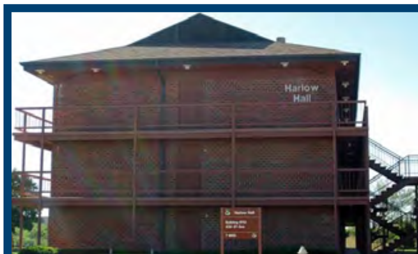
DRAFT
ENVIRONMENTAL ASSESSMENT FOR INSTALLATION DEVELOPMENT AT DYESS AFB, TEXAS



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COVER SHEET

DRAFT ENVIRONMENTAL ASSESSMENT FOR INSTALLATION DEVELOPMENT AT DYESS AFB, TEXAS

Responsible Agency: 7th Bomb Wing (7 BW), Dyess Air Force Base (AFB), Texas.

Proposed Action: The proposed actions consist of 14 different infrastructure projects on Dyess AFB.

Point of Contact: Mr. Tommy Downing, Community Planner 7 CES/CENPP, Dyess AFB, 325-696-2050

Report Designation: Draft Environmental Assessment (EA)

Abstract: Dyess AFB is preparing an EA for installation development to address deficiencies of function and capability in the facilities and infrastructure that result from obsolescence, deterioration, and evolving mission needs. The purpose of the installation development program is to provide a developmental path forward that incorporates known and projected mission requirements. Installation development has been planned relative to known constraints, functional use opportunities, and recommended courses of action to achieve optimal use of land, facilities and resources in support of installation missions. The proposed actions include 14 different projects. These projects are all within the boundaries of the installation and include new facility construction, building demolition, building renovation, infrastructure development (parking lots, utility lines), the relocation of the existing inert grenade range, and tree clearing.

During the facility planning, floodplains were identified and avoided where possible. However, due to the extent of floodplains on Dyess AFB, particularly near the large diversion ditches, no practicable alternatives to approximately 8.35 acres of construction in floodplains were identified. No permanent changes to National Flood Insurance Program (NFIP) flood hazard areas or floodplains are anticipated to result from any of the proposed projects.

The following resources were not carried forward for detailed analysis in this EA: Airspace, Aesthetics and Visual Resources, Surface Transportation, Hazardous Materials and Wastes, Socioeconomics, and Environmental Justice. Based on the analysis in the EA, implementing the proposed actions would not result in significant adverse impacts on the human or natural environment; therefore, preparing an Environmental Impact Statement (EIS) is not required.

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ACRONYMS AND ABBREVIATIONS

7 BW	7th Bomb Wing
317 AG	317th Airlift Group
317 OSS	317th Operational Support Squadron
°C	degrees Celsius
°F	degrees Fahrenheit
AFB	Air Force Base
ACAM	Air Conformity Applicability Model
ADA	Americans with Disabilities Act
AFI	Air Force Instruction
AFGSC	Air Force Global Strike Command
AFMAN	Air Force Manual
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
AMU	Aircraft Maintenance Unit
APE	Area of Potential Effect
AT/FP	Anti-Terrorism/Force Protection
BASH	bird-aircraft strike hazard
BCC	Birds of Conservation Concern
BCR	Bird Conservation Region
BDOC/ECC	Base Defense Operations Center and Emergency Communications Center
BMP	Best Management Practice
C&D	construction and demolition
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CGP	Construction General Permit
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act
CZ	clear zone
D4A	Dorms-4-Airmen
dB	decibel(s)
dBA	A-weighted decibel(s)
dBP	peak level decibel(s)
DCC	Deployment Control Center
DNL	day-night average sound level
DoD	U.S. Department of Defense
DoDI	Department of Defense Instruction
EA	Environmental Assessment
ECP	Entry Control Point
EIS	Environmental Impact Statement
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act

ACRONYMS AND ABBREVIATIONS (Continued)

ETL	Engineering Technical Letter
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FOD	Foreign Object Debris
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
GHG	greenhouse gas
GIS	geographic information system
GOV	government-owned vehicle
GWP	global warming potential
HAP	hazardous air pollutant
HQ	Headquarters
ICRMP	Integrated Cultural Resource Management Plan
IDP	Installation Development Plan
IDRC	Installation Deployment Readiness Cell
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Conservation
IPE	Individual Protective Equipment
kV	kilovolt
LEED	Leadership in Energy and Environmental Design
LUC	Land Use Control
LZ	Landing Zone
MBTA	Migratory Bird Treaty Act
MCF/day	thousand cubic feet per day
MGD	million gallons per day
MILCON	Military Construction
MSA	Munitions Storage Area
mVA	megavolt ampere
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
O&M	Operations and Maintenance
OSHA	Occupational Safety and Health Administration
PIF	Partners in Flight
$PM_{2.5}$	particulate matter less than or equal to 2.5 micrometers in diameter
PM_{10}	particulate matter less than or equal to 10 micrometers in diameter
POV	privately owned vehicle

ACRONYMS AND ABBREVIATIONS (Continued)

PPV	Public-Private Venture
PVA	Project Validation Assessment
QD	Quantity Distance
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
ROW	right-of-way
RSS	Right Sizing Study
SDZ	Surface Danger Zone
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_x	sulfur oxides
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TCP	Traditional Cultural Property
TMDL	total maximum daily load
TPWD	Texas Parks and Wildlife Department
TLF	Temporary Lodging Facility
TNDD	Texas Natural Diversity Database
TWDB	Texas Water Development Board
UFC	Unified Facilities Criteria
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USC	*United States Code*
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VCC	Visitor Control Center
VOC	volatile organic compound

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1.0 PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The 7th Bomb Wing (7 BW) at Dyess Air Force Base (AFB), Texas, and Headquarters (HQ) Air Force Global Strike Command (AFGSC) have identified priorities for installation development projects and propose to implement these projects over the next three years (2017-2019). This Environmental Assessment (EA) for installation development was prepared to evaluate the potential environmental impacts of implementing these proposed projects in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 (Secretary of the Air Force 2003).

The intent of the ongoing installation development at Dyess AFB is to provide infrastructure improvements necessary to support the missions of the 7 BW and the Dyess AFB tenant units. The 14 projects considered in this EA were identified as priorities for installation development in the Dyess AFB Installation Development Plan (IDP) (Dyess AFB 2016a). This plan identifies requirements for the improvement of the physical infrastructure and functionality of Dyess AFB, including the current and future missions, facilities and infrastructure requirements, development constraints and opportunities, and functional land use relationships.

Dyess AFB is located in Taylor County in west central Texas near Abilene (Figure 1-1). The installation encompasses approximately 5,424 acres of land and hosts three runways (Dyess AFB 2016a). Runway 16/34 is a north-south runway that is 13,500 feet long and 300 feet wide. Runways 163/343 and 164/344 (C-130 landing zones) located west of Runway 16/34 are 3,500 feet long and 60 feet wide.

Originally established and operated as Abilene Army Airfield in 1942, Dyess AFB has hosted a variety of missions and aircraft types throughout its history. The 7 BW is responsible for providing combat-ready B-1B aircraft, crews and associate combat support for global engagement taskings. The primary tenants at Dyess AFB include the 489th Bomb Group, the 317th Airlift Group (317 AG), the 436th Training Squadron, the 77th Weapons Squadron, the 337th Test and Evaluations Squadron and the Armed Forces Reserves Center. The B-1B and the C-130J Super Hercules are the only aircraft stationed at Dyess AFB.

The intent of the 7 BW is to streamline NEPA compliance and facilitate the installation development process by evaluating the potential impacts of implementing installation development projects in one integrated document.

The information presented in this document will serve as the basis for determining if implementation of the proposed action would result in a significant impact to the natural and human environments, requiring the preparation of an Environmental Impact Statement (EIS), or whether no significant impacts would result, in which case a Finding of No Significant Impact (FONSI) would be appropriate. Because implementation of some of the proposed actions would involve "construction" in floodplains, per Executive Order (EO) 11988, *Floodplain Management* as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, a Finding of No Practicable Alternative (FONPA) would be prepared in conjunction with the FONSI.

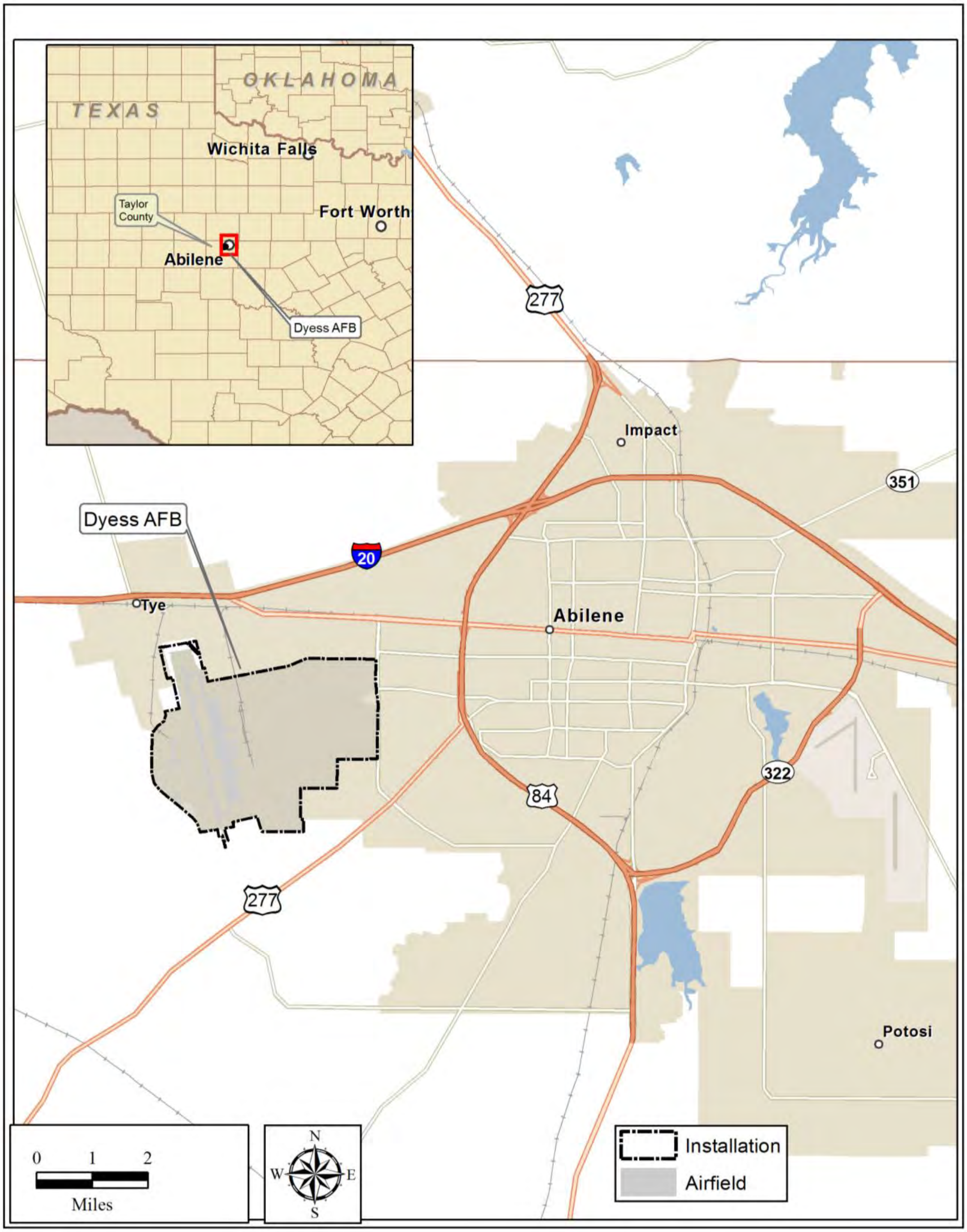

Figure 1-1. Location of Dyess AFB

1.2 PURPOSE OF INSTALLATION DEVELOPMENT

The purpose of the installation development program is to provide a developmental path forward that incorporates known and projected mission requirements. Installation development has been planned relative to known constraints, functional use opportunities, and recommended courses of action to achieve optimal use of land, facilities and resources in support of installation missions.

