Flight Profile T38_4RGCA
AICUZ GCA Box

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000

Scale in Feet 1:85,300 (1 inch = 7,110 feet)

N



Point	Distance ft	Height ft	Power % RPM	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	100 Variable	140	2.9	700	8
b	2,000	100 AGL	100 Variable	150	4.1	1100	27
c	9,000	600 AGL	100 Variable	160	4.1	1200	52
d	23,000	1,600 AGL	80 Variable	160	0.0	0	58
e	38,566	1,600 AGL	80 Approach	160	-6.0	-1600	49
f	51,000	300 AGL	80 Approach	140	-2.3	-600	26
g	57,132	50 AGL	80 Approach	140			

Flight Profile T38_4RVFR
AICUZ VFR Pattern

Scale in Feet 1:28,700 (1 inch = 2,390 feet)

B.2.3.2 Contract ADAIR Aircraft Representative Flight Profiles

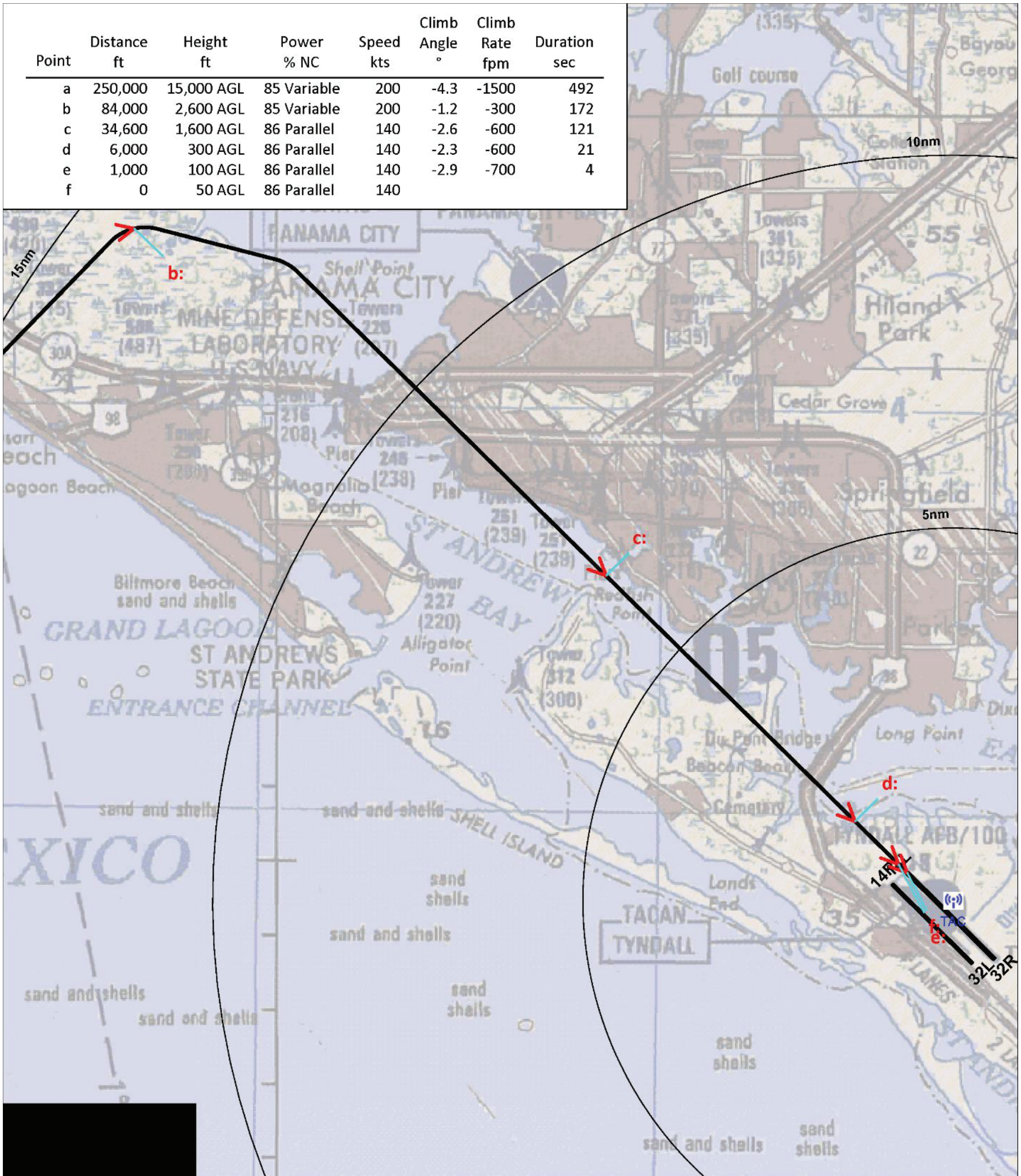
7.1.1.1.1.1.3 Contract ADAIR High Noise Eurofighter Typhoon (F-18E/F Surrogate)

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	88 Variable	0	0.0	0	38
b	4,750	0 AGL	97 Afterburner	150	10.5	3700	7
c	7,000	415 AGL	97 Afterburner	250	10.5	4700	2
d	8,000	600 AGL	97 Variable	250	10.4	5200	26
e	20,000	2,800 AGL	97 Variable	305	11.3	6600	11
f	26,000	4,000 AGL	97 Variable	350	11.3	7100	51
g	56,000	10,000 AGL	97 Variable	350	11.3	7100	59
h	91,000	17,000 AGL	82 Variable	350			

Flight Profile ADHD01
ADAIR High Noise Departure - REPRESENTATIVE
Flight Track: 4LDOYS2 - 14LD OYSTE 2 departure to 470 Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 10,000 20,000 30,000 40,000 50,000
Scale in Feet 1:175,000 (1 inch = 14,600 feet)

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	85 Variable	200	-4.3	-1500	492
b	84,000	2,600 AGL	85 Variable	200	-1.2	-300	172
c	34,600	1,600 AGL	86 Parallel	140	-2.6	-600	121
d	6,000	300 AGL	86 Parallel	140	-2.3	-600	21
e	1,000	100 AGL	86 Parallel	140	-2.9	-700	4
f	0	50 AGL	86 Parallel	140			



Flight Profile ADHA01
ADAIR HIGH NOISE ILS FROM 151
Flight Track: 4LILS151 - 14L instrument straight-in from 151 Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000
Scale in Feet 1:117,000 (1 inch = 9,790 feet)

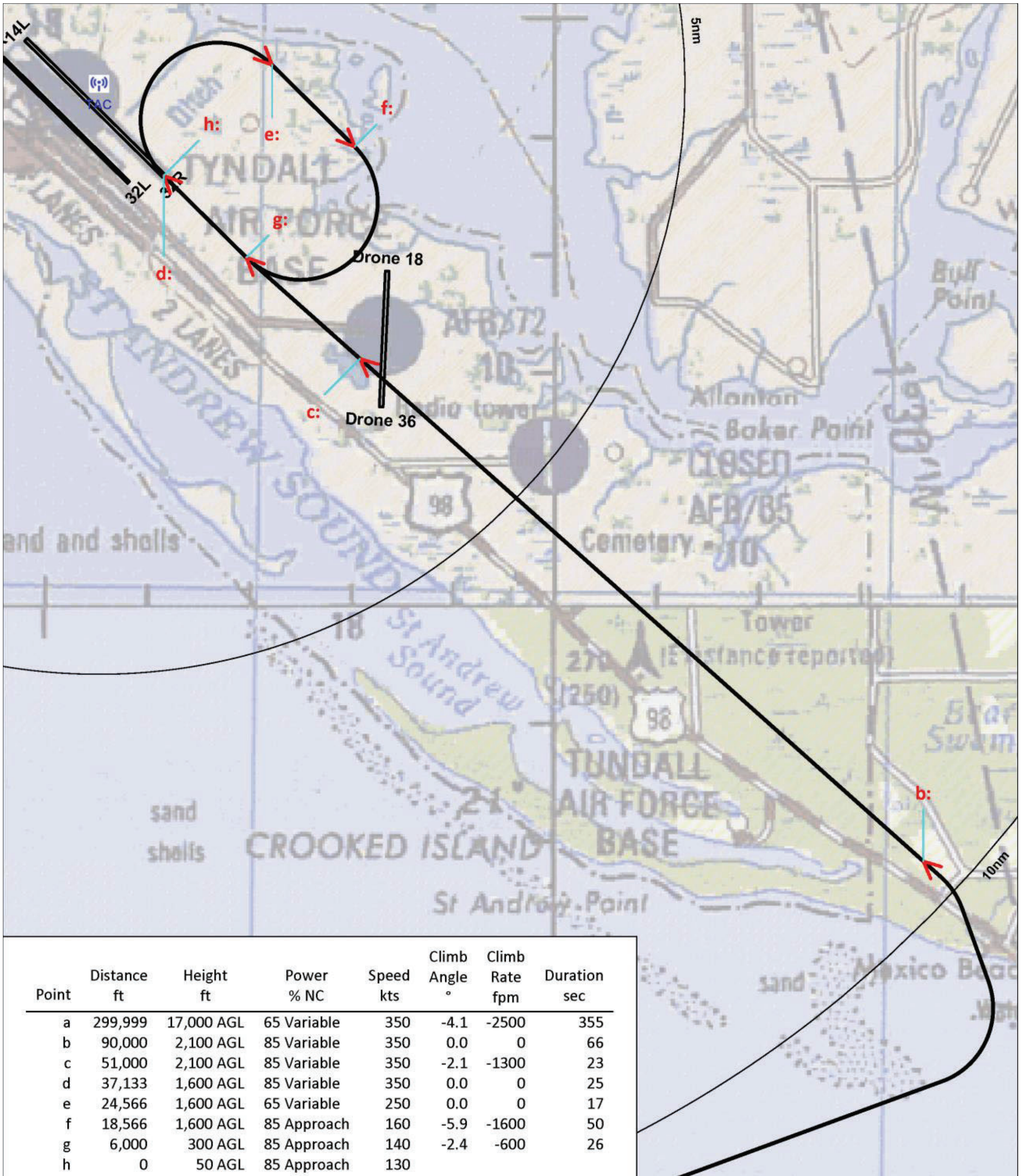
Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	85 Variable	200	-4.3	-1500	492
b	84,000	2,600 AGL	85 Variable	200	-1.4	-400	145
c	42,312	1,600 AGL	86 Approach	140	0.0	0	62
d	27,750	1,600 AGL	86 Approach	140	-3.4	-800	92
e	6,000	300 AGL	86 Approach	140	-2.3	-600	21
f	1,000	100 AGL	86 Approach	140	-2.9	-700	4
g	0	50 AGL	86 Approach	140			

Flight Profile ADHA09
ADAIR HIGH NOISE VFR FROM COMPASS LAKE
Flight Track: 4LA1CL - 14L base to final from Compass Lake Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 4,000 8,000 12,000 16,000 20,000 24,000
Scale in Feet 1:78,400 (1 inch = 6,530 feet)

N



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	299,999	17,000 AGL	65 Variable	350	-4.1	-2500	355
b	90,000	2,100 AGL	85 Variable	350	0.0	0	66
c	51,000	2,100 AGL	85 Variable	350	-2.1	-1300	23
d	37,133	1,600 AGL	85 Variable	350	0.0	0	25
e	24,566	1,600 AGL	65 Variable	250	0.0	0	17
f	18,566	1,600 AGL	85 Approach	160	-5.9	-1600	50
g	6,000	300 AGL	85 Approach	140	-2.4	-600	26
h	0	50 AGL	85 Approach	130			

Flight Profile ADHA39

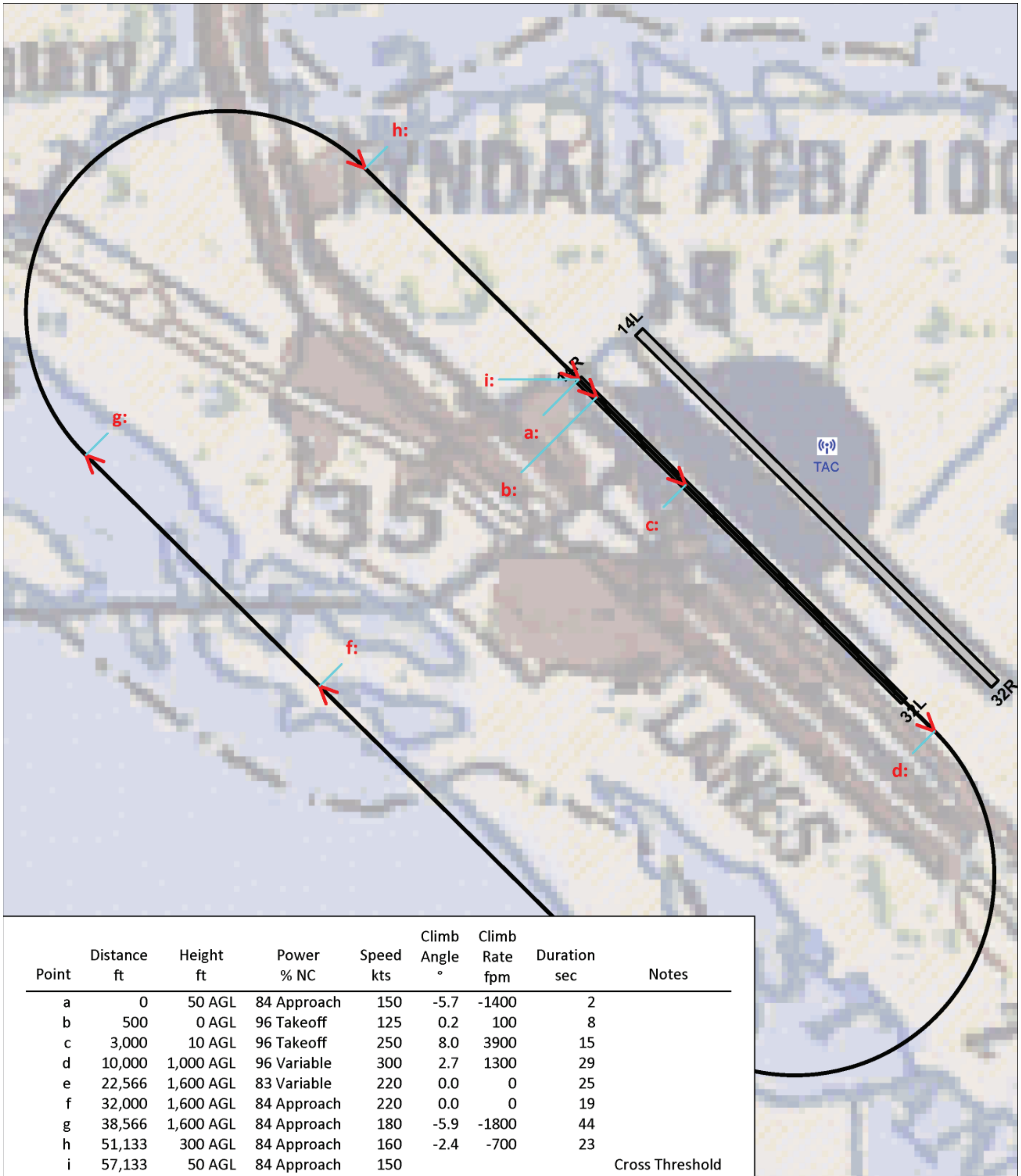
ADAIR HIGH NOISE OH ARRIVAL FROM 151

Flight Track: 2RA3OH151 - 32R initial to OH from 151 Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:74,200 (1 inch = 6,180 feet)