1.3 NEED FOR INSTALLATION DEVELOPMENT

Installation development is needed to address deficiencies of function and capability in the facilities and infrastructure at Dyess AFB that result from obsolescence, deterioration, and evolving mission needs. These deficiencies are remedied through an ongoing process of construction of new facilities and infrastructure, renovation of existing facilities, and demolition of redundant or obsolete facilities. Left unchecked, these deficiencies would degrade the ability of the installation to meet U.S. Air Force (USAF) and U.S. Department of Defense (DoD) current and future mission requirements relative to state and/or federal requirements.

Providing and maintaining up-to-date and adequately sized and safe infrastructure is needed to allow the 7 BW and its tenant units to successfully complete their missions. Installation development projects must be developed in a manner that:

1. Meets applicable DoD installation master planning criteria, consistent with Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning*; AFI 32-7062, *Comprehensive Planning;* and Air Force Policy Directive 32-10, *Installations and Facilities*;
2. Meets all applicable DoD, federal, state, and local laws and regulations such as but not limited to the Endangered Species Act (ESA), National Historic Preservation Act (NHPA), Clean Water Act (CWA), Clean Air Act (CAA), Resource Conservation and Recovery Act (RCRA) and Migratory Bird Treaty Act (MBTA). More detailed information regarding resource specific laws and regulations are provided in the specific resource sections located in Chapter 3;
3. Aligns with the 2011 Air Force Civil Engineering Strategic Plan (USAF 2011);
4. Provides reliable utilities and an efficient transportation system to support Dyess AFB and meets current USAF requirements for functional space, consistent with Air Force Manual (AFMAN) 32-1084, *Facility Requirements* (26 February 2016);
5. Meets applicable DoD antiterrorism/force protection (AT/FP) criteria, consistent with UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings*;
6. Reduces the consumption of fuel, energy, water, and other resources; maximizes the use of existing facilities; and reduces the footprint of unnecessary or redundant facilities and infrastructure in accordance EO 13693, *Planning for Federal Sustainability in the Next Decade,* and the Energy Policy Act of 2005;
7. Supports and enhances the morale and welfare of personnel assigned to the installation, their families, and civilian staff, consistent with Department of Defense Instruction (DoDI) 1015.10, *Military Morale, Welfare, and Recreation (MWR) Programs* (6 July 2009).

1.4 PURPOSE OF AND NEED FOR INDIVIDUAL AND PROPOSED ACTIONS

Each of the proposed actions (or projects) included in this EA has a specific purpose and need. The purpose and need for each of the installation development projects is presented in Table 1-1.

Table 1-1. Purpose and Need for Installation Development Projects

Project ID	Project Name	Purpose of and Need for the Action
Facility Construction Projects		
C01	Construct 317th Airlift Group HQ Building	The purpose of this project is to improve operational efficiencies, reduce redundant functions and eliminate mission workarounds in this facility. The 317 AG's facilities are substandard and undersized and more space is needed for the number of assigned personnel. In addition, in June 2017 the 317 AG will be converted to a Wing, which will require more personnel. The current HQ Building (6015) is a 1950 wood frame structure that is not compliant with the Americans with Disabilities Act (ADA) and not feasible for structural and utility upgrades that comply with energy efficient and sustainable development mandates. The 317th Operational Support Squadron (317 OSS) functions are currently operating out of four separate buildings and construction of this new building would consolidate all of those functions into one building.
C02	Construct Armament Management Building	The purpose of this project is to move personnel not working with explosives outside of the Munitions Storage Area (MSA) to increase personnel safety, optimize mission capability, and permit employees to work in compliance with AFMAN 91-201, *Explosive Safety Standards*. Placing non-explosive armament activities within explosive Quantity Distance (QD) Arcs puts personnel at unnecessary life threatening risks and places critical bomb delivery operations unprotected from breakdown or total destruction. This requirement is part of the short term initiative within the Munitions Facility Strategic Plan to move all personnel that do not work directly with explosives, outside the MSA. Construction of the new armament management building would provide an energy efficient, ADA-compliant facility outside of the QD arcs providing a safe separation of personnel not working with explosives. In effect, this project would accomplish two critical objectives; increase personnel safety and optimize mission capability.
C03	Construct Dormitory	The purpose of this project is to provide a dormitory facility for airman that meets the requirements of modern dormitory standards. The 2011 Dyess AFB Dormitory Master Plan identified a deficit of 38 beds/rooms on Dyess AFB and recommended that all unaccompanied dormitories should be renovated to the new Dorms-4-Airmen (D4A) configuration. In addition, based on the analysis completed in the master plan, it was recommended that one new 144 enlisted person dormitory be constructed. Previous 2-person dormitories provided a private room for each airman along with a shared bathroom/kitchen. The newer D4A configuration provides each airman a private room and bathroom with a shared living room, kitchen, and laundry facilities with three other airmen. Modern dormitories provide a level of emotional and financial stability that many airmen need and as such will advance the installation's vision to develop innovative and motivated airman to be mission ready to fly and fix aircraft, deploy, and operate safely on and off duty.
C04	Construct Temporary Lodging Facility	Based upon an Air Force-Wide Lodging Right Sizing Study (RSS), along with the Dyess Property Management System and the annual installation Temporary Lodging Facility (TLF) occupancy rates there is a need to replace substandard temporary lodging inventory at Dyess AFB. Information was garnered from guest registration, occupancy and reservations made during the last three full fiscal years and year-to-date to demonstrate occupancy trends in this area. The purpose of this project is to provide temporary lodging facilities at Dyess AFB that meet the documented market demand for 20 additional units that comply with USAF standards for temporary lodging facilities (AFI 34-135, *Air Force Lodging Program*).

Table 1-1. Purpose and Need for Installation Development Projects (Continued)

Project ID	Project Name	Purpose of and Need for the Action
Facility Construction Projects (Continued)		
C05	Construct Joint Forces Deployment Control Center	The current Deployment Control Center (DCC) has a limit of 250 passengers per deployment. On average, the 9th Bombing Squadron deployment is 275-300 passengers. The current building is a converted nose dock bolted down to the apron. During rain events, water flows underneath the facility into the building. The current configuration of the DCC has had no improvements since the 1950's era hangar was converted to Mobility Processing in 1980. Insufficient space and flawed building configuration require deployed personnel to stage outside, leave the sterile area during processing to obtain supplies at a separate mobility warehouse, and comingle between processed & unprocessed troops. Recurring rodent and water damage from roof leaks, wall exposures, and ground flooding have resulted in substantial repairs. In addition, the associated warehouse facilities lack sufficient storage and climate control to properly store and distribute deployment equipment. Damp and moldy conditions within the Installation Deployment Readiness Center (IDRC) and Individual Protective Equipment (IPE) warehouse pose health threats to Airmen. The purpose of the proposed project would be to provide an adequate space to efficiently deploy 300-350 passengers with minimal deployment processing errors and mission delays and to house deployment materials in a climate controlled, mold free environment. The need for the project is to ensure that the 7 BW active and reserve and the 317 AG, Marine and Army tenants can deploy from Dyess AFB without adverse health impacts and mission delays.
C06	Construct Crash Evaluation Facility	The purpose of and need for this project is to provide an area where aircraft parts can be arranged over a large area simulating an aircraft crash site. Dyess AFB currently does not have a facility such as this and teams routinely travel to Holloman AFB to conduct aircraft crash site training.
C07	Construct the Bowling Center	The purpose of the project is to construct a bowling center that will meet the recreational needs of base personnel. The bowling center at Building 7115 was originally constructed in 1959 as a 10-lane bowling center. An additional six lanes were added in 1984 due to high demand. The current facility is substandard due to deteriorating conditions. The plumbing and mechanical systems are undersized and require frequent repair. The roof is rated as the worst on base. The electrical and mechanical systems are undersized. The bathrooms are inadequate to meet current demand and there is a lack of storage throughout the facility to include a snack bar, a pro shop, and a maintenance area. Continued operation in this substandard facility provides less than adequate service to airmen and generates excessive maintenance costs.
Infrastructure Construction Projects		
I01	Construct GOV Parking Lot Extension 5225	The existing parking lot at Building 5225 is not large enough to accommodate the required number of vehicles and equipment at this location. The purpose of constructing this lot extension is to support equipment consolidation and increased equipment and government-owned vehicle (GOV) storage needs for the Aircraft Maintenance Unit (AMU) facility located in Building 5225. This parking lot extension is needed because there is a lack of parking and working space at this location which causes congestion, delays, and in some cases has caused property damage.
I02	Construct 6-Inch Water Pipeline	The purpose of the project is to provide fire protection for valuable resources and facilities at this location. The project is needed because there is currently no water supply available at this location. First responders and fire trucks have lengthy response times to this area due to the lack of any water lines and associated hydrants at this remote location.

Table 1-1. Purpose and Need for Installation Development Projects (Continued)

Project ID	Project Name	Purpose of and Need for the Action
		Renovation and Repair Projects
R01	Renovate Building 9265, Visitor Control Center	The purpose of this project is to provide a Visitor Control Center (VCC) that complies with current UFC requirements and is fully compliant with other applicable standards and codes including life safety, ADA, and AT/FP requirements. The current VCC is not of sufficient size to safely and efficiently manage and process visitors to Dyess AFB. The VCC requires a sufficiently sized waiting room and the capability to accommodate at least three visitor pass processing lines to effectively process individual customers and large contractor groups working on base. The current VCC does not have sufficient administrative space to manage both routine and non-routine 24-hour operations. The current VCC does not have ADA-compatible restrooms or sufficient parking. The current VCC services approximately 70,000 visitors per year including numerous groups at one time; however, current space has room for only three seating spots and essentially no extra standing room space which often requires visitors to line-up outside the building. The building does not have a separate room for use as a holding area to retain individuals picked-up on base by Security Forces to be transferred to local law enforcement officials. The current VCC size prohibits utilization of any physical security protection devices for the staff in the event of an active shooter event. The current building, with 24/7 operations, does not have space for an employee break room.
R02	Renovate Building 7232	The purpose of the proposed project is to consolidate the security forces squadron into a single facility in order to maximize space and increase efficiency. Security Forces are scattered in multiple substandard facilities across the base. The current facility, Building 7232 is involved in a 3-phase plan to maximize facility space, dispose of excess space and bring various functions in alignment with the base IDP. Building 7232 will be vacated and ready for renovation in order to accommodate 7 Security Forces operations.
		Demolition Projects
D01	Demolish Library Building	The purpose of this demolition is to remove an obsolete facility on Dyess AFB. Building 6142 is the former library at Dyess AFB. All of the contents of the library have been transferred to other USAF libraries or the Abilene Library and the building is vacant and obsolete.
		Other Projects
O01	Relocate the Inert Grenade Range	The existing inert grenade range is used for proficiency training with inert rounds only and the relocated grenade range would be used for the same purpose with inert rounds. The existing inert grenade range utilizes a Surface Danger Zone (SDZ) that extends outside the boundary of the installation to the south and west outside of USAF property in violation of Engineering Technical Letter (ETL) 11-18. The purpose of this project is to construct a new inert grenade range with an SDZ that remains within the boundary of Dyess AFB. An inert grenade range is necessary on Dyess AFB due to the Security Forces training requirements at this installation. The new inert grenade range would be constructed in compliance with ETL 11-18.
O02	Clear Trees South of Runway 164/344	The purpose of this project is to comply with airfield clearance criteria for Runway 164/344 by removing trees that are obstructing the approach/departure clearance surface. The project is needed to comply with USAF facility requirements (UFC 3-260-01, *Airfield and Heliport Planning and Design*).

1.5 INTERAGENCY/INTERGOVERNMENTAL COORDINATION AND CONSULTATIONS

1.5.1 Interagency Coordination and Consultations

Scoping is an early and open process for developing the breadth of issues to be addressed in the EA and for identifying significant concerns related to a proposed action. Per the requirements of Intergovernmental Cooperation Act of 1968 (42 *USC* 4331(a)) and EO 12372, federal, state, and local agencies with jurisdiction that could be affected by the proposed actions were notified during the development of this EA.

Appendix A contains the list of agencies consulted during this analysis and copies of the correspondence.

1.5.2 Government-to-Government Consultations

The NHPA, 36 *CFR* Part 800 and EO 13175, *Consultation and Coordination with Indian Tribal Governments* direct federal agencies to consult with Native American tribal governments and seek their input when identifying Traditional Cultural Properties (TCPs), evaluating TCP eligibility for the National Register of Historic Places (NRHP), and (if the TCP is eligible) resolving adverse effects of the proposed action(s). In accordance with the NHPA, EO 13175, DoDI 4710.02, *DoD Interactions with Federally-Recognized Tribes*, and AFI 90-2002, *Air Force Interaction with Federally-recognized Tribes*, the following federally-recognized tribes historically affiliated with the Dyess AFB geographic region have been invited to consult on the proposed undertakings and provide comments: the Comanche Nation of Oklahoma; the Apache Tribe of Oklahoma; the Jicarilla Apache Nation; the Fort Sill Apache Nation of Oklahoma; the Mescalero Apache Tribe; and the Kiowa Indian Tribe of Oklahoma.

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 Dyess AFB point-of-contact for Native American tribes is the Installation Commander.

The letters to Native American tribal governments that have been coordinated or consulted with regarding these actions are included in Appendix A.

1.5.3 Other Agency Consultations

Section 7 of the ESA requires federal agencies to consult with the U.S. Fish and Wildlife Service (USFWS) when a proposed action may affect a federally-listed plant or animal species or designated critical habitat. Because no such species or habitat is present on Dyess AFB, the USAF has determined that the proposed actions will have no effect on them, and consultation is not required.

Section 106 of the NHPA and its implementing regulations at 36 *CFR* Part 800 require federal agencies to consult with the State Historic Preservation Office (SHPO) when a proposed action is a type of activity that has the potential to cause effects on historic properties. Because the proposed actions include construction and demolition, the USAF has consulted with the Texas SHPO. On 17 April 2017, the Texas SHPO concurred with the USAF determination of the Area of Potential Effect (APE) and that the projects included in this EA as the proposed actions would not affect any historic properties. Correspondence regarding the findings, concurrence, and resolution of any adverse effects is included in Appendix A.

1.6 PUBLIC AND AGENCY REVIEW OF ENVIRONMENTAL ASSESSMENT

Because the proposed action areas have the potential to impact floodplains, this document is subject to the early notification requirements and objectives of EO 11990, *Protection of Wetlands,* and EO 11988, *Floodplain Management,* as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*. The USAF published an early public notice that the proposed actions would occur in a floodplain/wetland in the Abilene Reporter News on 31 March 2017 and 1 April 2017 (Appendix A). The notice identified state and federal regulatory agencies with special expertise that had been contacted and solicited public comment on the proposed action and any practicable alternatives.

1.7 DECISION TO BE MADE

The EA evaluates whether the proposed actions would result in significant impacts on the environment. If significant impacts are identified, Dyess AFB would undertake mitigation to reduce impacts to below the level of significance, undertake the preparation of an EIS addressing the proposed action, or abandon the proposed action.

This EA is a planning and decision-making tool that will be used to guide Dyess AFB in implementing the proposed actions in a manner consistent with USAF standards for environmental stewardship.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This EA evaluates the potential environmental impacts resulting from implementation of the 14 projects identified in Table 1-1 as part of the 2016 Dyess AFB IDP and approved as installation development priorities for the next three years (2017–2019). This EA considers each project independently and also evaluates the collective/aggregated impacts of implementing all of the projects.

2.1 INSTALLATION DEVELOPMENT PLANNING AND ALTERNATIVES

The scope and proposed location of each project, and where applicable, the alternatives, have undergone extensive review by 7 BW Civil Engineer Squadron personnel and supporting installation and USAF staff specialists. Because the flying missions at Dyess AFB have remained consistent for decades, the installation planning and development has been functional use based (i.e., locating facilities with like functional uses adjacent to one another). Installation development at Dyess AFB has followed an ordered development pattern extending east from the aircraft parking apron. Much of the first order development is directly related to aircraft operations and maintenance. Second order development is primarily industrial and the third order development includes unaccompanied housing, temporary lodging, outdoor recreation, community service, administration, and community commercial. Much of the third tier development provides a basis for what is referred to as Downtown Dyess AFB. Planning for facilities and infrastructure in a “Downtown” setting provides many opportunities for base personnel to live, work, and play on the installation.

USAF guidance and the visioning process associated with the 2016 Dyess AFB IDP resulted in the establishment of master planning districts on Dyess AFB. A planning framework that guides development was established for each master planning district. Projects, described as proposed actions in this EA were located within these master planning districts based on the planning development framework described in the 2016 Dyess AFB IDP.

2.2 ALTERNATIVE SELECTION STANDARDS

The scope and location of each proposed action and, where applicable, their alternatives, have undergone extensive review by 7 BW Civil Engineer Squadron personnel and supporting installation and USAF staff specialists.

Potential alternatives to the proposed actions were each evaluated based on three universal selection standards, which were applied to all alternatives. Each project description, beginning in Section 2.3, provides details regarding how these universal selection standards apply to specific project requirements.

Standard 1: *Planning Constraints (IDP Section 4)* – Planning constraints are man-made or natural elements that can create significant limitations to the operation or construction of buildings, roadways, utility systems, airfields, training ranges, and other facilities. These constraints, when considered collectively with the installation’s capacity opportunities, inform the identification of potential areas for development, as well as those areas that can be redeveloped to support growth. This standard addresses compatibility with installation operational aspects, natural and built resources, and land use compatibility, and largely dictate the location/placement of a proposed facility.

- *Operational* – Operational constraints are generally related to flying and maintaining aircraft; storing fuel, munitions, and other potentially hazardous cargo; or fulfilling similar operational requirements that can limit future development activity. Operational constraints include, but are not limited to, airfield clearance and safety zones, noise contours, explosive safety quantity distance zones, and antiterrorism force protection.
- *Natural/Cultural* – Natural and cultural resource constraints are considered during all planning processes because they provide positive aesthetic, social, cultural, and recreational attributes that substantially contribute to the overall quality of life on base.
- *Infrastructure* – The continuance of the installation mission and potential future development of Dyess AFB is largely dependent upon the efficiency and capability of the existing installation infrastructure, including the airfield and supporting utilities.
- *Land Use Compatibility* – Land use compatibility constraints are associated with use designations (e.g., airfield, administrative, recreation, etc.) on the installation and ensuring that planning considerations account for compatibility between proposed and existing uses (e.g., recreational use may not be compatible with the airfield).

Standard 2: *Installation Capacity Opportunities (IDP Section 5)* – This refers to the capabilities of the installation's existing facilities/infrastructure to meet existing and future mission needs. This standard largely drives the scope of the facility/infrastructure development and/or improvement. This standard requires that proposed facility/infrastructure development and improvements support current and future mission operations, built infrastructure and quality of life.

Standard 3: *Sustainability Development Indicators (IDP Section 6)* – The USAF defines sustainability as the capacity to continue its mission without compromise and the ability to operate into the future without decline. Sustainable planning seeks to create an installation that prevents and minimizes pollution and waste before they occur; supports development that mimics natural energy, water and material cycles; and creates a safe, healthy environment for community members. Sustainable planning decisions can minimize the negative impacts of the USAF's mission and operations on the environment, while still satisfying mission requirements. This standard also generally drives the scope of the facility/infrastructure development and/or improvement and supports sustainability of the installation through consideration of energy, water, waste water, air quality, facilities space optimization, encroachment, airfields, natural/cultural resources.