N

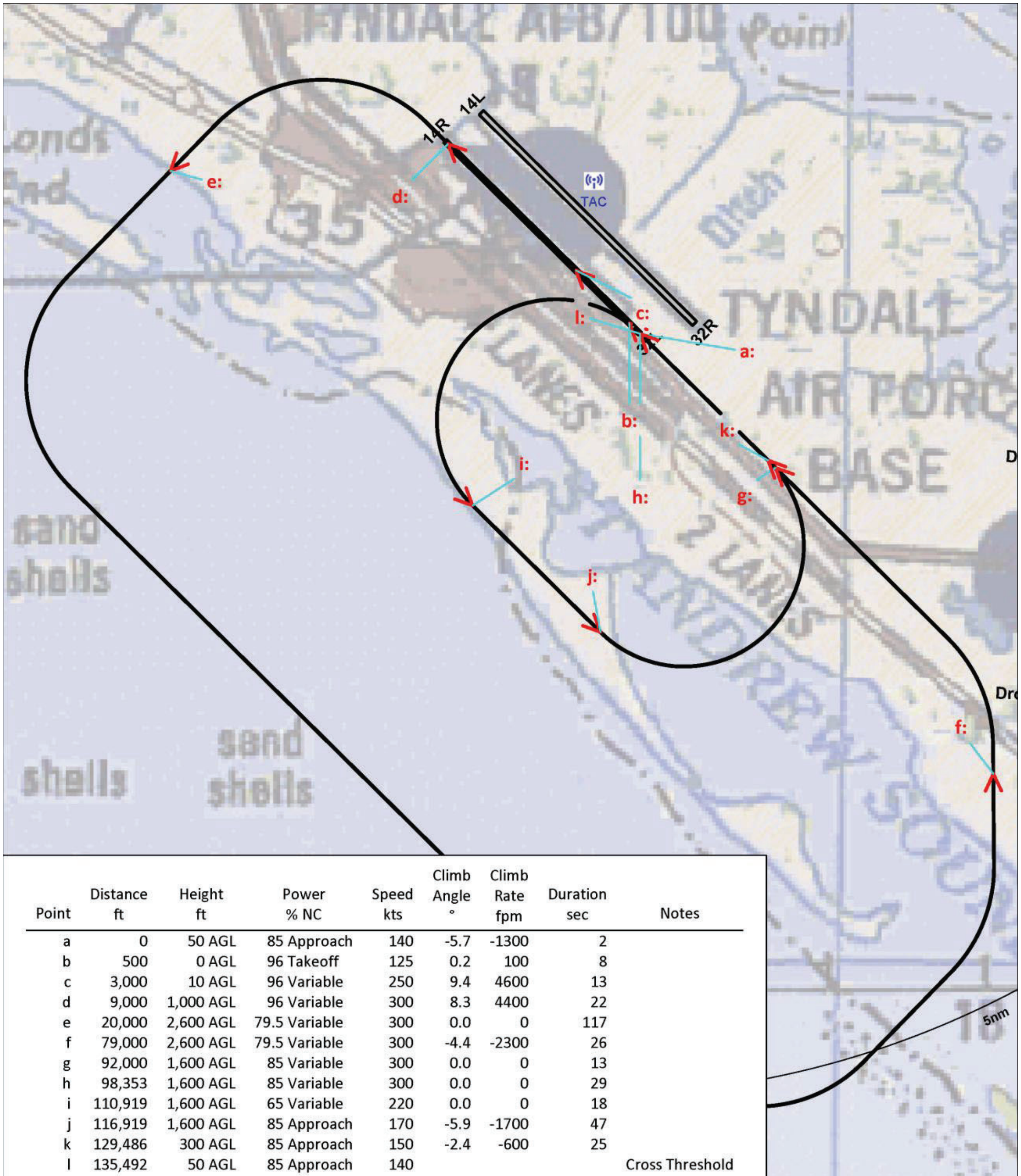


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	84 Approach	150	-5.7	-1400	2	
b	500	0 AGL	96 Takeoff	125	0.2	100	8	
c	3,000	10 AGL	96 Takeoff	250	8.0	3900	15	
d	10,000	1,000 AGL	96 Variable	300	2.7	1300	29	
e	22,566	1,600 AGL	83 Variable	220	0.0	0	25	
f	32,000	1,600 AGL	84 Approach	220	0.0	0	19	
g	38,566	1,600 AGL	84 Approach	180	-5.9	-1800	44	
h	51,133	300 AGL	84 Approach	160	-2.4	-700	23	
i	57,133	50 AGL	84 Approach	150				Cross Threshold

Flight Profile ADHC02
ADAIR HIGH NOISE - CLOSED VFR PATTERN
Flight Track: 4RC4 - VFR CLOSED Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Scale in Feet 1:28,700 (1 inch = 2,390 feet)

N



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	85 Approach	140	-5.7	-1300	2	
b	500	0 AGL	96 Takeoff	125	0.2	100	8	
c	3,000	10 AGL	96 Variable	250	9.4	4600	13	
d	9,000	1,000 AGL	96 Variable	300	8.3	4400	22	
e	20,000	2,600 AGL	79.5 Variable	300	0.0	0	117	
f	79,000	2,600 AGL	79.5 Variable	300	-4.4	-2300	26	
g	92,000	1,600 AGL	85 Variable	300	0.0	0	13	
h	98,353	1,600 AGL	85 Variable	300	0.0	0	29	
i	110,919	1,600 AGL	65 Variable	220	0.0	0	18	
j	116,919	1,600 AGL	85 Approach	170	-5.9	-1700	47	
k	129,486	300 AGL	85 Approach	150	-2.4	-600	25	
l	135,492	50 AGL	85 Approach	140				Cross Threshold

Flight Profile ADHC07
ADAIR HIGH NOISE - CLOSED PATTERN WITH OVERHEAD
Flight Track: 2LC2W - INSIDE DOWNWIND TO OVERHEAD Aircraft: ADAIR Cat C High Engine: F414-GE-400

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:47,900 (1 inch = 3,990 feet)

N

Contract ADAIR Medium Noise Dassault Mirage (F-16C Surrogate)

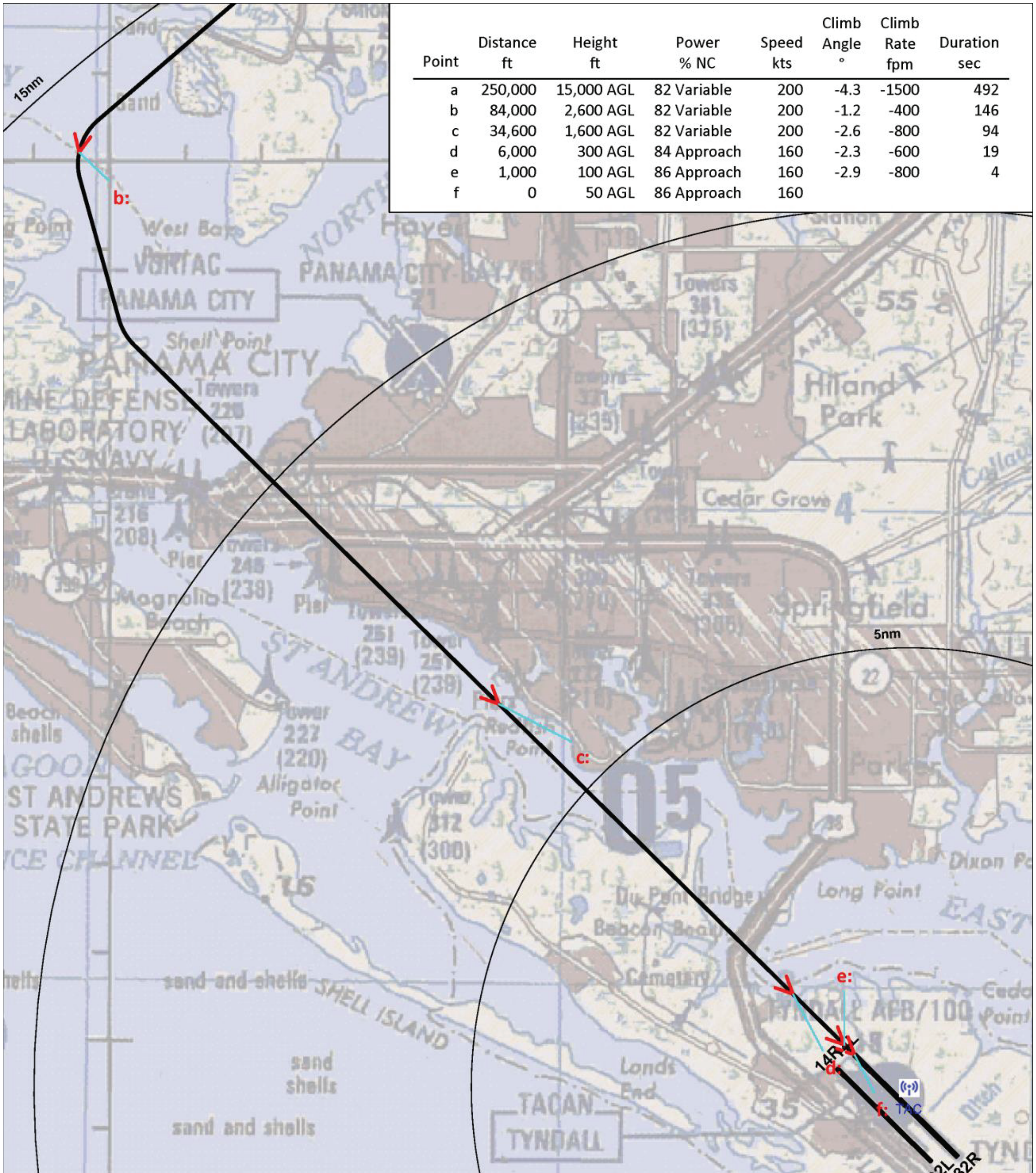
Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	88 Variable	0	0.0	0	38
b	4,750	0 AGL	92 Afterburner	150	10.5	3700	7
c	7,000	415 AGL	92 Afterburner	250	10.5	4700	2
d	8,000	600 AGL	95 Variable	250	10.4	5200	26
e	20,000	2,800 AGL	95 Variable	305	11.3	6600	11
f	26,000	4,000 AGL	95 Variable	350	11.3	7100	51
g	56,000	10,000 AGL	95 Variable	350	11.3	7100	59
h	91,000	17,000 AGL	86 Variable	350			

Flight Profile ADMD01
ADAIR MED NOISE DEPARTURE - REPRESENTATIVE
Flight Track: 4LDOYS2 - 14LD OYSTE 2 departure to 470 Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000 52,000
Scale in Feet 1:154,000 (1 inch = 12,800 feet)

N

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	82 Variable	200	-4.3	-1500	492
b	84,000	2,600 AGL	82 Variable	200	-1.2	-400	146
c	34,600	1,600 AGL	82 Variable	200	-2.6	-800	94
d	6,000	300 AGL	84 Approach	160	-2.3	-600	19
e	1,000	100 AGL	86 Approach	160	-2.9	-800	4
f	0	50 AGL	86 Approach	160			



Flight Profile ADMA04

ADAIR MED NOISE ILS FROM COMPASS LAKE

Flight Track: 4LILSCL - 14L instrument straight-in from Compass Lake Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

Scale in Feet 1:101,000 (1 inch = 8,410 feet)

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	82 Variable	200	-4.3	-1500	492
b	84,000	2,600 AGL	82 Variable	200	-1.4	-400	137
c	42,312	1,600 AGL	86 Approach	160	0.0	0	54
d	27,750	1,600 AGL	86 Approach	160	-3.4	-1000	81
e	6,000	300 AGL	86 Approach	160	-2.3	-600	19
f	1,000	100 AGL	86 Approach	160	-2.9	-800	4
g	0	50 AGL	86 Approach	160			

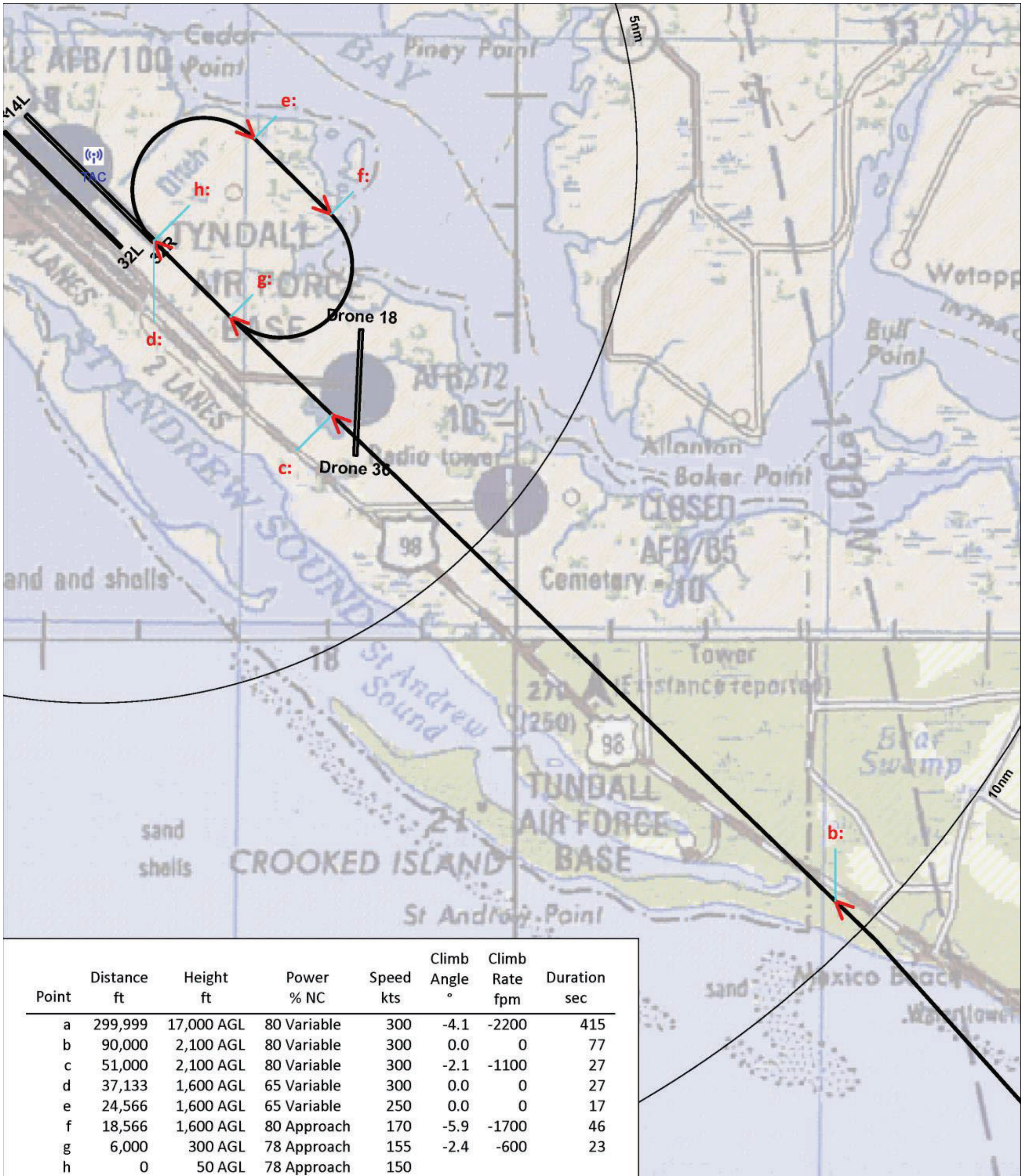
Flight Profile ADMA09

ADAIR MED NOISE VFR FROM COMPASS LAKE

Flight Track: 4LA1CL - 14L base to final from Compass Lake Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:78,400 (1 inch = 6,530 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	299,999	17,000 AGL	80 Variable	300	-4.1	-2200	415
b	90,000	2,100 AGL	80 Variable	300	0.0	0	77
c	51,000	2,100 AGL	80 Variable	300	-2.1	-1100	27
d	37,133	1,600 AGL	65 Variable	300	0.0	0	27
e	24,566	1,600 AGL	65 Variable	250	0.0	0	17
f	18,566	1,600 AGL	80 Approach	170	-5.9	-1700	46
g	6,000	300 AGL	78 Approach	155	-2.4	-600	23
h	0	50 AGL	78 Approach	150			