2.3 PROPOSED ACTION AND ALTERNATIVES

The proposed actions are identified as the 14 projects in Table 1-1. Although the NEPA and the CEQ regulations mandate the consideration of reasonable alternatives to proposed actions, some projects may not have any reasonable alternatives besides the No Action Alternative, because, for example, it may not be reasonable to construct the project at any other location on the installation.

For example, the USAF would not evaluate alternatives to construct a community use function such as a bowling alley in an industrial area of the installation. If the fire station, for example, requires reconstruction, the USAF would not evaluate alternatives to construct the fire station at another location because of the functional use relationship between the fire station and the airfield and because associated infrastructure (hydrants, etc.) supporting that facility has been developed over time and is currently in place.

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 actions. The No Action Alternative will substantively analyze the consequences of not undertaking the proposed action, not simply conclude no impact, and will serve to establish a comparative baseline for analysis.

Where applicable, alternatives were developed relative to the three universal selection standards. Alternatives that met all three selection standards were considered reasonable and retained for consideration in this EA. Alternatives that did not meet one or more of the standards were considered unreasonable and are not retained for consideration in the EA.

The scope, location, and objectives of proposed actions (Figure 2-1) are described below and are grouped by project category (i.e., construction, demolition, etc.). Where applicable, as described above, this section also presents reasonable and practicable alternatives to each proposed action. If there are no reasonable alternatives, an explanation is provided.

2.3.1 Facility Construction Projects

2.3.1.1 Project C01: Construct 317th Airlift Group Headquarters Building

The proposed action is to construct a new building for the 317 AG HQ.

2.3.1.1.1 Selection Standard Applicability

The site must have the ability to support a facility large enough to consolidate functions, along with infrastructure such as parking for privately owned vehicles (POVs) and government-owned vehicles (GOVs) (Selection Standards 1 and 2).

The site for this facility should be near the C-130 combined squadron Operations and maintenance facility in the north flightline district (Selection Standards 1 and 2).

Site must be free of environmental constraints (e.g. wetlands) and comply with land use districts and restraints as designated in the IDP (Standards 1 and 3).

2.3.1.1.2 Alternatives Considered but Eliminated from Further Analysis

The base has evaluated expanding the facility, but because the building is a 60-year old wood-frame facility, an expansion that would consolidate functions from four separate facilities would not be feasible within project programming constraints. In addition, the expansion would be more expensive than the value of the existing building.

2.3.1.1.3 Alternatives Considered for this Proposed Action

Alternative C01 (Preferred Alternative). Implementation of the preferred alternative would construct a new two-story building across the street from the existing 317 AG HQ building. The new building would support future conversion of the airlift group to a Wing, would consolidate all of the HQ and support functions including the Command and Group Staff Agencies (Inspector General, Standardizations and Evaluations, Plans and Programs, Safety) and future C-130 Operations and Maintenance (O&M) Groups into a single facility. Demolition of the existing HQ Building (6015) would be completed as part of this project.

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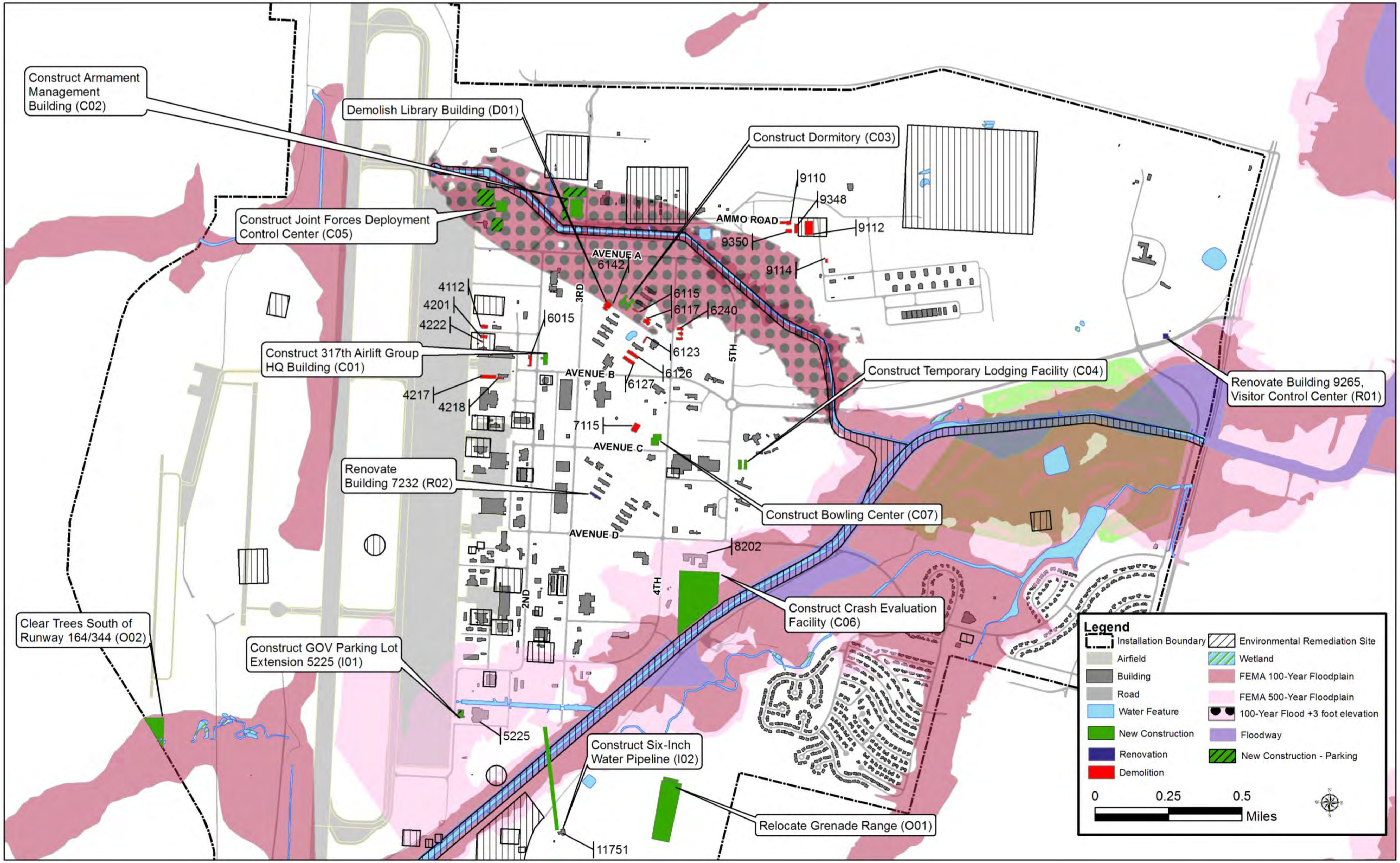

Figure 2-1. Location of Dyess AFB Installation Development Projects

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No Action Alternative C01: Implementation of the No Action Alternative would require the 317 AG to continue to operate in the obsolete and substandard Building 6015. In addition, the 317 OSS would continue to operate out of four separate buildings and the storing and handling of classified information and critical tactical mission planning would continue to operate inefficiently.

2.3.1.2 Project C02: Construct Armament Management Building

The proposed action is to construct a building for the Armament Management functions at Dyess AFB.

2.3.1.2.1 Selection Standard Applicability

The new site for this facility must be located outside any QD arcs and must be free of planning constraints (Selection Standard 1). The new site for this facility must be located along the munitions haul route on roads constructed to accommodate the weight of loaded munitions trailers (Selection Standards 1 and 2).

2.3.1.2.2 Alternatives Eliminated from Further Consideration

A location closer to the flight line was evaluated for construction of this facility. However, this alternative was eliminated from further consideration due to these areas being reserved for future flying missions. Therefore, only the preferred alternative is carried forward for further analysis.

2.3.1.2.3 Alternatives Considered for this Proposed Action

Alternative C02 (Preferred Alternative). Implementation of this alternative would construct the 55,000 square foot armament management building in an industrial area north of Ammo Road. The proposed site is adjacent to the munitions trailer maintenance facility and Ammo Road which is the primary transportation route from the munitions storage facility to the airfield. This project also includes the construction of a 2-acre parking lot and the demolition of existing structures that are no longer required. The structures proposed for demolition include Buildings 9110, 9112, 9114, 9348, and 9350.

No Action Alternative C02: Implementation of the No Action Alternative would continue the unsafe practice of allowing USAF personnel to work inside the explosive QD arcs associated with the munitions storage facility at Dyess AFB. According to AFMAN 91-201, the USAF goal is to expose the minimum number of people to the minimum amount of ammunitions and explosives for the minimum amount of time, consistent with safe and efficient operations. Placing non-explosive armament activities within explosive QD arcs puts personnel at unnecessary life threatening risks and places critical bomb delivery operations unprotected from breakdown or total destruction.

2.3.1.3 Project C03: Construct Dormitory

The proposed action is to construct a new dormitory on Dyess AFB.

2.3.1.3.1 Selection Standard Applicability

The facility must be within walking distance of the other community use functions on Dyess AFB (Selection Standard 1). The facility must be located adjacent to the other dormitories to facilitate space optimization and support quality of life for young Airman (Selection Standards 2 and 3).

2.3.1.3.2 Alternatives Eliminated from Further Consideration

Although the installation completed a preliminary analysis of reasonable options for fulfilling the need for this project, the installation did not evaluate other locations on Dyess AFB. The central dormitory area on Dyess AFB includes amenities such as the BX/Commissary complex, the fitness center, the dining facility, the chapel and other functions that are important in the daily life of a young Airman. Because these functions and amenities are currently located in this area, other geographic alternatives were not evaluated for construction of this dormitory. Dyess AFB has been renovating existing dormitories to meet USAF standards; however, the new room configurations result in fewer bed spaces after renovation. Without construction of a new dormitory, a deficiency of bed spaces would result. Therefore, only the preferred alternative is carried forward for further analysis.

2.3.1.3.3 Alternatives Considered for this Proposed Action

Alternative C03 (Preferred Alternative). Implementation of this alternative would construct the new 144 enlisted person dormitory per the new D4A configuration in an open area directly west of Buildings 426 and 434. Construction of the new dormitory would include site preparation, a steel reinforced concrete foundation, and a masonry and structural steel superstructure with a standing seam metal roof. This project also includes site improvements, fire protection, communications and landscaping, and the demolition of Building 7221.

No Action Alternative C03: Implementation of the No Action Alternative would not fulfill the deficit of 38 beds/rooms on Dyess AFB.

2.3.1.4 Project C04: Construct Temporary Lodging Facility

The proposed action is to construct a new Temporary Lodging Facility (TLF) on Dyess AFB.

2.3.1.4.1 Selection Standard Applicability

The facility must be within walking distance of the other community use functions on Dyess AFB (Selection Standard 1 and 3). The site for the facility must be free of environmental constraints (e.g., wetlands) and comply with land use districts and restraints as designated in the IDP (Selection Standard 1 and 2).

2.3.1.4.2 Alternatives Eliminated from Further Consideration

In 2014, Dyess AFB completed a Project Validation Assessment (PVA). As part of the PVA, Dyess AFB evaluated various alternatives to the proposed action including implementing a Public-Private Venture (PPV), maintaining the status quo and utilizing other existing facilities on Dyess AFB.

Use of other existing facilities was not recommended because, at the time of the study, there were not, nor were there expected to be in the future, any facilities available to be used to satisfy the demand at the existing TLF called the “Inns of Dyess”, therefore this alternative was eliminated from further consideration.

Establishing a PPV was evaluated but did not present a potential benefit to the installation or potentially to a private venture. Due to the lower than average room rates associated with the military lodging operation and lack of a return on investment, this option would not be attractive to a private sector partnership and was also eliminated from further consideration.

No other locations on Dyess AFB were evaluated for construction of this facility because the proposed site area is within walking distance of the Community Center area of the base which includes the Commissary, the Mini Mall, the movie theater, the bank and the chapel. Therefore, no alternatives besides the preferred alternative are carried forward for further analysis.

2.3.1.4.3 Alternatives Considered for this Proposed Action

Alternative C04 (Preferred Alternative). Implementation of the preferred alternative would construct the new 16 two-bedroom TLF between the Inns of Dyess and the Heritage Club. This area of the base currently supports temporary lodging facilities and is within walking distance of other community use functions such as the mini mall, the BX, commissary, chapel, and movie theater. The 16-unit facilities would include two separate buildings with a combined total of approximately 51,120 square feet. Construction would include supporting areas such as laundry facilities, a business center, and conference rooms. The project includes retaining Buildings 7420 and 7421 with their 4 four-bedroom units and demolishing Building 6240. Construction of the new TLF facility combined with the use of Buildings 7420 and 7421 would support the market demand of 20 TLF units on Dyess AFB.

No Action Alternative C04: Implementation of the No Action Alternative would not include any changes to the current temporary lodging configuration or number of rooms on base. With the existing TLF being substandard; and having reached the end of its functional useful life, maintaining the status quo would prevent the base from providing reasonable TLF services to assigned personnel. In addition, the existing TLF would be susceptible to down time of aged TLF units and/or the need for additional funds to repair and maintain the units in the buildings that have reached their life expectancy. Continued operation of the existing TLF units does not meet the usage requirements for the installation. Additionally, the one-bedroom configuration of the existing units does not meet the current USAF lodging standards to support military family demographics.

2.3.1.5 Project C05: Construct Joint Forces Deployment Control Center

The proposed action is the construction of a Deployment Control Center (DCC), a cargo pad and an associated parking area.

2.3.1.5.1 Selection Standard Applicability

The site for this facility must be behind the flightline fence to maintain a sterile environment for personnel preparing for deployment (Selection Standard 1). Use of the site must not interfere with flying operations (Selection Standard 2). The new site must accommodate reuse of the existing pavement areas for parking and staging (Selection Standard 3).

2.3.1.5.2 Alternatives Eliminated from Further Consideration

The installation evaluated an alternative to relocate the Installation Deployment Readiness Cell (IDRC) function to space in the Logistics Warehouse for day-to-day work, while exercise and deployment execution would remain in the existing DCC building. Implementation of this alternative would require the mobility warehouse to purchase containers and secure other outside storage to hold Individual Protective Equipment (IPE) and supplies in advance of troop deployments. This alternative was eliminated from further consideration because equipment and supplies used to deploy troops would be exposed to uncontrolled climate conditions reducing IPE shelf life. In addition, various workarounds would be required to accommodate troops in the process of deploying. Therefore, only the preferred alternative is carried forward for further analysis.

2.3.1.5.3 Alternatives Considered for this Proposed Action

*Alternative C05 (Preferred Alternative).*Implementation of the preferred alternative would construct the DCC and associated parking at the north end of the installation near the transient ramp inside of the flightline providing ready access to aircraft preparing for deployment. The DCC would be approximately 38,481 square feet and the cargo pad and parking area would be approximately 3 acres. As part of this project, Buildings 4112, 4217 and 4218 would be demolished.

No Action Alternative C05: Implementation of the No Action Alternative would continue to require deployed personnel to stage outside of any building and leave the sterile area during processing to obtain supplies at a separate mobility warehouse. Requiring deployed personnel to leave the sterile area causes a comingling of processed and unprocessed troops. In addition, IPE and supplies would continue to be subject to rodent infestation and water damage from roof leaks continuing to add to equipment damage and repairs. In addition, the associated warehouse facilities lack sufficient storage and climate control to properly store and distribute deployment materials. Damp and moldy conditions within the IDRC and IPE warehouse would continue to pose health threats to Airmen.

2.3.1.6 Project C06: Construct Crash Evaluation Facility

This project includes the construction of a crash evaluation facility on Dyess AFB.

2.3.1.6.1 Selection Standard Applicability

The site for this facility must be within walking distance of the building used by the 436th Training Squadron to facilitate the training mission (Selection Standards 1, 2, and 3). The site must be compatible to host various aircraft parts to simulate a crash site without being visually obtrusive (Selection Standard 1).

2.3.1.6.2 Alternatives Eliminated from Further Consideration

The off-base radio site was evaluated for development of the crash evaluation facility. This alternative was eliminated from further consideration because students would need to be transported from Building 8202 to the off-base radio site, approximately 8 miles from the main gate. The user prefers to have this facility next to their building so that they can walk in and out of their classrooms in Building 8202 during mock aircraft crash evaluations.

2.3.1.6.3 Alternatives Considered for this Proposed Action

Alternative C06 (Preferred Alternative). Implementation of the preferred alternative would construct the crash evaluation facility in an open area South of Building 8202. Building 8202 is currently used by the 436th Training Squadron as their training facility. This project includes the construction of a fence around a greenfield area where aircraft parts such as wheels, rudders, etc. would be positioned to simulate an aircraft crash area. No other site improvements would be necessary.

No Action Alternative C06: Implementation of the No Action Alternative would continue to require 436th Training Squadron personnel to travel to Holloman AFB in New Mexico to complete their crash evaluation training.

2.3.1.7 Project C07: Construct the Bowling Center

The proposed action is construct a new 16-lane bowling center combined with a family fun center.

2.3.1.7.1 Selection Standard Applicability

The facility must be within walking distance of the other community use functions on Dyess AFB (Selection Standard 1). The facility must be located adjacent to the existing facility to take advantage of existing parking areas and community use infrastructure (Selection Standards 2 and 3).

2.3.1.7.2 Alternatives Eliminated from Further Consideration

No other locations on Dyess AFB were evaluated for reconstruction of this facility because the only practical location for a new bowling center is adjacent to the existing facility. The location is within walking distance of the Community Center area of the base which includes dormitories, the fitness center, the BX/Commissary, the Mini Mall, the movie theater, the bank and the chapel. This area of the installation has been developed specifically for community uses such as the bowling center.

The existing bowling center was evaluated for renovation and addition or alteration to meet the current recreational needs on Dyess AFB. The entire facility has been determined to be substandard due to its age and condition. The roof is rated as the worst on Dyess AFB. Because the facility has been expanded over time, the current electrical and mechanical systems are undersized and the bathrooms have been determined to be inadequate. For these reasons, this alternative was eliminated from further consideration and only the preferred alternative is carried forward for further analysis.

2.3.1.7.3 Alternatives Considered for this Proposed Action

Alternative C07 (Preferred Alternative). Implementation of the preferred alternative would construct the new 16-lane bowling center directly east of the existing bowling center. Building 7115, the former bowling center, would be demolished as part of this project. In addition to the 16 lanes, this facility would include a pro shop, snack bar and a maintenance area. This project includes all of the supporting facilities including service laterals of utilities, a parking lot, and exterior lighting. The facility would meet minimum DoD force protection standards. Sustainable principles, to include life cycle cost-effective practices, would be integrated into the design, development, and construction of the project in accordance with applicable laws and EOs.

No Action Alternative C07: Implementation of the No Action Alternative would mean that personnel at Dyess AFB would continue to use a substandard recreational facility with deteriorated plumbing, roofing, and service facilities.

2.3.2 Infrastructure Construction Projects

2.3.2.1 Project I01: Construct Government-Owned Vehicle Parking Lot Extension 5225

Construct a 1-acre, asphalt-paved parking lot extension for Building 5225.

2.3.2.1.1 Selection Standard Applicability

The site for the parking lot extension must be on the flightline side of Building 5225 to prevent vehicles from undergoing Foreign Object Debris (FOD) checks each time they are utilized (Selection Standards 1 and 2). The site cannot interfere with existing roadways or parking areas (Selection Standard 2). The site must be located so that equipment parked on the new facility does not violate any of the airfield clearance requirements (Selection Standard 1). The site should be located in an area to optimize the best use of available open space (Selection Standard 3).

2.3.2.1.2 Alternatives Eliminated from Further Consideration

Building 5225 hosts the 9th Bomb Squadron and its associated Aircraft Maintenance Unit (AMU). Existing parking for this facility is currently located between the building and the aircraft parking apron. The area on the east or front side of Building 5225 was initially evaluated but vehicles parked in this area would be required to undergo a FOD check each time the flight line is accessed.

No other alternative locations were determined to be practical because of the location of the existing Entry Control Point (ECP) used to access this area and vehicles cannot be parked on the aircraft apron due to the B-1 aircraft clearances.

The proposed parking lot is tied to the AMU, and the location of the existing parking lot makes it impractical to locate this lot extension anywhere other than the proposed location. In addition, it would not be practical to locate this lot away from the Building 5225 because the trucks and workers need ready access to the tool crib and offices in the AMU.

2.3.2.1.3 Alternatives Considered for this Proposed Action

Alternative I01 (Preferred Alternative): Construct a 1-acre, asphalt-paved parking lot on the west side of Building 5225 over an existing turf grass area. The site work includes regrading of the approximately 300 feet of drainage channel and excavation and construction over existing fuel and natural gas lines. This was determined to be the only practical alternative for this project.

No Action Alternative I01: Implementation of the No Action Alternative would result in continued congestion, delays and damage to equipment resulting from inadequate parking space for both GOVs and aircraft support equipment.

2.3.2.2 Project I02: Construct 6-Inch Water Pipeline

The proposed action is to construct 1,600 linear feet of 6-inch looped water pipeline.