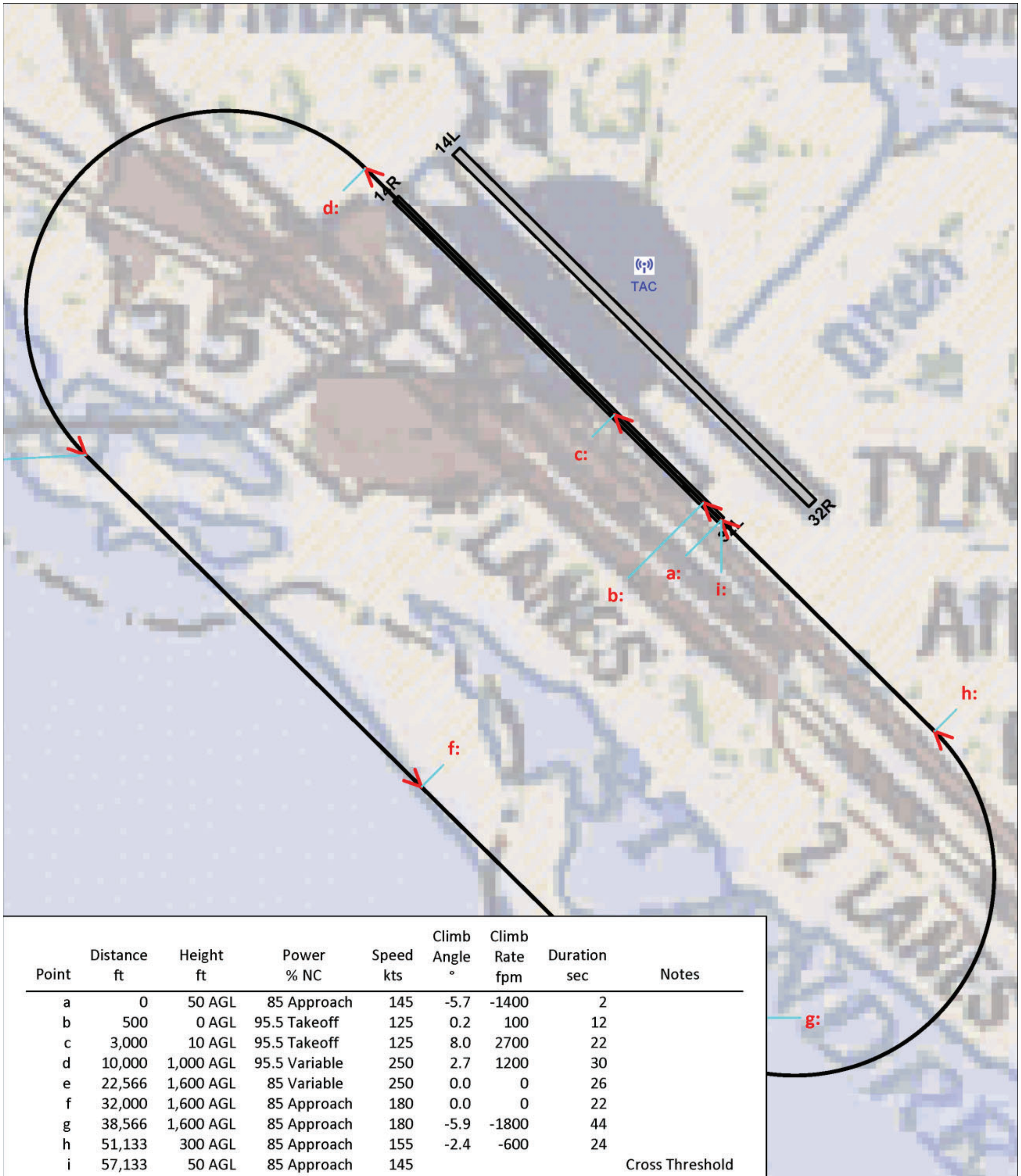
Flight Profile ADMA40

ADAIR MED NOISE OH ARRIVAL FROM 470

Flight Track: 2RAOH470 - F15,F22 32R initial to OH from 470 Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:80,200 (1 inch = 6,690 feet)

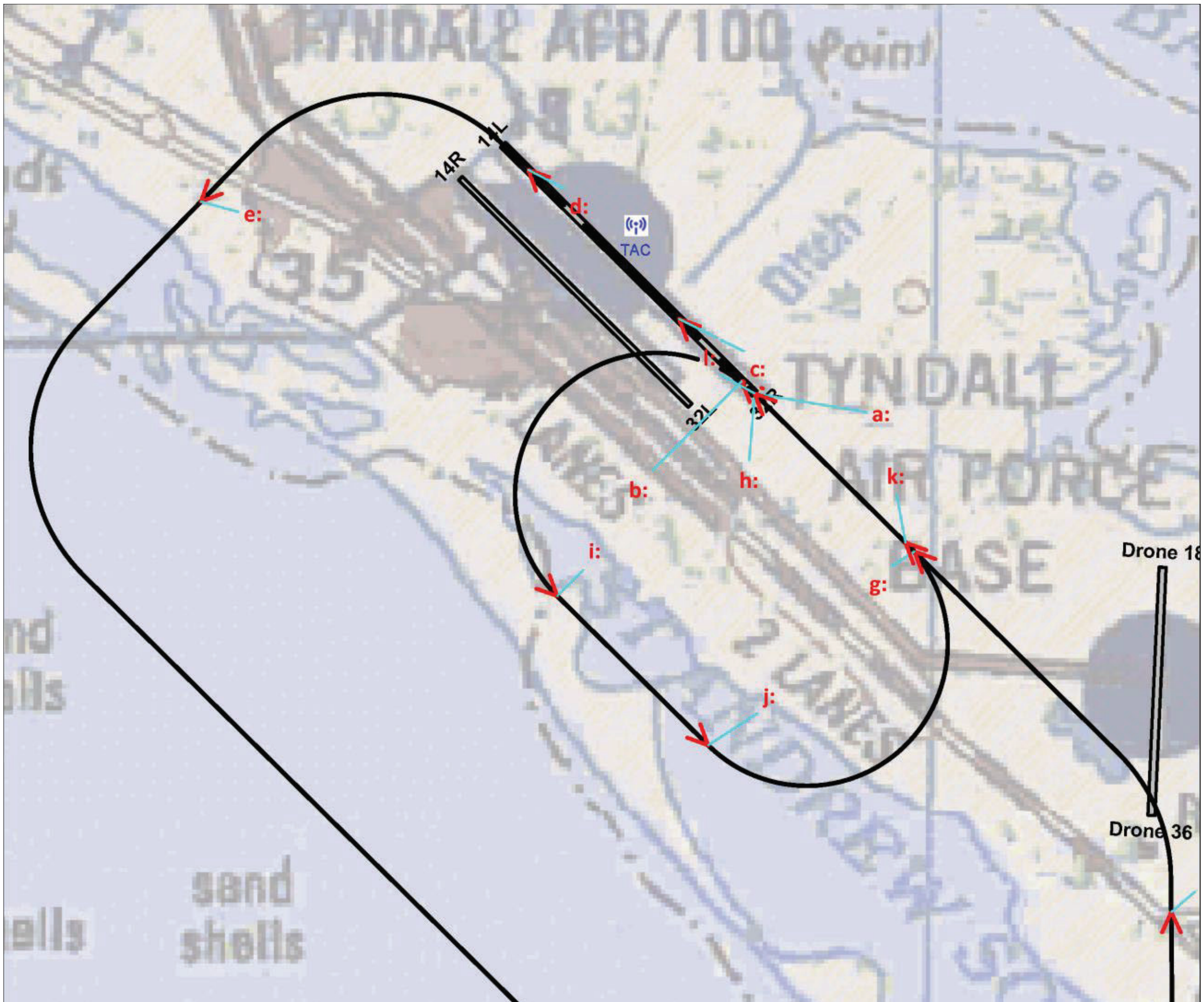


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	85 Approach	145	-5.7	-1400	2	
b	500	0 AGL	95.5 Takeoff	125	0.2	100	12	
c	3,000	10 AGL	95.5 Takeoff	125	8.0	2700	22	
d	10,000	1,000 AGL	95.5 Variable	250	2.7	1200	30	
e	22,566	1,600 AGL	85 Variable	250	0.0	0	26	
f	32,000	1,600 AGL	85 Approach	180	0.0	0	22	
g	38,566	1,600 AGL	85 Approach	180	-5.9	-1800	44	
h	51,133	300 AGL	85 Approach	155	-2.4	-600	24	
i	57,133	50 AGL	85 Approach	145				Cross Threshold

Flight Profile ADMC03
ADAIR MED NOISE - CLOSED VFR PATTERN
Flight Track: 2LC4 - VFR CLOSED Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000

Scale in Feet 1:28,700 (1 inch = 2,390 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	85 Approach	145	-5.7	-1400	2	
b	500	0 AGL	95.5 Takeoff	125	0.2	100	8	
c	3,000	10 AGL	95.5 Takeoff	250	9.4	4200	14	
d	9,000	1,000 AGL	95.5 Takeoff	250	8.3	4100	24	
e	20,000	2,600 AGL	85 Max Endurance	300	0.0	0	117	
f	79,000	2,600 AGL	85 Max Endurance	300	-4.4	-2300	26	
g	92,000	1,600 AGL	85 Variable	300	0.0	0	13	
h	98,353	1,600 AGL	85 Variable	300	0.0	0	28	
i	110,919	1,600 AGL	85 Variable	240	0.0	0	17	
j	116,919	1,600 AGL	85 Approach	180	-5.9	-1800	44	
k	129,486	300 AGL	85 Approach	155	-2.4	-600	24	
l	135,492	50 AGL	85 Approach	145				Threshold crossing

Flight Profile ADMC08
ADAIRMED NOISE - CLOSED PATTERN - WITH OVERHEAD
Flight Track: 2RC3W - INSIDE DOWNWIND TO OVERHEAD Aircraft: ADAIR Cat C Medium Engine: F100-PW-220

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:47,900 (1 inch = 3,990 feet)

N

7.1.1.1.1.1.4 Contract ADAIR Low Noise JAS 39 Gripen (F-16A Surrogate)

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	0 AGL	85 Variable	0	0.0	0	38
b	4,750	0 AGL	90 Afterburner	150	10.5	3700	7
c	7,000	415 AGL	90 Afterburner	250	10.5	4700	2
d	8,000	600 AGL	96 Variable	250	10.4	5200	26
e	20,000	2,800 AGL	96 Variable	305	11.3	6600	11
f	26,000	4,000 AGL	96 Variable	350	11.3	7100	51
g	56,000	10,000 AGL	96 Variable	350	2.8	1700	244
h	200,000	17,000 AGL	85 Variable	350			

Flight Profile ADLD01
ADAIR Low Noise - Departure - REPRESENTATIVE
Flight Track: 4LDOYS2 - 14LD OYSTE 2 departure to 470 Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000 44,000 48,000 52,000

Scale in Feet 1:154,000 (1 inch = 12,800 feet)

N

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	82 Variable	200	-3.9	-1400	537
b	68,561	2,600 AGL	82 Variable	200	-1.8	-600	86
c	42,533	1,800 AGL	84 Approach	160	-1.0	-300	43
d	30,895	1,600 AGL	86 Approach	160	-2.9	-800	114
e	0	25 AGL	86 Approach	160			

Flight Profile ADLA01
ADAIR LOW NOISE ILS FROM 151
Flight Track: 4LILS151 - 14L instrument straight-in from 151 Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 4,000 8,000 12,000 16,000 20,000 24,000 28,000 32,000 36,000 40,000

Scale in Feet 1:117,000 (1 inch = 9,790 feet)

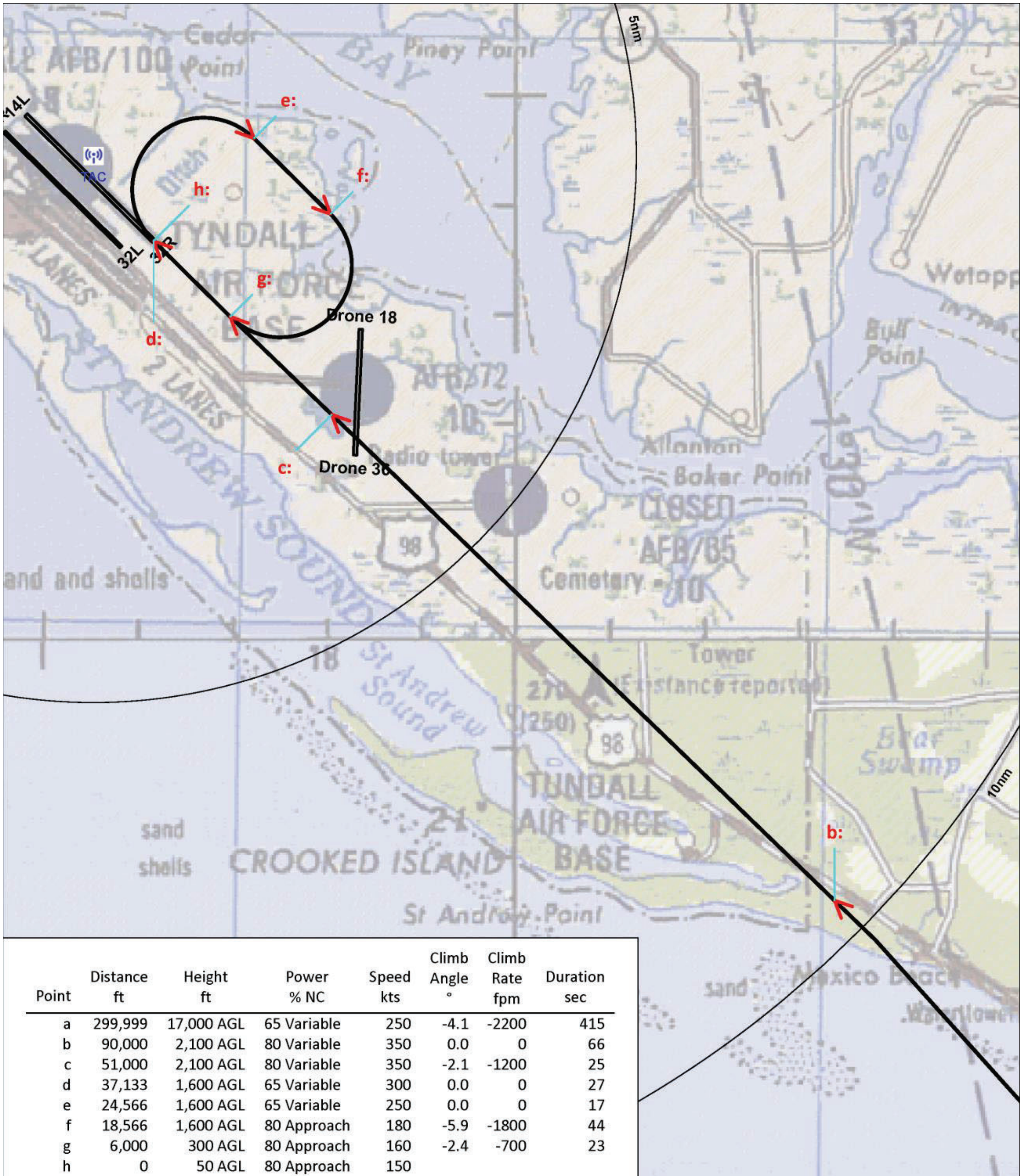
N

Note: The blank areas in the above image are areas in which Compressed Arc Digitized Raster Graphic map images are not available.

Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	250,000	15,000 AGL	82 Variable	200	-4.3	-1500	492
b	84,000	2,600 AGL	82 Variable	200	-1.4	-400	137
c	42,312	1,600 AGL	84 Approach	160	0.0	0	54
d	27,750	1,600 AGL	86 Approach	160	-3.4	-1000	81
e	6,000	300 AGL	86 Approach	160	-2.3	-600	19
f	1,000	100 AGL	86 Approach	160	-2.9	-800	4
g	0	50 AGL	86 Approach	160			

Flight Profile ADLA09
ADAIR LOW NOISE VFR FROM COMPASS LAKE
Flight Track: 4LA1CL - 14L base to final from Compass Lake Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 4,000 8,000 12,000 16,000 20,000 24,000
Scale in Feet 1:78,400 (1 inch = 6,530 feet)



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	299,999	17,000 AGL	65 Variable	250	-4.1	-2200	415
b	90,000	2,100 AGL	80 Variable	350	0.0	0	66
c	51,000	2,100 AGL	80 Variable	350	-2.1	-1200	25
d	37,133	1,600 AGL	65 Variable	300	0.0	0	27
e	24,566	1,600 AGL	65 Variable	250	0.0	0	17
f	18,566	1,600 AGL	80 Approach	180	-5.9	-1800	44
g	6,000	300 AGL	80 Approach	160	-2.4	-700	23
h	0	50 AGL	80 Approach	150			

Flight Profile ADLA40

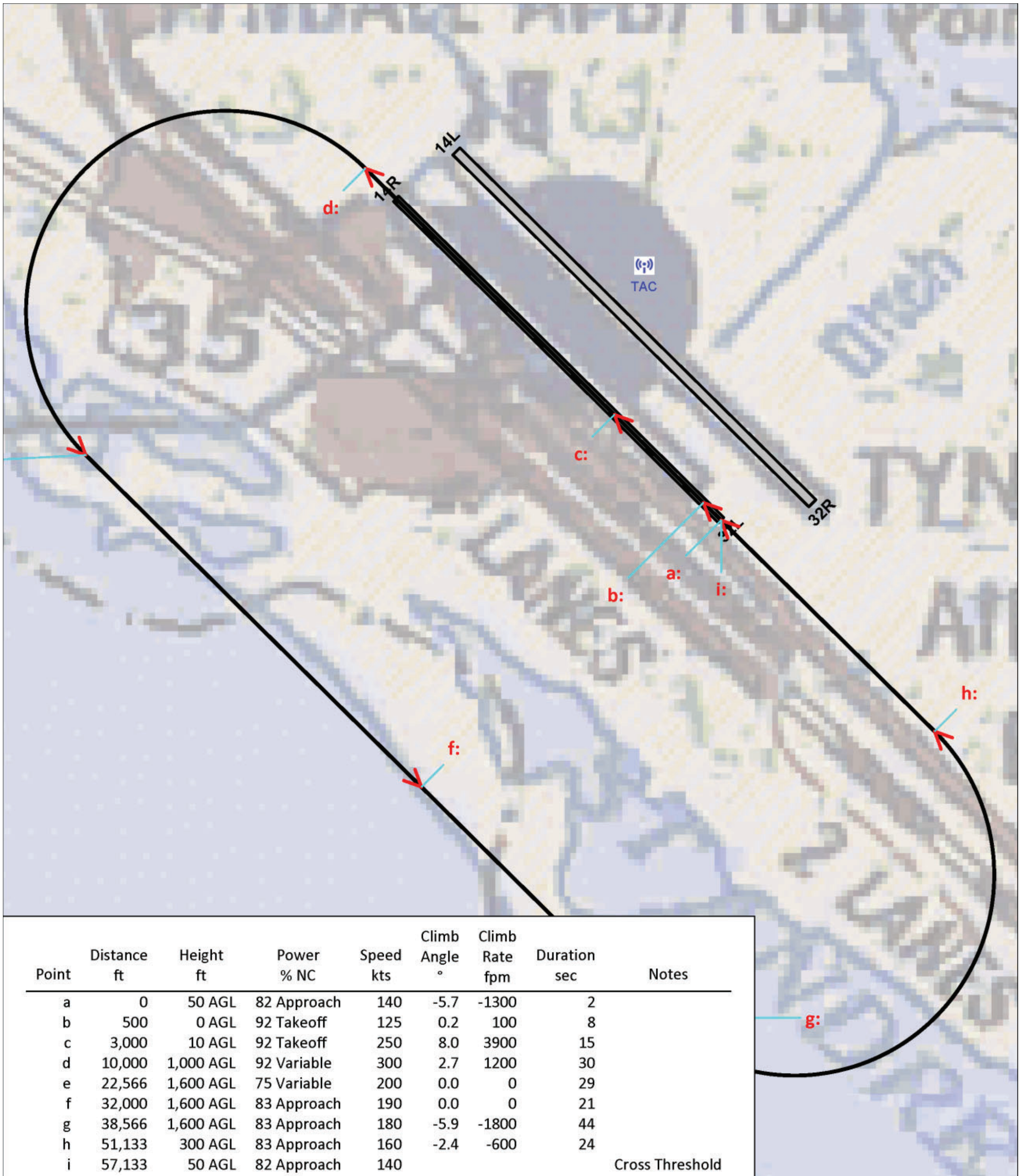
ADAIR HIGH NOISE OH ARRIVAL FROM 470

Flight Track: 2RAOH470 - F15,F22 32R initial to OH from 470 Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 4,000 8,000 12,000 16,000 20,000 24,000

Scale in Feet 1:80,200 (1 inch = 6,690 feet)

N

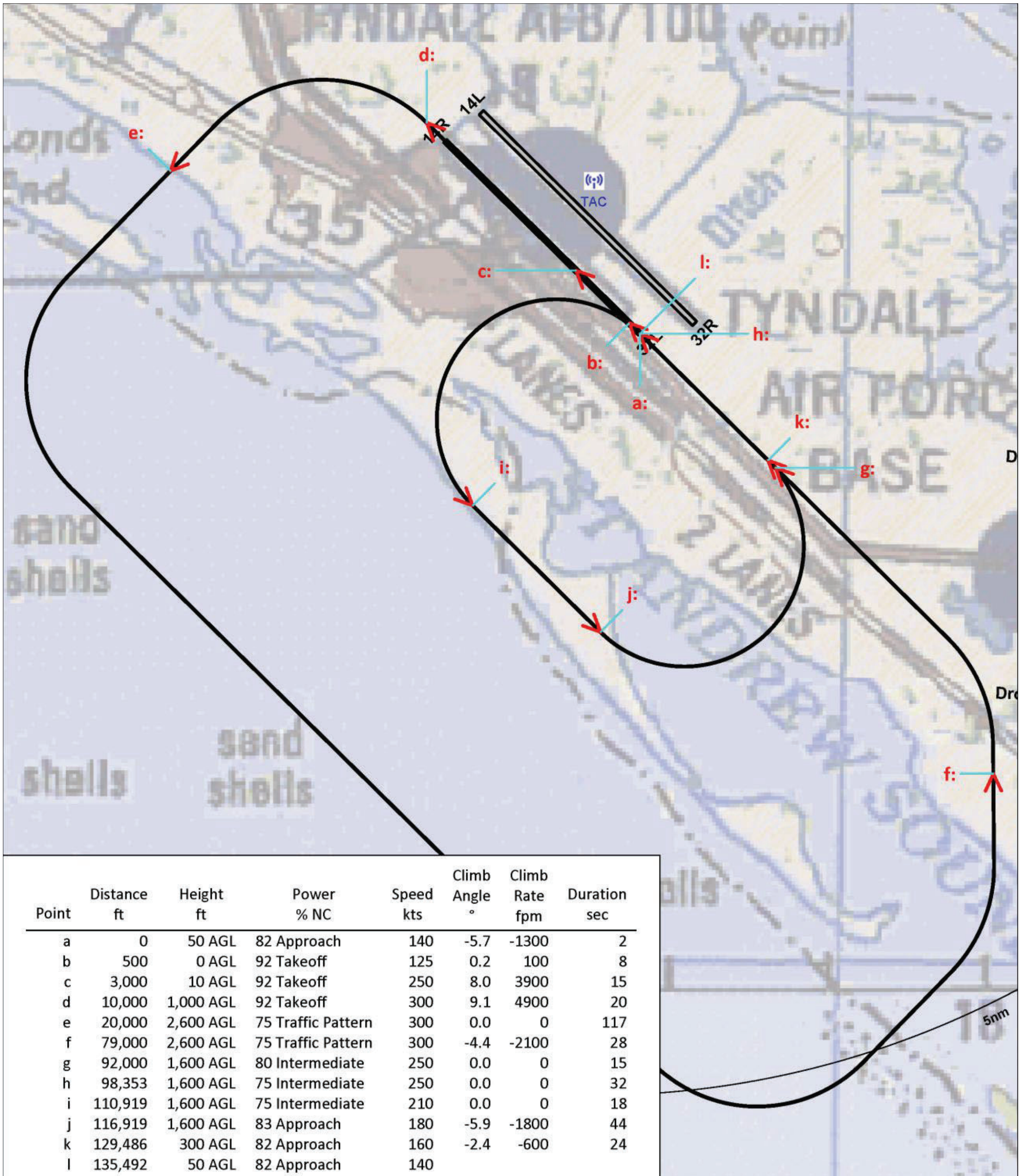


Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec	Notes
a	0	50 AGL	82 Approach	140	-5.7	-1300	2	
b	500	0 AGL	92 Takeoff	125	0.2	100	8	
c	3,000	10 AGL	92 Takeoff	250	8.0	3900	15	
d	10,000	1,000 AGL	92 Variable	300	2.7	1200	30	
e	22,566	1,600 AGL	75 Variable	200	0.0	0	29	
f	32,000	1,600 AGL	83 Approach	190	0.0	0	21	
g	38,566	1,600 AGL	83 Approach	180	-5.9	-1800	44	
h	51,133	300 AGL	83 Approach	160	-2.4	-600	24	
i	57,133	50 AGL	82 Approach	140				Cross Threshold

Flight Profile ADLC03
ADAIR LOW NOISE - CLOSED VFR PATTERN
Flight Track: 2LC4 - VFR CLOSED Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000
Scale in Feet 1:28,700 (1 inch = 2,390 feet)

N



Point	Distance ft	Height ft	Power % NC	Speed kts	Climb Angle °	Climb Rate fpm	Duration sec
a	0	50 AGL	82 Approach	140	-5.7	-1300	2
b	500	0 AGL	92 Takeoff	125	0.2	100	8
c	3,000	10 AGL	92 Takeoff	250	8.0	3900	15
d	10,000	1,000 AGL	92 Takeoff	300	9.1	4900	20
e	20,000	2,600 AGL	75 Traffic Pattern	300	0.0	0	117
f	79,000	2,600 AGL	75 Traffic Pattern	300	-4.4	-2100	28
g	92,000	1,600 AGL	80 Intermediate	250	0.0	0	15
h	98,353	1,600 AGL	75 Intermediate	250	0.0	0	32
i	110,919	1,600 AGL	75 Intermediate	210	0.0	0	18
j	116,919	1,600 AGL	83 Approach	180	-5.9	-1800	44
k	129,486	300 AGL	82 Approach	160	-2.4	-600	24
l	135,492	50 AGL	82 Approach	140			

Flight Profile ADLC07
ADAIR LOW NOISE - CLOSED PATTERN WITH OVERHEAD
Flight Track: 2LC2W - INSIDE DOWNWIND TO OVERHEAD Aircraft: ADAIR Cat C Low Engine: F100-PW-100

0 2,000 4,000 6,000 8,000 10,000 12,000 14,000 16,000
Scale in Feet 1:47,900 (1 inch = 3,990 feet)

N

B.2.4 Ground/Maintenance Run-ups

This section details the number, type, and duration of the ground and maintenance engine run-up operations at the airfield. Contract ADAIR aircraft maintenance would include routine inspections and minor unscheduled repairs on the flightline. Aircraft requiring major scheduled (depot level maintenance) or unscheduled maintenance would be expected to be flown back to the contractor's home base for repairs. The only ground operations expected to increase with the addition of contract ADAIR aircraft would be the preflight run-up checks, postflight idling, and trim tests. **Figure B-16** shows the location of all the static run-up locations at Tyndall AFB prior to Hurricane Michael. For the purposes of noise modeling, representative locations for contract ADAIR aircraft parking are also noted on the figure. The locations at the ends of the runway are the locations for the arming and dearming of the F-16C aircraft. The trim pad is where trim test operations for ADAIR aircraft would be performed as well as the based aircraft. Note: the trim pad is currently not certified or rated for use. **Table B-9** details the number, type, and duration of the on-field maintenance operations.