2.3.2.2.1 Selection Standard Applicability

The pipeline should be compatible with the installation's existing water distribution network (Selection Standard 1). The route selected for the new pipeline should minimize impacts to planning constraints such as wetlands and floodplains (Selection Standard 1). The route for the line should be as direct from the source to the target area as possible to minimize impacts and maintain water pressure differentials for fire hydrants (Selection Standard 2). The route and design for the pipeline must provide for increased capacity to accommodate additional future water uses in the target area (Selection Standard 3).

2.3.2.2.2 Alternatives Eliminated from Further Consideration

An alternative route to the housing area was evaluated for construction of this pipeline. This alternative was eliminated from further consideration because the distance from the housing area water supply and the target area is twice the distance proposed and because the USAF does not have access to the water main at that location. No other practical alternatives were identified and therefore only the preferred alternative is carried forward for further analysis.

2.3.2.2.3 Alternatives Considered for this Proposed Action

Alternative I02 (Preferred Alternative): Implementation of the preferred alternative would construct approximately 1,600 feet of 6-inch looped water pipeline with a 50-foot wide right-of-way (ROW) to the Cantonment Area for three fire hydrants. As part of this project, the main diversion ditch would be trenched to install this water pipeline. The water line would extend from the southern end of the base perpendicular across the drainage channel across Diversion Road to an area near Building 11751.

No Action Alternative I02: Implementation of the No Action Alternative would continue to expose facilities and infrastructure in this area to the unprotected risk of fire.

2.3.3 Renovation and Repair Projects

2.3.3.1 Project R01: Renovate Building 9265, Visitor Control Center

The proposed action is to construct an addition to the Visitor Control Center (VCC) (Building 9265).

2.3.3.1.1 Selection Standard Applicability

The site must be adjacent to the main gate and be adequate to support all of the functions necessary for a modern VCC, including pass and identification, a security holding location, and the ability to accommodate parking for POVs and GOVs (Selection Standards 1 and 2). This site and facility must be located and constructed in compliance with all AT/FP requirements for minimum setbacks etc. and be constructed per UFC 4-010-01, *DoD Minimum Antiterrorism Standards for Buildings* (Standard 3).

2.3.3.1.2 Alternatives Eliminated from Further Consideration

Construction of a new visitor control center was eliminated from further consideration due to the excessive costs that would be required to construct a new facility and the logistical issues associated with demolishing the existing facility and constructing a new facility near the main gate. Therefore, the only practical alternative evaluated is the preferred alternative which is carried forward for further analysis.

2.3.3.1.3 Alternatives Considered for this Proposed Action

Alternative R01 (Preferred Alternative): Implementation of the preferred alternative would expand Building 9265 by demolishing a portion of the existing facility and building on to the existing stone veneer wall and joining to the existing roof line. This VCC provides pass and identification services for visitors entering Dyess AFB. The existing VCC would be increased by approximately 1,300 square feet. The project would include site preparation, structural slab on grade, stone veneer walls on wooden framing to match existing, sloped standing seam metal roofing, mechanical and plumbing systems, electrical distribution and lighting, fire suppression and detection, and mass notification. Site improvements include new AT/FP measures, the addition of a 20-space asphalt parking lot, concrete sidewalks, landscaping, and associated exterior lighting and utilities. Building improvements include a new break room and administrative space, new lobby space, an interior waiting room, a new service counter, ADA-compliant restrooms, and covered outdoor overflow waiting area. Force protection measures would be constructed in compliance with DoD minimum antiterrorism standards to include laminated glass for windows and storefront doorways.

No Action Alternative R01: The security forces squadron is currently operating out of the existing VCC (Building 9265) but the facility cannot adequately accommodate the daily customer demand. Day-to-day operations would continue to operate at less than optimum levels as customers would repeatedly be required to wait outside because of insufficient seating and standing room space inside the facility. Visitors would continue to perceive the operation as insufficient for normal visitor processing.

2.3.3.2 Project R02: Renovate Building 7232

The proposed action is to renovate Building 7232 to consolidate security forces into one facility on Dyess AFB.

2.3.3.2.1 Selection Standard Applicability

The site should be located along a main thoroughfare to provide rapid response to all major areas of the installation, including the main gate, flightline and cantonment areas (Selection Standards 1 and 2).

The site must be free of environmental constraints (e.g. wetlands) and comply with land use districts and restraints as designated in the IDP and UFC 4-010-01 (Standards 1 and 3).

2.3.3.2.2 Alternatives Eliminated from Further Consideration

Dyess AFB completed a preliminary analysis of reasonable options for consolidating the security forces functions at Dyess AFB. The preliminary analysis evaluated constructing a new facility, renovating existing facilities and constructing additions to existing facilities. This analysis determined that consolidating the numerous functions into one renovated facility would be the most cost effective alternative and therefore no other alternatives besides renovating an existing building were evaluated.

2.3.3.2.3 Alternatives Considered for this Proposed Action

Alternative R02 (Preferred Alternative): Implementation of the preferred alternative involves the renovation of Building 7232 to consolidation all security forces functions into a single, ADA-compliant facility. The renovated facility would allow for a large training room, an armory and a Base Defense Operations Center and Emergency Communications Center (BDOC/ECC) for security forces operations. The resulting consolidation would vacate five facilities (4201, 4222, 6115, 6117 and 6123) which would all be demolished as part of this project. Approximately 34,400 square feet of asphalt and concrete parking and sidewalk area would be added as to provide adequate parking for security forces vehicle requirements.

No Action Alternative R02: Implementation of the No Action Alternative would continue to require security forces personnel to operate out of non ADA-compliant, obsolete, substandard facilities scattered across the installation. Facilities would continue to operate less efficiently because both mechanical and electrical systems are in need of repair in the current facilities.

2.3.4 Demolition Projects

2.3.4.1 Project D01: Demolish Library Building

The proposed action is to demolish the vacant library building on Dyess AFB.

2.3.4.1.1 Selection Standard Applicability

Per Selection Standard 1, the facility must no longer be needed and no longer be compatible with installation operational aspects. Maintenance of vacant and obsolete facilities requires recurring maintenance and operational costs with no benefit to the USAF (Selection Standard 3). Maintenance of vacant and obsolete facilities reduces the installation capacity opportunities (Selection Standard 2).

2.3.4.1.2 Alternatives Eliminated from Further Consideration

No practicable alternatives were eliminated from consideration.

2.3.4.1.3 Alternatives Considered for this Proposed Action

Alternative D01 (Preferred Alternative): Implementation of the preferred alternative would demolish Building 6142.

No Action Alternative D01: Implementation of the No Action Alternative would not demolish Building 6142 causing the USAF to continue to spend money on a vacant and obsolete facility. The space for this vacant and obsolete facility would not be available to support additional installation capacity for growth of existing missions or for new mission.

2.3.5 Other Projects

2.3.5.1 Project O01: Relocate the Inert Grenade Range

This proposed action is to relocate the inert grenade range.

2.3.5.1.1 Selection Standard Applicability

The site proposed for the range should encompass the entire Surface Danger Zone (SDZ) associated with inert grenade launch activities (Selection Standard 1). The site should be located in an area of the installation to minimize impacts to personnel working and living on Dyess AFB (Selection Standard 1). The site and associated SDZ should be entirely on USAF land, should maximize the use of available open land (Selection Standard 3), and should allow security forces sufficient area to meet weapons certifications (Selection Standard 2).

2.3.5.1.2 Alternatives Eliminated from Further Consideration

The installation evaluated relocating the range in an east/west configuration over the top of the landfill. This alternative was evaluated but eliminated from further consideration because the landfill is regulated by Land Use Controls (LUCs) established as part of the closure documentation agreed to with the Texas Commission on Environmental Quality (TCEQ). In addition, the landfill cap is monitored on a regular basis and use of the cap as an inert grenade range would not be conducive to maintaining the LUCs associated with the landfill as the cap would have to be cleared of vegetation and the surface leveled.

The installation also evaluated an alternative to locate the range directly west of its current location. This alternative was evaluated but eliminated from further consideration because the SDZ would extend outside of the base boundary off of USAF property.

2.3.5.1.3 Alternatives Considered for this Proposed Action

Alternative O01 (Preferred Alternative): Implementation of the preferred alternative would construct the new inert grenade range east of the former landfill. As part of this project, an observation tower would be constructed and a 15,000 square foot parking area would be developed. The existing road would be improved and oriented north to south.

No Action Alternative O01: Implementation of the No Action Alternative would mean that security forces staff would continue to violate Engineering Technical Letter (ETL) 11-18 by utilizing an inert grenade range that has an SDZ which extends off of U.S. government-owned or leased land.

2.3.5.2 Project O02: Clear Trees South of Runway 164/344

The proposed action is to clear trees in the area south of Runway 164/344.

2.3.5.2.1 Selection Standard Applicability

Alternatives should be developed to minimize potential impacts to wetlands and floodplains and other planning constraints (Selection Standard 1). The tree clearing shall be conducted in a manner to prevent potential impacts to aircraft operations (Selection Standard 2 and 3).

2.3.5.2.2 Alternatives Eliminated from Further Consideration

No practicable alternatives to clearing the trees at this location were eliminated from further consideration. The trees pose a substantial safety hazard to aircraft and aircrews and currently violate the approach/departure surfaces of Landing Zone (LZ) 164/344.

2.3.5.2.3 Alternatives Considered for this Proposed Action

Alternative O02 (Preferred Alternative): Implementation of the preferred alternative would clear approximately three acres of mesquite trees in the area south of Runway 164/344. Trees in the upland areas of the site would be cleared using heavy equipment while the trees in the riparian corridor of the site would be hand cleared with the rootballs left undisturbed to minimize impacts to wetlands in this area.

No Action Alternative O02: Implementation of the No Action Alternative would mean that trees would continue to violate the approach/departure surfaces of LZ 164/344 and continue to violate the provisions described in ETL 09-6, which indicates that the approach/departure surfaces for LZs must be clear of obstructions.

2.4 RESOURCE AREAS ELIMINATED FROM CONSIDERATION

Resource areas that are not impacted (40 *CFR* 1501.7(3)) or that have been covered by prior environmental review (40 *CFR* 1506.3) have not been carried forward for further environmental review.

The determination of environmental resources to be analyzed versus those not carried forward for detailed analysis is part of the EA scoping process. CEQ and USAF regulations (40 *CFR* §1501.7(a) (3) and 32 *CFR* 989.18) encourage project proponents to identify and eliminate resource areas from detailed study that are not important or have no potential to be impacted through implementation of their respective proposed actions.

The following environmental resource areas were found to have no applicability to the proposed action, the alternative action, or the No Action Alternative, as there would be no potential for direct, indirect, or cumulative impacts. Therefore, these environmental resource areas are not carried forward for detailed analysis in this EA.

Airspace – There would be no interactions between airspace and the projects identified in Table 1-1. None of the proposed projects involve changes to, or use of, airspace. Therefore the airspace resource area is not carried forward for detailed analysis in this EA.

Aesthetics and Visual Resources – Implementation of the projects identified in Table 1-1 would not change the visual resources of the area. Proposed improvements are anticipated to be low impact and low visibility. No changes to the aesthetics and visual resources of Dyess AFB or surrounding areas would occur with implementation of the proposed actions, thus a detailed analysis of aesthetics and visual resources is not necessary.

Surface Transportation – The proposed actions do not involve the creation of new roads or the alteration or closing of existing roads. Therefore, detailed analysis of transportation systems is not required.

Hazardous Materials and Wastes – No new or additional chemicals or other hazardous materials would be utilized as part of the proposed actions, thus no additional waste would be generated. Any lead based paint or asbestos containing materials encountered during renovation or demolition activities would be handled in accordance with all applicable USAF, state, and federal regulations. Other than construction of the 6-inch water pipeline, none of the proposed projects would interact with any active or closed Environmental Restoration Program (ERP) projects. The 6-inch water pipeline would extend across the south diversion ditch, which has since been closed with LUCs prohibiting residential land uses. Therefore, a detailed analysis of hazardous materials and wastes is not warranted.

Socioeconomics – Besides the temporary increase in construction personnel, no new personnel are associated with implementation of any of the projects. Therefore, additional analysis of socioeconomic impacts is not required.

Environmental Justice – Dyess AFB is an active military base, whose residents are nonpermanent officers, enlisted personnel and their families. There are no low-income or minority populations on the base and no off-base populations would be affected and therefore additional analysis of the environmental justice resource area is not required.

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3.0 BASE-AFFECTED ENVIRONMENT

The baseline, existing condition or affected environment information, organized by resource area, forms the basis for the comparative impact analysis presented in Chapter 4. The USAF evaluates and compares installation development, operational and economic factors relative to the environmental resource areas to determine potential impacts. The baseline conditions for each resource area, as described in this chapter, constitute conditions under the No Action Alternative for each of the proposed actions. For most of the resource areas, the Region of Influence (ROI) is defined as the area(s) of the base affected by the installation development. For some resource areas (e.g., air quality), the ROI extends into surrounding communities unique to that specific resource area.

Because the proposed actions are dispersed across the installation and not in one particular area, this section of the EA describes resources across the installation rather than at specific locations. The location and scope of each proposed action partially determines which resource areas would be impacted. Therefore, the analysis in Chapter 4 focuses on site-specific potential environmental impacts resulting from project implementation at each of the proposed project locations.

3.1 NOISE

3.1.1 Definition of the Resource

Noise is considered unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. Sound levels in this EA are stated in decibels (dB), a logarithmic scale used to simplify communication of a very wide range of audible sound pressure levels. At distances of about 3 feet, normal human speech ranges from 63 to 65 dB, loud kitchen appliances (e.g., blender) range from about 83 to 88 dB, and rock bands may approach 110 dB.

The frequency (i.e., pitch) of a sound is also important in determining how the sound will be perceived. Unless otherwise noted, noise levels in this document have been adjusted to emphasize frequencies heard best by the human ear, a process known as "A-weighting." Peak level decibels (dBP) is often used in discussing noise from small-arms ranges. Peak level is the maximum instantaneous sound level that occurs during an acoustic event. Another analysis used for assessing explosive noise is PK 15(met) peak noise levels. Risk of complaint is considered low for a PK 15 (met) less than 115 dB, moderate for levels of 115-130 dB, and high for levels greater than 130 dB.

For noise impacts, the ROI for the proposed actions and the No Action Alternative includes the proposed project areas and surrounding areas where noise impacts could occur.

3.1.2 Existing Conditions

The noise environment at Dyess AFB primarily consists of two types of noise: transportation noise from aircraft and vehicles, and construction-related noise from ongoing base improvement projects. Noise is also generated by the existing inert grenade range located near the southern installation boundary.

The B-1B and C-130 are the principal aircraft operating at Dyess AFB. B-1B operations average 33.93 per day, and C-130 operations average 98.5 per day (Dyess AFB 2015). An operation is defined as one take-off/departure, one approach/landing, or half of a closed pattern. Numerous transient aircraft from other locations land at and take-off from Dyess AFB. The Air Installation Compatible Use Zone (AICUZ) noise contours for Dyess AFB are shown on Figure 3-1.

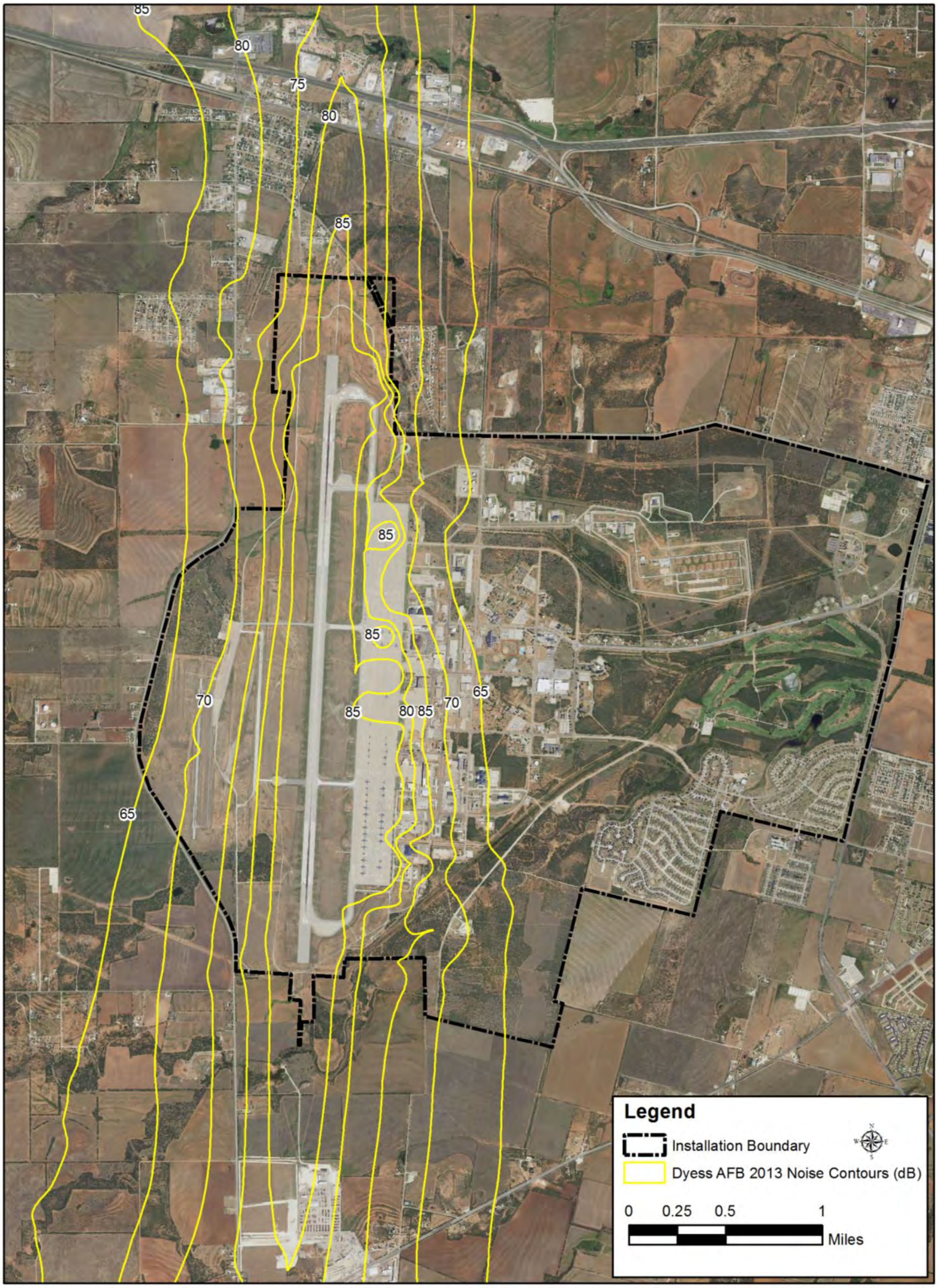

Figure 3-1. Dyess AFB Noise Contours

The contours are based on a day-night average sound level (DNL) expressed in A-weighted decibels (dBA). The majority of administrative functions and residential use lands at Dyess AFB are located outside of the 75 dBA contour. The area located near the flightline falls within the 80 dBA zone.

3.2 AIR QUALITY

3.2.1 Definition of the Resource

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin, and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of parts per million or micrograms per cubic meter.

The current standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards established under the CAA of 1990, as amended. These standards represent the maximum allowable atmospheric concentration that could occur while still protecting public health and welfare. The NAAQS provide both short- and long-term standards for the following criteria pollutants: carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than or equal to 10 micrometers in diameter (PM_{10}) particulate matter less than or equal to 2.5 micrometers in diameter ($PM_{2.5}$), ozone (O_3), and lead.

Under the CAA, it is the responsibility of individual states to achieve and maintain the NAAQS. To accomplish this, states use the U.S. Environmental Protection Agency (USEPA)-required State Implementation Plan (SIP). A SIP identifies goals, strategies, schedules, and enforcement actions designed to reduce the level of pollutants in the air and bring the state into compliance with the NAAQS.

All areas of the United States are designated as having air quality better than the NAAQS (attainment) or worse than the NAAQS (nonattainment). Areas in which the air quality data are insufficient for the USEPA to form a basis for attainment status are deemed unclassifiable. Such areas are treated as attainment areas until proven otherwise. “Maintenance areas” are those areas previously classified as nonattainment areas but where air pollution concentrations have been successfully reduced to levels below the standard. Maintenance areas are subject to special maintenance plans to ensure compliance with the NAAQS.

Hazardous air pollutants (HAPs) are chemicals known to cause or suspected of causing cancer or other serious health effects. Unlike the criteria pollutants, HAPs currently do not have national ambient standards. Some volatile organic compounds (VOCs) are classified as HAPs. VOCs are also ozone precursors and include any organic compound involved in atmospheric photochemical reactions, except those designated by a USEPA administrator as having negligible photochemical reactivity. HAPs are not covered by the NAAQS but may present a threat of adverse human health or environmental effects under certain conditions.

3.2.2 Existing Conditions

Dyess AFB is located in Taylor County, Texas, which constitutes the ROI for air quality. This area is analyzed for the regional air quality impact.