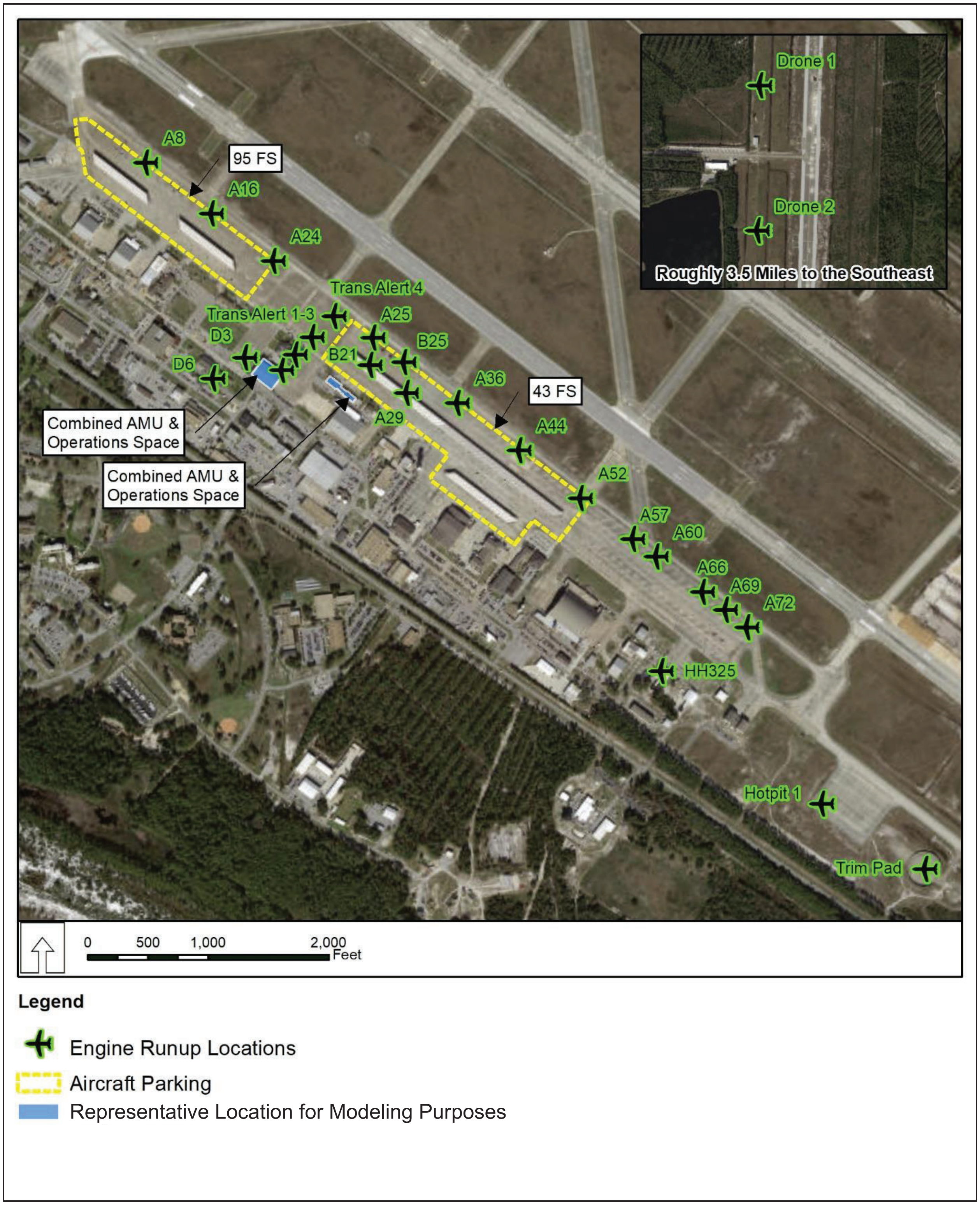


Figure B-16. Static Operations Locations.

Table B-9
Location, Type, and Duration of Ground/Maintenance Run-Up Operations at Tyndal Air Force Base

Aircraft Type	Run-up Type	Frequency	Annual Events	Percent Day (0700-2200)	Percent Night (2200 - 0700)	Run-up Pad ID	Power Setting	Power Units	Duration Per Event (s)	# of Engines Running Per Event
T-38	Preflight checks up to 80%	95% of all flights	5100	95%	5%	B 25, 21 A 29, 25	48	%RPM	600	2
	Preflight checks up over 80%	5% of all flights	268	91%	0.09	Trimpad	48		1800	2
							92		15	2
	Low Power runups-2 engine	4X weekly	208	100%	0	B 25, 21 A 29, 25	48		900	2
							70		300	2
							75		120	2
	Engine Wash	Every 15 flights	358	90%	10%	B 25, 21 A 29, 25	48		600	2
QF-16	Preflight checks-Main runway	50% of all flights	219	100%	0%	A 66, 69, 72	74	%NC	1200	1
	Preflight checks-Main runway	50% of all flights	219	100%	0%	Trans Alert 1,2,3	74		1200	1
	Preflight checks-Drone runway	Every flight	312	100%	0%	Drone 1,2	74		1200	1
	Engine Change	2X weekly	104	100%	0%	A 66, 72	85		120	1
							74		1200	1
E-9	Preflight checks-Main runway	Every flight	218	100%	0%	A 57, 60	380	ISHP	1200	2
F-22	Preflight checks-95FS	Every flight	3416	95%	5%	A 8, 16, 24	10	%ETR	1500	2
	Preflight checks-43FS	Every flight	4392	95%	5%	A 36, 44, 52	10		1500	2
	Leak, ops check	40X weekly	2080	95%	5%	A 8, 16, 36, 44	50		600	2
							10		1800	2

Table B-9
Location, Type, and Duration of Ground/Maintenance Run-Up Operations at Tyndal Air Force Base

Aircraft Type	Run-up Type	Frequency	Annual Events	Percent Day (0700-2200)	Percent Night (2200 - 0700)	Run-up Pad ID	Power Setting	Power Units	Duration Per Event (s)	# of Engines Running Per Event
F-22	Hot Pit checks	2X weekly, 15 jets per day	1560	95%	5%	Hot Pit 1	10	%ETR	600	2
	Trouble Shooting	20X weekly	1040	95%	5%	A 8, 16, 36, 44	50		480	2
							10		480	2
							10		960	2
	Acceptance Run	100X annually	100	100%	0%	HH 325	68		1200	1
							82		900	1
							92 (A/B)		300	1
							80		600	1
	Core operations	6X monthly	72	100%	0%	HH 325	80		1200	1
							88		900	1
							90		300	1
							80		600	1
	Functional Operations	8X monthly	96	100%	0%	HH 325	68		480	1
							88		180	1
							90		180	1
MU-2	Pre-flight checks	Every flight	1952	100%	0%	D 3,6	65	%NC	300	2
	Post-flight cooldown	Every flight	1952	100%	0%	D 3,6	65		180	2
	MX on pads	50X annually	50	100%	0%	D 3,6	100		300	2
F-35A	Pre-flight checks	Every departure	6	100%	0%	Trans Alert 3,4	75	%ETR	1200	1
	Post-flight cooldown	Every arrival	6	100%	0%	Trans Alert 3,4	75		600	1
F-16	Pre-flight checks	Every departure	200	100%	0%	Trans Alert 1,2	74	%NC	1200	1
	Post-flight cooldown	Every arrival	200	100%	0%	Trans Alert 1,2	74		1200	1

Table B-9
Location, Type, and Duration of Ground/Maintenance Run-Up Operations at Tyndal Air Force Base

Aircraft Type	Run-up Type	Frequency	Annual Events	Percent Day (0700-2200)	Percent Night (2200 - 0700)	Run-up Pad ID	Power Setting	Power Units	Duration Per Event (s)	# of Engines Running Per Event
F-18	Pre-flight checks	Every departure	55	100%	0%	Trans Alert 3,4	65	%NC	1200	2
	Post-flight cooldown	Every arrival	55	100%	0%	Trans Alert 3,4	65		600	2
F-15	Pre-flight checks	Every departure	270	100%	0%	Trans Alert 1,2	63	%NC	1200	2
	Post-flight cooldown	Every arrival	270	100%	0%	Trans Alert 1,2	63		600	2
C-21A	Pre-flight checks	Every departure	47	100%	0%	Trans Alert 1,2	60	%NC	1200	2
	Post-flight cooldown	Every arrival	47	100%	0%	Trans Alert 1,2	60		1200	2
ADAIR Category C	Pre/Post flight check/cooldown	Every flight	3400	99%	1%	ADAIR parking	Idle	-	1200	All
	Trim[1]	24 tests/year/ aircraft	336	100%	0%	Trimpad	Idle	-	720	1
							Approach		1620	
							Intermediate		540	
							Military		540	
							Afterburner		180	

Notes:
(0) Annual events rounded to the nearest integer for clarity. Noise modeling will use fractional event numbers.
(1) ACAM defaults assumed for ADAIR aircraft. Expecting 12 ADAIR aircraft.

APPENDIX C

AIR QUALITY

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Appendix C-1

Air Conformity Applicability Analysis

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7.1.1.2 C.1 Air Quality

This appendix presents an overview of the Clean Air Act (CAA) and the state of Florida air quality regulations. It also presents calculations, including the assumptions used for the air quality analyses presented in the Air Quality sections of this Environmental Assessment.

C.1.1 Air Quality Program Overview

To protect public health and welfare, the United States Environmental Protection Agency (USEPA) has developed numerical concentration-based standards, or National Ambient Air Quality Standards (NAAQS), for six “criteria” pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQS: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health, including the health of “sensitive” populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings (40 Code of Federal Regulations [CFR] Part 50).

The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the federal program. The Florida Division of Air Resources Management oversees the state’s air pollution control program under the authority of the federal CAA and amendments, federal regulations, and state laws. Florida has adopted the federal NAAQS (Florida Administrative Code 62-204.800). These standards are shown in **Table C-1**.

Florida operates and maintains an ambient air monitoring network that follows the USEPA protocols and quality assurance/control procedures. Based on measured ambient air pollutant concentrations, the USEPA designates areas of the United States as having air quality better than (attainment) the NAAQS, worse than (nonattainment) the NAAQS, and unclassifiable. The areas that cannot be classified (on the basis of available information) as meeting or not meeting the NAAQS for a particular pollutant are “unclassifiable” and are treated as attainment until proven otherwise. Attainment areas can be further classified as “maintenance” areas, which are areas previously classified as nonattainment but where air pollutant concentrations have been successfully reduced to below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS.

Section 176(c) (1) of the CAA contains legislation that ensures federal activities conform to relevant State Implementation Plans (SIPs) and thus do not hamper local efforts to control air pollution. Conformity to a SIP is defined as conformity to a SIP’s purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards. As such, a general conformity analysis is required for areas of nonattainment or maintenance where a federal action is proposed.

The action can be shown to conform by demonstrating that the total direct and indirect emissions are below the *de minimis* levels (**Table C-2**), and/or showing that the proposed action emissions are within the state- or tribe-approved budget of the facility as part of the SIP or Tribal Implementation Plan (USEPA, 2010).

Direct emissions are those that occur as a direct result of the action. For example, emissions from new equipment that are a permanent component of the completed action (e.g., boilers, heaters, generators, paint booths) are considered direct emissions. Indirect emissions are those that occur at a later time or at a distance from the proposed action. For example, increased vehicular/commuter traffic because of the action is considered an indirect emission. Construction emissions must also be considered. For example, the emissions from vehicles and equipment used to clear and grade building sites, build new buildings, and construct new roads must be evaluated. These types of emissions are considered direct.

Table C-1
National Ambient Air Quality Standards

Pollutant	Standard Value[6]		Standard Type
Carbon Monoxide (CO)			
8-hour average	9 ppm	(10 mg/m^3)	Primary
1-hour average	35 ppm	(40 mg/m^3)	Primary
Nitrogen Dioxide (NO_2)			
Annual arithmetic mean	0.053 ppm	(100 μg/m^3)	Primary and Secondary
1-hour average[1]	0.100 ppm	(188 μg/m^3)	Primary
Ozone (O_3)			
8-hour average[2]	0.070 ppm	(137 μg/m^3)	Primary and Secondary
Lead (Pb)			
3-month average[3]		0.15 μg/m^3	Primary and Secondary
Particulate <10 Micrometers (PM_{10})			
24-hour average[4]		150 μg/m^3	Primary and Secondary
Particulate <2.5 Micrometers ($PM_{2.5}$)			
Annual arithmetic mean[4]		12 μg/m^3	Primary
Annual arithmetic mean[4]		15 μg/m^3	Secondary
24-hour average[4]		35 μg/m^3	Primary and Secondary
Sulfur Dioxide (SO_2)			
1-hour average[5]	0.075 ppm	(196 μg/m^3)	Primary
3-hour average[5]	0.5 ppm	(1,300 μg/m^3)	Secondary

Source: USEPA, 2016

Notes:
1 In February 2010, the USEPA established a new 1-hour standard for NO_2 at a level of 0.100 ppm, based on the 3-year average of the 98th percentile of the yearly distribution concentration, to supplement the then-existing annual standard.
2 In October 2015, the USEPA revised the level of the 8-hour standard to 0.070 ppm, based on the annual 4th highest daily maximum concentration, averaged over 3 years; the regulation became effective on 28 December 2015. The previous (2008) standard of 0.075 ppm remains in effect for some areas. A 1-hour standard no longer exists.
3 In November 2008, USEPA revised the primary lead standard to 0.15 μg/m^3. USEPA revised the averaging time to a rolling 3-month average.
4 In October 2006, USEPA revised the level of the 24-hour $PM_{2.5}$ standard to 35 μg/m^3 and retained the level of the annual $PM_{2.5}$ standard at 15 μg/m^3. In 2012, USEPA split standards for primary and secondary annual $PM_{2.5}$. All are averaged over 3 years, with the 24-hour average determined at the 98th percentile for the 24-hour standard. USEPA retained the 24-hour primary standard and revoked the annual primary standard for PM_{10}.
5 In 2012, the USEPA retained a secondary 3-hour standard, which is not to be exceeded more than once per year. In June 2010, USEPA established a new 1-hour SO_2 standard at a level of 75 ppb, based on the 3-year average of the annual 99th percentile of 1-hour daily maximum concentrations.
6 Parenthetical value is an approximately equivalent concentration for NO_2, O_3, and SO_2.

μg/m^3 = microgram(s) per cubic meter; mg/m^3 = milligram(s) per cubic meter; ppb = part(s) per billion; ppm = part(s) per million; USEPA = United States Environmental Protection Agency

Table C-2
General Conformity Rule *De minimis* Emission Thresholds

Pollutant	Attainment Classification	Tons per year
Ozone (VOC and NO_x)	Serious nonattainment	50
	Severe nonattainment	25
	Extreme nonattainment	10
	Other areas outside an ozone transport region	100
Ozone (NO_x)	Marginal and moderate nonattainment inside an ozone transport region	100
	Maintenance	100
Ozone (VOC)	Marginal and moderate nonattainment inside an ozone transport region	50
	Maintenance within an ozone transport region	50
	Maintenance outside an ozone transport region	100
Carbon Monoxide, SO_2 and NO_2	All nonattainment and maintenance	100
PM_{10}	Serious nonattainment	70
	Moderate nonattainment and maintenance	100
$PM_{2.5}$ Direct emissions, SO_2, NO_x (unless determined not to be a significant precursor), VOC and ammonia (if determined to be significant precursors)	All nonattainment and maintenance	100
Lead	All nonattainment and maintenance	25

Source: USEPA, 2017

NO_2 = nitrogen dioxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; USEPA = United States Environmental Protection Agency; VOC = volatile organic compound

Each state is required to develop a SIP that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each nonattainment area.

In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds; that is, 100 or 250 tons/year based on the source's industrial category. These thresholds are applicable to stationary sources. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. **Table C-3** provides a tabular listing of the PSD significant emissions rate thresholds for selected criteria pollutants (USEPA, 1990). Air quality modeling analysis for a PSD proposed facility is required to demonstrate that its emissions of specific pollutants will not cause or significantly contribute to a violation of any ambient air quality standard.

Table C-3
Criteria Pollutant Significant Emissions Rate Increases Under Prevention of Significant Deterioration Regulations

Pollutant	Significant Emission Rate (ton/year)
PM_{10}	15
$PM_{2.5}$	10
TSP	25
SO_2	40
NO_x	40
Ozone (VOCs)	40
CO	100

Source: Title 40 Code of Federal Regulations Part 52 Subpart A, §52.21

Notes:
CO = carbon monoxide; NO_x = nitrogen oxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide; TSP = total suspended particulate; VOC = volatile organic compound

The goals of the PSD program are to (1) ensure economic growth while preserving existing air quality; (2) protect public health and welfare from adverse effects that might occur even at pollutant levels better than the NAAQS; and (3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in **Table C-4**. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development. There are no Class I areas near the Tyndall Air Force Base (AFB).

Table C-4
Federal Allowable Pollutant Concentration Increases Under Prevention of Significant Deterioration Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (µg/m³)		
		Class I	Class II	Class III
$PM_{2.5}$	Annual	1	4	8
	24-hour	2	9	18
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 Code of Federal Regulations Part 52 Subpart A, §52.21

Notes:
$\mu g/m^3$ = microgram(s) per cubic meter; NO_2 = nitrogen dioxide; $PM_{2.5}$ = particulate matter with a diameter of less than 2.5 micrometers; PM_{10} = particulate matter with a diameter of less than 10 micrometers; SO_2 = sulfur dioxide

The Air Quality Monitoring Program monitors ambient air throughout the state. The purpose is to monitor, assess, and provide information on statewide ambient air quality conditions and trends as specified by the state and federal CAA. The Air Quality Monitoring Program works in conjunction with local air pollution agencies and some industries, measuring air quality throughout the states.

The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards. Also included are areas where the ambient standards are being met, but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth.

The result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality, exceedances of air quality standards, and pollutant trends.

C.1.2 Assumptions

The following are assumptions were used in the air quality analysis for the proposed and alternative actions:

1. No construction (or negligible construction) would be associated with the Proposed Action. This includes no demolition, earth moving, hauling, or paving. Some minor interior building fabrication would be possible but affected square footage is too small to result in outdoor air quality impacts. This may include upgrade to fire suppression/life support systems.
2. No installation of new boilers or generators. No generators would be used for the Proposed Action.
3. No new storage tanks would be installed; additional Jet A fuel needed by contractor aircraft would be calculated based on engine type, number of sorties, and engine fuel consumption rate.
4. Air Force personnel would deliver fuel to the contractor at the airfield using tank trucks. Gas and diesel/Jet A fuel for the contractor's aerospace ground equipment (AGE) and flight line special purpose vehicles would be obtained by contract adversary air (ADAIR) personnel from the base military service station.
5. Chaff and flares to be used by contractor would be stored using current facilities (additional/new ammunition storage facilities not needed).
6. No new Hush House/Engine Test Cell facilities would be installed and existing Hush House/Engine Test Cell facilities would not be used for ADAIR contractor aircraft.
7. No new paint booth facilities would be installed, and existing paint booths would not be used for ADAIR contract aircraft.
8. Contractor may bring their own parts cleaner (or share already installed unit unknown at this time) - for either case it is assumed contractor use would be minimal - (no more than 0.5 gallon/month solvent used/lost).
9. Maintenance for contractor aircraft would be limited to minor repairs and minor routine maintenance/inspections (significant repairs, schedule/phased maintenance and inspections to be conducted off-site).
10. While ADAIR targeted performance is estimated to start in September 2020 with up to a 10-year period of performance, the emissions were estimated for each year of the Proposed Action beginning in June 2020 and ending in May 2030. For air quality modeling purposes, these are representative years; the modeling generates air emissions estimates for the life of a representative 10-year contract. A full year is a reference year and partial years (start and end year) may be determined by dividing by the number of months estimated for that year.

11. Contractor aircraft takeoff and landing cycles - use/assume Air Conformity Applicability Model (ACAM) default "times in mode" to be conservative.
12. Assume once an aircraft is out of the landing and take-off (LTO) cycle the time spent traveling to/from the special use airspace (5 to 20 minutes) would be at an altitude above 3,000 feet (ft).
13. Assume mixing height is 3,000 ft, which matches USEPA and Air Force Guidance.
14. Air Force training sorties would not increase or decrease as result of this action. Roles may change (i.e., the Air Force no longer need to play the adversary, but this would not change in any substantial way the number of Air Force sorties flown); thus, the change (increase) in emissions for air operations would be strictly due to the addition of the contract ADAIR aircraft and associated ground and maintenance activities.
15. Assume the number of transient aircraft utilizing the airfield would not increase or decrease as a direct result of contract ADAIR.
16. Air Force use of engine test cells/hush house would not change as a result of the Proposed Action. No changes to Air Force trim tests also assumed.
17. For contactor AGE and auxiliary power units (APUs) - until the contractor is selected, what they would bring/use in terms of AGE and APUs is unknown, thus ACAM defaults will be used based on the surrogate aircraft and engine type.
18. Assume contract aircraft would engage in LTO cycles, and touch and go (TGO) or low-approach activities only in the vicinity of the airfield.
19. Assume 5 percent of on-airfield daytime sorties (120 of 2,400 sorties) would include multiple patterns for contractor proficiency.
20. It is unknown what contractor requirements would be for trim tests; thus, ACAM defaults will be assumed based on surrogate aircraft and engine type.
21. Assume all new ADAIR contractor personnel (pilots and maintenance staff) would live off-base and commute to the base 5 days per week. ACAM defaults will be used for commute distances.
22. All contract ADAIR training sorties would utilize chaff and flares (as described in Chaff/Flare Allocations V5). Only RR-196T chaff and M206 flares, or equivalent, would be utilized (no other materials will be considered in the analysis). Chaff and flares would only be used in all the special use airspace except Tyndall C MOA.
23. Assume air quality impacts from chaff releases under actual flight conditions would be low and would have negligible impact on the particulate matter with a diameter of less than 10 and 2.5 micrometers NAAQS (Air Force, 1997); thus, only the use of flares and impulse cartridges (if applicable) used at or below 3,000 ft will be considered in the air quality analysis. It is assumed flares used above 3,000 ft would disperse and not affect air quality in the lowest 3,000 ft above ground level (AGL). While contract ADAIR aircraft would employ M206 flares or similar during training sortie operations within the Warning Areas and Tyndall B, E, and H MOAs, only the Warning Areas allow their use at or below 3,000 ft altitude. As a result, flare emissions are only included in the air quality analysis for W-151 and W-470.
24. For the High Emission Scenario, the surrogate for the MIG-29 is the F15 A/BC/D with engine model F100-PW-100.
25. For the Medium Emission Scenario, the surrogate for the Mirage is the F16 C/D with engine model F110-GE-100.
26. For the Low Emission Scenario, the aircraft is F5A/F5B with engine model J85-GE-13.
27. All ADAIR related training at Tyndall AFB would occur in the Tyndall C, B, E, and H MOAs and Warning Areas W-151 and W-470 as designated in the description of the Proposed Action and as summarized in this appendix.
28. Contractor training/mission time in airspace would be approximately 45 to 60 minutes. Time spent at or below 3,000 ft is estimated to be approximately 8.7 minutes; see **Table C-5**) in Tyndall C and E MOAs and Warning Areas W-151 and W-470.
29. ACAM does not have separate inputs for time spent within a MOA or Warning Area. To represent the time spent at or below 3,000 ft, 8.7 minutes was assigned to Climb out/Intermediate power mode within the ACAM LTO input fields. No time was assigned to any other power modes, but default ACAM output also lists trim tests and TGOs; however, all inputs for these fields were set to zero for time spent within the special use airspace (**Table C-6**).
30. Assume the time spent below 3,000 ft AGL would be the same for all sorties.

31. No changes to baseline Air Force aircraft air operations (sorties) due to contract ADAIR and no changes to transient and civilian air operations due to contract ADAIR.
32. For consideration of potential air quality impacts, it is the volume of air extending up to the mixing height (3,000 ft AGL) and coinciding with the spatial distribution of the region of influence that is considered. Pollutants that are released above the mixing height typically would not disperse downward and thus would have little or no effect on ground level concentrations of pollutants. The mixing height is the altitude at which the lower atmosphere undergoes mechanical or turbulent mixing, producing a nearly uniform air mass. The height of the mixing level determines the volume of air within which pollutants can disperse. Mixing heights at any one location or region can vary by the season and time of day, but for air quality applications an average mixing height of 3,000 ft AGL is an acceptable default value (40 CFR § 93.153[c][2]). Although the proposed ADAIR training is projected to occur within multiple MOAs and Warning Areas only those with training at or below 3,000 ft AGL are a a concern with respect to potential air quality impacts.
33. **Tables C-5** and **C-6** below show the data and assumptions used as input to ACAM for flight operations.

Table C-5
Airspace Assumptions and Air Conformity Applicability Model Data Inputs

Special Use Airspace	Percent of Total Sorties	No. of Sorties in Airspace[1]	Minimum Mission Altitude	Total Mission Time (minutes) ≤3,000 ft AGL	Power Mode[2]
Tyndall C MOA	2.5	82	300 ft AGL	8.75	Intermediate/ Climb out
Tyndall E MOA	2.5	82	300 ft AGL	8.75	Intermediate/ Climb out
Tyndall B and H MOAs[3]	N/A	N/A	9,000 ft MSL	N/A	N/A
Warning Area W-151	25	820	Surface	8.75	Intermediate/ Climb out
Warning Area W-470	70	2,296	Surface	8.75	Intermediate/ Climb out

Notes:
1 Based on 3,280 total sorties in special use airspace (Source: CAF ADAIR Calculator - NEPA 6).
2 ACAM does not have separate inputs for time spent within a MOA. To represent the time spent within a MOA, the expected flight time at or below 3,000 ft (11.9 minutes) was assigned to Climb out/Intermediate power mode within the ACAM LTO input fields. No time was assigned to any other power modes.
3 Sorties occur above the mixing height. No emissions calculated.

ACAM = Air Conformity Applicability Model; ADAIR = adversary air; AGL = above ground level; CAF = Combat Air Forces; ft = feet; LTO = landing and take-off; N/A = not applicable; MOA = Military Operations Area; NEPA = National Environmental Policy Act

Table C-6
Times in Mode[1] (minutes) for Aircraft Operations

Type of Operation	Number of Sorties	Taxi/Idle (out)	Take-off (Military and/or Afterburn	Climb Out	Approach	Taxi/Idle(in)
LTO	3,400	18.5	0.4	0.8	3.5	11.3
TGO[2]	459	-	-	0.8	3.5	-

Notes:
1 Given time in mode applicable to all emission scenarios (High, Medium, and Low)

[2] 5 percent of on-airfield daytime sorties (3,060) are expected to include multiple patterns for contractor proficiency. Each of those 5 percent sorties is assumed to include three TGO/low approaches.

LTO = landing and take-off; TGO = touch and go

C.1.3 Regulatory Comparisons

The CAA Section 176(c), General Conformity, requires federal agencies to demonstrate that their proposed activities would conform to the applicable SIP for attainment of the NAAQS. General conformity applies only to nonattainment and maintenance areas. If the emissions from a federal action proposed in a nonattainment area exceed annual *de minimis* thresholds identified in the rule, a formal conformity determination is required of that action. The thresholds are more restrictive as the severity of the nonattainment status of the region increases. The Council on Environmental Quality (CEQ) defines significance in terms of context and intensity in 40 CFR § 1508.27. This requires that the significance of the action be analyzed with respect to the setting of the proposed action and based relative to the severity of the impact. The CEQ NEPA regulations (40 CFR § 1508.27[b]) provide 10 key factors to consider in determining an impact's intensity.

Emissions from the proposed action were compared against standard *de minimis* thresholds of 100 tons per year for Critera Pollutant as stipulated by 40 CFR Part 93. Emissions were also compared against regional emissions, and PSD and Title V threshols to further evaluate impacts. Estimates of emissions are summarized in **Chapter 4**. ACAM summary reports for each emission scenario for the Tyndall AFB and associated airspace are provided as **Appendix C-2** of this Air Quality summary report.

7.1.1.3 C.2 References

USEPA. 1990. Office of Air Quality Planning and Standards. *Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Permitting.* October.

USEPA. 2010. *40 CFR Parts 51 and 93, Revisions to the General Conformity Regulations*. 75 Federal Register 14283, EPA-HQ-OAR-2006-0669; FRL-9131-7. 24 March.

USEPA. 2016. *NAAQS Table*. <https://www.epa.gov/criteria-air-pollutants/naaqs-table>. 20 December.

USEPA. 2017. *General Conformity: De minimis* Tables. <https://www.epa.gov/general-conformity/de-minimis-tables>. 04 August.

Appendix C-2

Detailed Air Conformity Applicability Model Sample Report
(Airfield – High Emission Scenario)

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1. General Information

- Action Location
Base: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Temporary Adversary Air (ADAIR) at Tyndall AFB, Florida

- Project Number/s (if applicable):

- Projected Action Start Date: 9 / 2020

- Action Purpose and Need:

- Action Description:
The Proposed Action would contract for an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW and other units at Eglin AFB. Tyndall AFB would be staffed by an estimated 78 additional contracted maintenance personnel.

The high emission scenario assumes all 12 contractor aircraft are the F-15 with the F100-PW-100 Engine.

- Point of Contact
Name: Austin Naranjo
Title: Environmental Engineer - Air Quality Specialist
Organization: AFCEC/CZTQ
Email:
Phone Number: (210)749-7000

- Activity List:

Activity Type		Activity Title
2.	Aircraft	Addition of 12 Aircraft at 2,400 LTOs and 324 TGOs
3.	Personnel	93 Addtional Personnel for the ADAIR at Tyndall

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. Aircraft

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Addition of 12 Aircraft at 2,400 LTOs and 324 TGOs

- Activity Description:

- Activity Start Date
Start Month: 9
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 9
End Year: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	21.535330	PM 2.5	15.262478
SO_x	9.933470	Pb	0.000000
NO_x	116.762708	NH_3	0.000000
CO	181.478981	CO_2e	23342.9
PM 10	16.753772		

- Activity Emissions [Flight Operations (includes Trim Test & APU) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	12.681827	PM 2.5	12.714781
SO_x	8.150008	Pb	0.000000
NO_x	91.286427	NH_3	0.000000
CO	165.943886	CO_2e	22001.6
PM 10	14.127535		

- Activity Emissions [Aerospace Ground Equipment (AGE) part]:

Pollutant	Total Emissions (TONs)	Pollutant	Total Emissions (TONs)
VOC	8.853503	PM 2.5	2.547697
SO_x	1.783461	Pb	0.000000
NO_x	25.476281	NH_3	0.000000
CO	15.535095	CO_2e	1341.3
PM 10	2.626237		

2.2 Aircraft & Engines

2.2.1 Aircraft & Engines Assumptions

- Aircraft & Engine
Aircraft Designation: F-15A
Engine Model: F100-PW-100
Primary Function: Combat
Aircraft has After burn: Yes
Number of Engines: 2

- Aircraft & Engine Surrogate
Is Aircraft & Engine a Surrogate? Yes
Original Aircraft Name: MiG-29 Typhoon
Original Engine Name: Unknown

2.2.2 Aircraft & Engines Emission Factor(s)

- Aircraft & Engine Emissions Factors (lb/1000lb fuel)

	Fuel Flow	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CO_2e
Idle	1127.00	3.79	1.07	4.64	49.58	3.13	2.82	3234

Approach	2765.00	1.06	1.07	12.52	3.99	1.57	1.41	3234
Intermediate	7685.00	0.14	1.07	27.09	0.72	0.72	0.65	3234
Military	10996.00	0.12	1.07	35.01	0.70	1.24	1.12	3234
After Burn	54007.00	0.13	1.07	6.62	9.57	0.87	0.78	3234

2.3 Flight Operations

2.3.1 Flight Operations Assumptions

- Flight Operations
Number of Aircraft: 12
Number of Annual LTOs (Landing and Take-off) cycles for all Aircraft: 2400
Number of Annual TGOs (Touch-and-Go) cycles for all Aircraft: 324
Number of Annual Trim Test(s) per Aircraft: 12

- Default Settings Used: Yes

- Flight Operations TIMs (Time In Mode)
Taxi/Idle Out [Idle] (mins): 18.5 (default)
Takeoff [Military] (mins): 0.2 (default)
Takeoff [After Burn] (mins): 0.2 (default)
Climb Out [Intermediate] (mins): 0.8 (default)
Approach [Approach] (mins): 3.5 (default)
Taxi/Idle In [Idle] (mins): 11.3 (default)

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 (default)
Approach (mins): 27 (default)
Intermediate (mins): 9 (default)
Military (mins): 9 (default)
AfterBurn (mins): 3 (default)

2.3.2 Flight Operations Formula(s)

- Aircraft Emissions per Mode for LTOs per Year
$AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * LTO / 2000$

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
LTO: Number of Landing and Take-off Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for LTOs per Year
$AE_{LTO} = AEM_{IDLE\_IN} + AEM_{IDLE\_OUT} + AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{LTO}: Aircraft Emissions (TONs)
AEM_{IDLE_IN}: Aircraft Emissions for Idle-In Mode (TONs)

AEM_{IDLE_OUT}: Aircraft Emissions for Idle-Out Mode (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for TGOs per Year
AEM_{POL} = (TIM / 60) * (FC / 1000) * EF * NE * TGO / 2000

AEM_{POL}: Aircraft Emissions per Pollutant & Mode (TONs)
TIM: Time in Mode (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
TGO: Number of Touch-and-Go Cycles (for all aircraft)
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for TGOs per Year
$AE_{TGO} = AEM_{APPROACH} + AEM_{CLIMBOUT} + AEM_{TAKEOFF}$

AE_{TGO}: Aircraft Emissions (TONs)
$AEM_{APPROACH}$: Aircraft Emissions for Approach Mode (TONs)
$AEM_{CLIMBOUT}$: Aircraft Emissions for Climb-Out Mode (TONs)
$AEM_{TAKEOFF}$: Aircraft Emissions for Take-Off Mode (TONs)

- Aircraft Emissions per Mode for Trim per Year
$AEPS_{POL}$ = (TD / 60) * (FC / 1000) * EF * NE * NA * NTT / 2000

$AEPS_{POL}$: Aircraft Emissions per Pollutant & Power Setting (TONs)
TD: Test Duration (min)
60: Conversion Factor minutes to hours
FC: Fuel Flow Rate (lb/hr)
1000: Conversion Factor pounds to 1000pounds
EF: Emission Factor (lb/1000lb fuel)
NE: Number of Engines
NA: Number of Aircraft
NTT: Number of Trim Test
2000: Conversion Factor pounds to TONs

- Aircraft Emissions for Trim per Year
$AE_{TRIM} = AEPS_{IDLE} + AEPS_{APPROACH} + AEPS_{INTERMEDIATE} + AEPS_{MILITARY} + AEPS_{AFTERBURN}$

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)

2.4 Auxiliary Power Unit (APU)

2.4.1 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

2.4.2 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

2.4.3 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

2.5 Aerospace Ground Equipment (AGE)

2.5.1 Aerospace Ground Equipment (AGE) Assumptions

- Default Settings Used: Yes

- AGE Usage
Number of Annual LTO (Landing and Take-off) cycles for AGE: 2400

- 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

2.5.2 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

2.5.3 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

3. Personnel

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: 93 Addtional Personnel for the ADAIR at Tyndall

- Activity Description:

- Activity Start Date
Start Month: 9
Start Year: 2020

- Activity End Date
Indefinite: No
End Month: 9
End Year: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.434237
SO_x	0.002917
NO_x	0.350319
CO	4.976922
PM 10	0.007758

Pollutant	Total Emissions (TONs)
PM 2.5	0.006606
Pb	0.000000
NH_3	0.026791
CO_2e	446.6

3.2 Personnel Assumptions

- Number of Personnel
Active Duty Personnel: 93
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)

3.3 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

3.4 Personnel Emission Factor(s)

- On Road Vehicle Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.282	000.002	000.207	003.392	000.006	000.005		000.023	00341.791
LDGT	000.376	000.003	000.373	004.889	000.007	000.006		000.024	00439.705
HDGV	000.832	000.005	000.964	016.217	000.016	000.014		000.046	00814.851
LDDV	000.084	000.003	000.127	002.822	000.004	000.004		000.008	00334.379
LDDT	000.227	000.004	000.365	004.850	000.007	000.006		000.008	00473.628
HDDV	000.423	000.014	004.175	001.653	000.176	000.162		000.028	01559.331
MC	003.040	000.003	000.626	013.017	000.026	000.023		000.052	00392.775

3.5 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

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Appendix C-3

Summary Air Conformity Applicability Model Reports

Record of Air Analysis (ROAA)

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TYNDALL AIR FORCE BASE HIGH SCENARIO SUMMARY

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 Protection; 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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Temporary Adversary Air (ADAIR) at Tyndall AFB, Florida

c. Project Number/s (if applicable):

d. Projected Action Start Date: 9 / 2020

e. Action Description:

The Proposed Action would contract for an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW and other units at Eglin AFB. Tyndall AFB would be staffed by an estimated 78 additional contracted maintenance personnel.

The high emission scenario assumes all 12 contractor aircraft are the F-15 with the F100-PW-100 Engine.

f. Point of Contact:
Name: Austin Naranjo
Title: Environmental Engineer - Air Quality Specialist
Organization: AFCEC/CZTQ
Email:
Phone Number: (210)749-7000

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR

93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	3.515	100	No
NOx	18.738	100	No
CO	29.833	100	No
SOx	1.590	100	No
PM 10	2.682	100	No
PM 2.5	2.443	100	No
Pb	0.000	25	No
NH3	0.004	100	No
CO2e	3806.3		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	10.545	100	No
NOx	56.214	100	No
CO	89.499	100	No
SOx	4.769	100	No
PM 10	8.046	100	No
PM 2.5	7.329	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	11419.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	7.909	100	No
NOx	42.161	100	No
CO	67.124	100	No
SOx	3.577	100	No
PM 10	6.034	100	No
PM 2.5	5.497	100	No
Pb	0.000	25	No
NH3	0.010	100	No
CO2e	8564.2		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No

SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Austin Naranjo, Environmental Engineer - Air Quality Specialist DATE

TYNDALL AIR FORCE BASE MEDIUM SCENARIO SUMMARY

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 Protection; 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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Temporary Adversary Air (ADAIR) at Tyndall AFB, Florida

c. Project Number/s (if applicable):

d. Projected Action Start Date: 9 / 2020

e. Action Description:

The Proposed Action would contract for an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW and other units at Eglin AFB. Tyndall AFB would be staffed by an estimated 78 additional contracted maintenance personnel.

The medium emission scenario assumes all 12 contractor aircraft are the F-16 with the F110-GE-100 Engine.

f. Point of Contact:
Name: Austin Naranjo
Title: Environmental Engineer - Air Quality Specialist
Organization: AFCEC/CZTQ
Email:
Phone Number: (210)749-7000

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR

93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.804	100	No
NOx	10.905	100	No
CO	15.079	100	No
SOx	1.036	100	No
PM 10	1.534	100	No
PM 2.5	1.023	100	No
Pb	0.000	25	No
NH3	0.004	100	No
CO2e	2536.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	5.411	100	No
NOx	32.714	100	No
CO	45.236	100	No
SOx	3.109	100	No
PM 10	4.601	100	No
PM 2.5	3.068	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	7609.4		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	4.058	100	No
NOx	24.536	100	No
CO	33.927	100	No
SOx	2.332	100	No
PM 10	3.451	100	No
PM 2.5	2.301	100	No
Pb	0.000	25	No
NH3	0.010	100	No
CO2e	5707.0		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No

SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Austin Naranjo, Environmental Engineer - Air Quality Specialist DATE

TYNDALL AIR FORCE BASE LOW SCENARIO SUMMARY

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 Protection; 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: TYNDALL AFB
State: Florida
County(s): Bay
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Temporary Adversary Air (ADAIR) at Tyndall AFB, Florida

c. Project Number/s (if applicable):

d. Projected Action Start Date: 9 / 2020

e. Action Description:

The Proposed Action would contract for an estimated 12 contractor aircraft to fly an estimated 2,400 annual sorties in support of the 33 FW and other units at Eglin AFB. Tyndall AFB would be staffed by an estimated 78 additional contracted maintenance personnel.

The low emission scenario assumes all 12 contractor aircraft are the F-5.

f. Point of Contact:
Name: Austin Naranjo
Title: Environmental Engineer - Air Quality Specialist
Organization: AFCEC/CZTQ
Email:
Phone Number: (210)749-7000

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are EPA General Conformity Rule (GCR) thresholds (de minimis levels) that are applied out of context to their intended use. Therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR de minimis threshold values are the maximum net change an action can acceptably emit in non-attainment and maintenance areas, these threshold values would also conservatively indicate an actions emissions within an attainment would also be acceptable. An air quality indicator value of 100 tons/yr is used based on the GCR de minimis threshold for the least severe non-attainment classification for all criteria pollutants (see 40 CFR

93.153). Therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	10.017	100	No
NOx	4.884	100	No
CO	52.836	100	No
SOx	0.754	100	No
PM 10	0.424	100	No
PM 2.5	0.411	100	No
Pb	0.000	25	No
NH3	0.004	100	No
CO2e	1641.8		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	30.050	100	No
NOx	14.653	100	No
CO	158.509	100	Yes
SOx	2.263	100	No
PM 10	1.273	100	No
PM 2.5	1.234	100	No
Pb	0.000	25	No
NH3	0.013	100	No
CO2e	4925.4		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	22.538	100	No
NOx	10.990	100	No
CO	118.882	100	Yes
SOx	1.697	100	No
PM 10	0.955	100	No
PM 2.5	0.925	100	No
Pb	0.000	25	No
NH3	0.010	100	No
CO2e	3694.1		

2023 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No

SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

Some estimated emissions associated with this action are above the GCR indicators, indicating a significant impact to air quality; therefore, further air assessment is needed.

Austin Naranjo, Environmental Engineer - Air Quality Specialist DATE

EGLIN E MILITARY OPERATIONS AREA HIGH EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 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
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin MOA E Emissions

c. Project Number/s (if applicable): Eglin MOA E Emissions

d. Projected Action Start Date: 9 / 2020

e. Action Description:

Eglin MOA E Emissions

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	16.420	100	No
CO	0.436	100	No
SOx	0.643	100	No
PM 10	0.436	100	No
PM 2.5	0.393	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1960.2		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	16.420	100	No
CO	0.436	100	No
SOx	0.643	100	No
PM 10	0.436	100	No
PM 2.5	0.393	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1960.2		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor DATE

EGLIN E MILITARY OPERATIONS AREA MEDIUM EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 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
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin MOA E Emissions

c. Project Number/s (if applicable): Eglin MOA E Emissions

d. Projected Action Start Date: 9 / 2020

e. Action Description:

Eglin MOA E Emissions

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.147	100	No
NOx	5.221	100	No
CO	2.018	100	No
SOx	0.385	100	No
PM 10	0.202	100	No
PM 2.5	0.129	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1181.0		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.147	100	No
NOx	5.221	100	No
CO	2.018	100	No
SOx	0.385	100	No
PM 10	0.202	100	No
PM 2.5	0.129	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1181.0		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor   DATE

EGLIN E MILITARY OPERATIONS AREA LOW EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 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
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin MOA E Emissions

c. Project Number/s (if applicable): Eglin MOA E Emissions

d. Projected Action Start Date: 9 / 2020

e. Action Description:

Eglin MOA E Emissions

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.705	100	No
NOx	0.403	100	No
CO	7.536	100	No
SOx	0.186	100	No
PM 10	0.002	100	No
PM 2.5	0.002	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	566.8		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.705	100	No
NOx	0.403	100	No
CO	7.536	100	No
SOx	0.186	100	No
PM 10	0.002	100	No
PM 2.5	0.002	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	566.8		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor DATE

WARNING AREA W-151 HIGH EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 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
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin W-151

c. Project Number/s (if applicable): Eglin W-151

d. Projected Action Start Date: 9 / 2020

e. Action Description:

Eglin W-151

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	16.420	100	No
CO	0.436	100	No
SOx	0.643	100	No
PM 10	0.436	100	No
PM 2.5	0.393	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1960.2		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.172	100	No
NOx	32.840	100	No
CO	0.873	100	No
SOx	1.285	100	No
PM 10	0.873	100	No
PM 2.5	0.786	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	3920.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.086	100	No
NOx	16.420	100	No
CO	0.436	100	No
SOx	0.643	100	No
PM 10	0.436	100	No
PM 2.5	0.393	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1960.2		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor   DATE

WARNING AREA W-151 MEDIUM EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 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
Regulatory Area(s): NOT IN A REGULATORY AREA

b. Action Title: Eglin W-151

c. Project Number/s (if applicable): Eglin W-151

d. Projected Action Start Date: 9/ 2020

e. Action Description:

Eglin W-151

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.147	100	No
NOx	5.221	100	No
CO	2.018	100	No
SOx	0.385	100	No
PM 10	0.202	100	No
PM 2.5	0.129	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1181.0		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.293	100	No
NOx	10.441	100	No
CO	4.037	100	No
SOx	0.769	100	No
PM 10	0.404	100	No
PM 2.5	0.257	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	2362.0		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.147	100	No
NOx	5.221	100	No
CO	2.018	100	No
SOx	0.385	100	No
PM 10	0.202	100	No
PM 2.5	0.129	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1181.0		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor DATE

WARNING AREA W-151 LOW EMISSION SCENARIO

1. General Information: The Air Force's ACAM was used to perform an analysis to assess the potential air quality impact(s) associated with the action in accordance with AFM 32-7002; the EIAP (32 CFR Part 989); and the GCR (40 CFR Part 93 Subpart B). This report provides a summary of the ACAM analysis.

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

b. Action Title: Eglin W-151

c. Project Number/s (if applicable): Eglin W-151

d. Projected Action Start Date: 9 / 2020

e. Action Description:

Eglin W-151

f. Point of Contact:
Name: Isaac Jimenez
Title: Contractor
Organization: Versar
Email: ijimenez@versar.com
Phone Number: 830-776-2315

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

_____ applicable
__X__ not applicable

Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions.

"Air Quality Indicators" were used to provide an indication of the significance of potential impacts to air quality. These air quality indicators are USEPA GCR thresholds (*de minimis* levels) that are applied out of context to their intended use; therefore, these indicators do not trigger a regulatory requirement; however, they provide a warning that the action is potentially significant. It is important to note that these indicators only provide a clue to the potential impacts to air quality.

Given the GCR *de minimis* threshold values are the maximum net change an action can acceptably emit in nonattainment and maintenance areas, these threshold values would also conservatively indicate an actions emission within an attainment would also be acceptable. An air quality indicator value of 100 tons/year is used based on the GCR *de minimis* threshold for the least severe nonattainment classification for all criteria pollutants (see 40 CFR § 93.153); therefore, the worst-case year emissions were compared against the GCR Indicator and are summarized below.

Analysis Summary:

2019

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.705	100	No
NOx	0.403	100	No
CO	7.536	100	No
SOx	0.186	100	No
PM 10	0.002	100	No
PM 2.5	0.002	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	566.8		

2020

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2021

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2022

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2023

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2024

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2025

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2026

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2027

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2028

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	1.411	100	No
NOx	0.806	100	No
CO	15.072	100	No
SOx	0.372	100	No
PM 10	0.004	100	No
PM 2.5	0.004	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	1133.5		

2029

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.705	100	No
NOx	0.403	100	No
CO	7.536	100	No
SOx	0.186	100	No
PM 10	0.002	100	No
PM 2.5	0.002	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	566.8		

2030 - (Steady State)

Pollutant	Action Emissions (ton/yr)	AIR QUALITY INDICATOR	
		Threshold (ton/yr)	Exceedance (Yes or No)
NOT IN A REGULATORY AREA			
VOC	0.000	100	No
NOx	0.000	100	No
CO	0.000	100	No
SOx	0.000	100	No
PM 10	0.000	100	No
PM 2.5	0.000	100	No
Pb	0.000	25	No
NH3	0.000	100	No
CO2e	0.0		

None of estimated emissions associated with this action are above the GCR indicators, indicating no significant impact to air quality; therefore, no further air assessment is needed.

Isaac Jimenez, Contractor　　　　DATE

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APPENDIX D

LISTED SPECIES POTENTIALLY OCCURRING IN THE ACTION AREA

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THREATENED AND ENDANGERED SPECIES/CRITICAL HABITAT

A list of species that could potentially occur at Tyndall Air Force Base (AFB), in areas within the noise contours and safety zones, and within the Tyndall Military Operations Areas, Air Traffic Control Assigned Airspaces, and Warning Areas was obtained from the United States Fish and Wildlife Service (USFWS) Environmental Conservation Online System website, National Marine Fisheries Service (NMFS) Listed Species lists, Florida Fish and Wildlife Conservation Commission (FWC), Florida Natural Areas Inventory (FNAI), and the Tyndall AFB Integrated Natural Resources Management Plan. The complete list of all federal and state listed species with the potential to occur in or near Tyndall AFB and the special use airspace is provided in **Table D-1**.

References

FNAI. 2019. *Searchable Tracking List*. <https://www.fnai.org/trackinglist.cfm>. Accessed May 2019.

FWC. 2019. *Species Profiles*. <https://myfwc.com/wildlifehabitats/profiles>. Accessed May 2019.

Tyndall AFB. 2015. *Tyndall Air Force Base Integrated Natural Resources Management Plan*.

USFWS. 2019. *Environmental Conservation Online System*. <https://ecos.fws.gov/ecp/>. Accessed April 2019.

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Birds									
American oystercatcher (*Haematopus palliates*)	-	T		X					
Black skimmer (*Rynchops niger*)	-	T		X					
Eastern black rail (*Laterallus jamaicensis* ssp. *jamaicensis*)	PT	-					X		
Florida burrowing owl (*Athene cunicularia floridana*)	-	T		X					
Florida sandhilll crane (*Antigone canadensis pratensis*)	-	T		X					
Least tern (*Sterna antillarum*)	-	T	X	X		X	X		
Little blue heron (*Egretta caerulea*)	-	T		X	X				
Marian's marsh wren (*Cistothorus palustris marianae*)	-	T		X					
Piping plover (*Charadrius melodus*)	T	T		X		X	X		
Reddish egret (*Egretta rufescens*)	-	T		X					
Red-cockaded woodpecker (*Picoides borealis*)	E	E	X	X	X	X	X		
Red knot (*Calidris canutus rufa*)	T	T	X	X		X	X		
Snowy plover (*Charadrius alexandrinus tenuirostris*)	-	T	X	X		X	X		
Southeastern American kestrel (*Falco sparverius paulus*)	-	T	X	X	X	X	X		
Tricolored heron (*Egretta tricolor*)	-	T		X	X				

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Wood stork (*Mycteria americana*)	T	T	X	X	X	X	X		
Mammals									
Choctawhatchee beach mouse (*Peromyscus polionotus allophrys*)	E	E	X	X		X			
Fin whale (*Balaenoptera physalus*)	E	-						X	X
Bryde's whale – Gulf of Mexico DPS (*Balaenoptera edeni*)	E	-						X	X
Gray bat (*Myotis grisescens*)	E	E			X	X			
Red wolf (*Canis rufus*)	E	E					X		
Sperm whale (*Physeter macrocephalus*)	E	-						X	X
Sei whale (*Balaenoptera borealis*)	E	-						X	X
St. Andrew beach mouse (*Peromyscus polionotus peninsularis*)	E	E	X		X	X			
West Indian manatee (*Trichechus manatus*)	T	-	X	X	X	X			
Reptiles									
Eastern indigo snake (*Drymarchon corais couperi*)	T	T	X			X	X		
Florida pine snake (*Pituophis melanoleucus mugitus*)	-	T							
Gopher tortoise (*Gopherus polyphemus*)	C	T	X			X	X		
American alligator (*Alligator mississippiensis*)	T (S/A)	-	X	X	X	X	X		
Green turtle (North Atlantic DPS) (*Chelonia mydas*)	T	-	X	X		X	X	X	X

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Hawksbill turtle (*Eretmochelys imbricata*)	E	-	X	X		X	X	X	X
Kemp's ridley sea turtle (*Lepidochelys kempii*)	E	-	X	X		X	X	X	X
Leatherback turtle (*Dermochelys coriacea*)	E	-	X	X		X	X	X	X
Loggerhead turtle (Northwest Atlantic DPS) (*Caretta caretta*)	T	-	X	X		X	X	X	X
Amphibians									
Florida bog frog (*Lithobates okaloosae*)	-	T		X					
Red Hills salamander (*Phaeognathus hubrichti*)	T	-			X				
Reticulated flatwoods salamander (*Ambystoma bishopi*)	T	T	X			X	X		
Fish									
Atlantic sturgeon (Gulf subspecies) (*Acipenser oxyrinchus* [=*oxyrhynchus*] *desotoi*)	T	T	X			X	X		
Blackmouth shiner (*Notropis melanostamus*)	-	T		X					
Giant manta ray (*Manta birostris*)	T	T						X	X
Gulf sturgeon (*Acipenser oxyrinchus desotoi*)	T	T		X	X			X	X
Nassau grouper (*Epinephelus striatus*)	T	T						X	X
Oceanic whitetip shark (*Carcharhinus longimanus*)	T	-						X	X
Okaloosa darter (*Etheostoma okaloosae*)	T			X					
Smalltooth sawfish (*Pristis pectinata*)	E	E						X	X

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Mollusks									
Alabama pearlshell (*Margaritifera marrianae*)	E	E			X				
Chipola slabshell (*Elliptio chipolaensis*)	T	T	X			X	X		
Choctaw bean (*Villosa choctawensis*)	E	E	X	X		X			
Fat threeridge (mussel) (*Amblema neislerii*)	E	E	X			X	X		
Fuzzy pigtoe (*Pleurobema strodeanum*)	T	T	X	X		X			
Gulf moccasinshell (*Medionidus penicillatus*)	E	E	X			X			
Narrow pigtoe (*Fusconaia escambia*)	T			X					
Ochlockonee moccasinshell (*Medionidus simpsonianus*)	E	E				X	X		
Oval pigtoe (*Pleurobema pyriforme*)	E	E	X			X			
Purple bankclimber (mussel) (*Elliptoideus sloatianus*)	T	T	X			X	X		
Round ebonyshell (*Fusconaia rotulata*)	E	E			X				
Shinyrayed pocketbook (*Lampsilis subangulata*)	E	E	X			X			
Southern kidneyshell (*Ptychobranchus jonesi*)	E	E	X	X		X			
Southern sandshell (*Hamiota australis*)	T	T	X	X					
Tapered pigtoe (*Fusconaia burkei*)	T	T	X	X		X			
Crustaceans									

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Panama City crayfish (*Procambarus econfinae*)	PT	SSC	X	X		X			
Plants									
Alabama spiney pod (*Matela alabamensis*)	-	E		X	X				
Apalachicola dragonhead (*Physotegia godfreyi*)	-	T	X			X	X		
Apalachicola rosemary (*Conradina glabra*)	E	-				X	X		
Arkansas oak (*Quercus arkansana*)	-	T		X	X				
Ashe's magnolia (*Magnolia ashei*)	-	E		X	X				
Batzel's sedge (*Carex baltzelli*)	-	T		X					
Beacked spikerush (*Eleocharis rostellata*)	-	E		X					
Bogbuttons (*Lachnocaulon digynum*)	-	T		X					
Bog spice bush (*Lindera subcoriacea*)	-	E		X	X				
Carolina lily (*Lilium michauxii*)	-	E		X	X				
Chaffseed (*Schwalbea americana*)	-	E		X					
Chapman's butterwort (Pinguicula planifolia)	-	T	X			X	X		
Chapman's crownbeard (*Verbesina chapmanii*)	-	T	X			X	X		
Chapman rhododendron (*Rhododendron chapmanii*)	E	-				X	X		

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Cooley's meadowrue (*Thalictrum cooleyi*)	E	-		X		X	X		
Coville's rush (*Juncus gymnocarpus*)	-	E		X					
Cruise's golden aster (*Chrysopsis gossypina* ssp.*cruiseana*)	-	E		X					
Curtiss' sandgrass (*Calamovilfa curtissii*)	-	T		X					
Dew thread sundew (*Drosera filiformis*)	-	E	X			X	X		
Dwarf witch-alder (*Fothergilla gardenia)*	-	E		X					
Eared coneflower (*Rudbeckia auriculata*)	-	E		X	X				
Florida skullcap (*Scutellaria floridana*)	T	-	X	X	X	X	X		
Florida torreya (*Torreya taxifolia*)	E	-				X	X		
Fringed campion (*Silene polypetala*)	E	-				X			
Gentian pinkroot (*Spigelia gentianoides*)	E	-		X		X			
Giant water dropwort (*Oxypolis greenmanii*)	-	E	X			X	X		
Godfrey's butterwort (*Pinguicula ionantha*)	T	E	X	X	X	X	X		
Godfrey's golden aster (*Chrysopis godfreyi*)	-	E	X	X		X	X		
Green adder's mouth (*Malaxis unifolia*)	-	E		X					
Gulf coast lupine (*Lupinus westianus*)	-	T	X	X	X	X	X		

Table D-1
Federally and State Listed Species with the Potential to Occur at Tyndall Air Force Base and the Special Use Airspace

Species	Federal Status[1]	State Status[2]	Tyndall AFB	Special Use Airspace					
				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Harper's beauty (*Harperocallis flava*)	E	-	X	X	X	X	X		
Harper's yellow-eyed grass (*Xyris scabrifolia*)	-	T	X	X	X	X	X		
Harry peduncled beakrush (*Rhynchospora crinipes*)	-	E		X					
Heartfelt (*Hexastylis arifolia*)	-	T		X					
Henry's spider lily (*Hymenocallis henryae*)	-	E	X	X	X	X	X		
Hummingbird flower (*Macranthera flammea*)	-	E		X					
Indian cucumber-root (*Medeola virginiana*)	-	E		X					
Karst pond yellow-eyed grass (*Xyris longisepala*)	-	E	X	X	X	X	X		
Large-leaved jointweed (*Polygonella macrophylla*)	-	T	X	X	X	X	X		
Little club-spur orchid (*Platanthera clavellata*)	-	E		X					
Many-flowered grass-pink (*Calopogon multiflorus*)	-	E		X					
Mountain laurel (*Kalmia latifolia*)	-	T		X					
Naked-stemmed panic grass (*Panicum nudicaule*)	-	T		X	X				
Orange azalea (*Rhododendron austrinum*)	-	E		X	X				
Panhandle lily (*Lilium iridollae*)	-	E		X					
Panhandle meadowbeauty (*Rhexia salicifolia*)	-	T		X					

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				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Papery whitlow-wort (*Paronychia chartacea*)	T	-	X	X		X			
Parrot pitcher plant (*Sarracenia psittacina*)	-	T	X			X	X		
Piedmont jointgrass (*Coelorachis tuberculosa*)	-	T		X					
Pine barren false-foxglove (*Agalinis georgiana*)	-	E		X					
Pineland hoary pea (*Tephrosia mohrii*)	-	T		X	X				
Pine sap (*Monotropa hypopithys*)	-	E		X	X				
Pine woods bluestem (*Andropogon arctatus*)	-	E		X					
Pineland wild indigo (*Baptisia calycosa* var *villosa*)	-	T		X					
Pondberry (*Lindera melissifolia*)	E	-			X				
Pondspice (*Litsea aestivalis*)	-	E		X					
Primrose-flowered butterwort (*Pinguicula primuliflora*)	-	E		X					
Purple pitcher plant (*Sarracenia rosea*)	-	T	X			X	X		
Pyramid magnolia (*Magnolia pyramidata*)	-	E		X	X				
Quillwort yellow-eyed grass (*Xyris isoetifolia*)	-	E	X			X	X		
Serviceberry holly (*Ilex amelanchier*)	-	T		X					
Silky camellia (*Stewartia malacodendron*)	-	E		X					

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				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
Small-flowered meadow beauty (*Rhexia parviflora*)	-	E		X					
Small spreading pogonia (*Pogonia bifaria*)	-	E	X			X	X		
Snakemouth orchid (*Pogonia ophioglossoides*)	-	T	X			X	X		
Southern milkweed (*Asclepias viridula*)	-	T	X	X	X	X	X		
Southern red lily (*Lilium catesbaei*)	-	T	X			X	X		
Spoon-leafed sundew (*Drosera intermedia*)	-	T	X			X	X		
Southern yellow fringeless orchid (*Platanthera integra*)	-	E		X	X				
Sweet pitcherplant (*Sarracenia rubra*)	-	T		X	X				
Sweet shrub (*Calycanthus floridus* var. *floridus*)	-	E		X					
Telephus spurge (*Euphorbia telephioides*)	T	-	X	X	X	X	X		
Thick-leaved water willow (*Justicia crassifolia*)	-	E	X			X	X		
Thorne's buckthorn (*Sideroxylon thornei*)	-	E		X					
Toothed savory (*Calamintha dentata*)	-	T		X					
Trailing arbutus (*Epigaea repens*)	-	E		X					
Umbrella magnolia (*Magnolia tripetala*)	-	E		X					
West's flax (*Linum westii*)	-	E		X					

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				Eglin E MOA	Rose Hill MOA	Tyndall B and C/H MOAs	Tyndall E MOA	Warning Area W-151	Warning Area W-470
White birds-in-a-nest (*Macbridea alba*)	T	-	X	X	X	X	X		
White-flowered wild petunia (*Ruellia noctiflora*)	-	E	X			X	X		
Wild pink (*Silene caroliniana*)	-	E		X	X				
Wiregrass gentian (*Gentiana pennelliana*)	-	E	X			X	X		
Yellow-flowered butterwort (*Pinguicula lutea*)	-	T	X			X	X		
Yellow-root (*Xanthorhiza simplicissima*)	-	E		X					
Lichens									
Florida perforate cladonia (*Cladonia perforata*)	E	E		X					

Source:
[1] USFWS, 2019
[2] FWC, 2019; FNAI, 2019; Tyndall AFB, 2015

AFB = Air Force Base; C = Candidate; DPS = Distinct Population Segment; E = Endangered; MOA = Military Operations Area; PT = Proposed Threatened; S/A = Similarity of Appearance (removes federal agency responsibilities under Section 7 of the Endangered Species Act); SSC = Species of Special Concern; T = Threatened