3.2.2.1 Climate

Dyess AFB is located within the incorporated limits of Abilene, Texas, and forms Abilene’s westernmost boundary. The climate is characterized as semi-arid. The annual average temperature in the ROI is 64.5 degrees Fahrenheit (°F) (18.1degrees Celsius [°C]). The warmest month on average is July, with an average temperature of 83.6°F (28.7°C). The coolest month on average is January, with an average temperature of 32°F (0.0°C). The highest recorded temperature in 2016 was 110.0°F (43.3°C), recorded in July. The lowest recorded temperature in 2016 was -10.0°F (-12.2°C), recorded in December.

The total amount of precipitation in the ROI for 2016 was 23.9 inches (60.7 centimeters). The average rainfall per month in 2016 was 2.0 inches (5.1 centimeters). The month with the most precipitation was May, with 3.3 inches (8.4 centimeters) of precipitation. The month with the least precipitation was January, with 2.8 inches (7.1 centimeters) of precipitation. In terms of liquid precipitation, there was an average of 66 days of rain in 2016. The most rainfall occurred during the months of May and June, with a total of 14 days of rain, and the least rainfall occurred in November and December, with a total of 8 days of rain. The total amount of snowfall in 2016 was 5.2 inches (13.2 centimeters) (Weatherbase 2017).

3.2.2.2 Air Quality

According to the USEPA, Taylor County is in attainment for all criteria pollutants and is not a maintenance area for any of the criteria pollutants (USEPA 2017a); therefore a conformity determination is not required. Taylor County emissions data obtained from USEPA's 2014 National Emissions Inventory (NEI) were used as the baseline for analysis. The NEI data are presented in Table 3-1. The county data include emission amounts from point sources, area sources, and mobile sources. Point sources are stationary sources that can be identified by name and location. Area sources are point sources from which emissions are too low to track individually (e.g., a home or small office building) or a diffuse stationary source (e.g., wildfires or agricultural tilling). Mobile sources are any kind of vehicle or equipment with a gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and nonroad. On-road sources consist of vehicles such as cars, light trucks, heavy trucks, buses, and motorcycles. Nonroad sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA 2017b).

Table 3-1. Current Criteria Pollutant Emissions Inventory for Taylor County, Texas

County	Criteria Pollutants (tons/year)					
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOCs
Taylor	16,418.5	4,958.3	11,394.8	1,657.8	66.6	18,008.3

Source: USEPA 2017c
NO_x = nitrogen oxides; SO_x = sulfur oxides

3.2.2.3 Greenhouse Gas Emissions

Greenhouse gases (GHGs) are gases that trap heat in the atmosphere; the accumulation of these gases in the atmosphere has been attributed to the regulation of the earth's temperature. Human influence on the climate system is clear, and recent anthropogenic emissions of greenhouse gases are the highest in history. Recent climate changes have had widespread impacts on human and natural systems (IPCC 2014).

The six primary GHGs, defined in Section 202(a) of the CAA, are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Section 16(e) of EO 13693, released in March 2015, also includes nitrogen triflouride. The GHGs of interest for this project are carbon dioxide (CO_2), nitrous oxide (N_2O), and methane (CH_4). 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 allows GHGs to be compared with each other by converting the GHG quantity into the common unit carbon dioxide equivalent (CO_2e). Current GHG emissions for Taylor County, obtained from USEPA's 2014 NEI, are summarized in Table 3-2.

Table 3-2. Current Greenhouse Gas Emissions Inventory for Taylor County, Texas

Greenhouse Gases (tons/year)				
County	**CO_2**	**N_2O**	**CH_4**	**CO_2e**
Taylor	1,026,511.7	17.7	104.0	1,034,391.7

Source: USEPA 2017c

3.3 SAFETY

3.3.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Potential safety issues at Dyess AFB include ground, AT/FP, explosives, construction jobsite, and flight safety. Ground safety considers issues associated with human activities, and operations and maintenance activities that support unit operations. A specific aspect of ground safety addresses AT/FP considerations. Explosive, munitions, and range safety addresses the management and use of ordnance or munitions associated with installation operations and training activities. Construction jobsite safety considerations include the prevention of mishaps related to construction, demolition, and renovation projects. Flight safety considers aircraft flight risks such as aircraft mishaps and accidents. The ROI for safety is Dyess AFB and the area immediately adjacent to the installation.

3.3.2 Existing Conditions

Numerous federal, civil, and military laws and regulations govern day-to-day O&M activities at Dyess AFB. Individually and collectively, these laws and regulations prescribe measures, processes, and procedures required to ensure safe operations and to protect the public, military, and property.

3.3.2.1 Ground Safety

Day-to-day O&M activities conducted at Dyess AFB are performed in accordance with applicable USAF safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements. These are intended to reduce occupational risks to government personnel and contractors, and to protect other persons that reside on or visit the base or the vicinity of the base.

3.3.2.2 Anti-Terrorism/Force Protection

AT/FP is a security program designed to protect USAF active-duty personnel, civilian employees, family members, and facilities and equipment in all locations and situations. The program is accomplished through the planned and integrated application of anti-terrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks, several regulations have been promulgated to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of

Military Construction (MILCON)-funded facilities. UFC 04-010-01, *DoD Minimum Antiterrorism Standards for Buildings* (DoD 2013) establishes minimum standoff distances that must be maintained between several categories of structures and areas that are relatively accessible to terrorists.

The intent of AT/FP and design guidance is to improve security, minimize fatalities, and limit damage to facilities in the event of a terrorist attack at Dyess AFB. New construction and modification of facilities would incorporate AT/FP standards to the maximum extent practicable.

3.3.2.3 Explosives, Munitions, and Small Arms Range Safety

The explosives and munitions safety program at Dyess AFB is conducted in accordance with AFMAN 91-201, *Explosive Safety Standards*. The purpose of the program is to provide the maximum possible protection to personnel and property, both inside and outside the installation, from the damaging effects of potential accidents involving ammunition and explosives. AFMAN 91-201 establishes the size of the clearance zone around facilities used to store, handle, and maintain munitions based on the QD criteria. Currently, non-explosive armament activities within the QD Arcs for the Munitions Storage Area (MSA) place personnel at unnecessary life threatening risks.

According to ETL 11-18, range operations require that the surface area encompassing the SDZ be protected by purchase, lease, or other restriction to ensure the safety of personnel, structures, and the public. Currently, the Dyess AFB inert grenade range SDZ extends outside the boundary of the installation in violation of ETL 11-18.

3.3.2.4 Construction Jobsite Safety

Construction jobsite safety and the prevention of accidents is an ongoing activity on any Dyess AFB jobsite. All contractors performing construction activities are responsible for complying with USAF safety and Occupational Safety and Health Administration (OSHA) regulations, and are required to conduct construction activities in a manner that does not pose any undue risk to workers or personnel.

3.3.2.5 Flight Safety

The primary public concern with regard to flight safety at Dyess AFB is the potential for aircraft mishaps or accidents. One such mishap that could occur is a collision with terrain or objects at or around the airfield or LZ. UFC 3-260-01, *Airfield and Heliport Planning and Design Criteria*, limits the location and heights of objects (i.e., trees) in the immediate vicinity (i.e., clear zone [CZ]) of the Dyess AFB airfield to minimize hazards to flight operations. The Dyess AFB AICUZ Study (Dyess AFB 2015) and ETL 09-6, *C-130 and C-17 Landing Zone (LZ) Dimensional, Marking, and Lighting Criteria,* provide information on the requirements and criteria for the approach/departure surfaces. The purpose of these requirements and criteria, with regard to imaginary airspace control surfaces, is to enhance the safety and efficiency of aircraft operations. LZ 164/344 at Dyess AFB is currently in violation of UFC 3-260-01 and ETL 09-6, because of approximately 3 acres of trees within the southern CZ.

3.4 SOILS AND WATER

3.4.1 Soil Resources

3.4.1.1 Definition of the Resource

The following section describes the soils and topography of the proposed action areas. The term “soils” refers to unconsolidated materials formed from the underlying bedrock or other parent material. Soil structure, elasticity, strength, shrink-swell potential, and erodibility all determine the ability of the ground to support man-made structures and facilities, provide a landscaped environment, and control the transport of eroded soils into nearby drainages. The soils within Dyess AFB are presented on Figure 3-2.

For the purposes of this soils analysis, the ROI for the proposed action areas and the No Action Alternative includes the footprints of the proposed actions.

3.4.1.2 Existing Conditions

Dyess AFB is located within the Osage Plains division of the Great Plains physiographic province (USGS 2016). This area is characterized by broad flat plains and gently rolling hills. Dyess AFB soils are primarily members of the Sagerton-Rowena-Rotan association, which are deep noncalcareous to calcareous clay loams (USDA 2016). This association occurs on lands that are nearly level to gently sloping and comprises up to 45 percent of the soils in Taylor County, Texas. Sagerton soils are deep, nearly level to gently sloping, well-drained, loamy soils that formed in calcareous loamy sediment. At Dyess AFB, these occur on broad uplands with slopes of 0 to 1 percent, or as urban complexes with slopes of 0 to 3 percent. Rowena soils consist of deep, flat to gently sloping, well-drained, loamy soils that formed in calcareous clayey to loamy sediments. Rowena soils that occur on Dyess AFB are part of the Rowena-urban complex and have 0 to 1 percent slopes. Rotan soils are deep, nearly level to gently sloping, well-drained soils of uplands. They were formed in calcareous sediment. Slopes for Rotan soils at Dyess AFB range from 0 to 3 percent (Dyess AFB 2016b).

Other soil series found on base include Gageby, Hamby, Mangum, Tobosa, and Vernon. The Gageby series soils are deep, nearly level, well-drained, loam soils on bottomlands. They typically occur on the floodplain associated with Little Elm Creek. Hamby soils are deep, nearly level to gently sloping, well-drained, loamy and sandy soils of uplands with slopes of 0 to 3 percent. At Dyess AFB, Hamby soils occur east of the flightline within the developed areas of the base. Mangum soils consist of deep, nearly level, well to moderately drained clayey soils of floodplains. The soils were formed in clayey alluvium. Mangum soils on Dyess AFB are nearly level and are confined to the floodplain of Little Elm Creek. Tobosa soils consist of deep, nearly level to gently sloping, well-drained, clayey soils on uplands.

At Dyess AFB, these soils are associated with concave areas of uplands with 0 to 15 percent slopes, or metropolitan areas with 0 to 3 percent slopes. Vernon soils are moderately deep, gently to strongly sloping, well-drained, clayey soils on uplands. They formed in calcareous clayey shale. Vernon soils on site have slopes of 1 to 3 percent and occur on convex upland ridges in the northern part of base (TPWD 1994; Dyess AFB 2016b).

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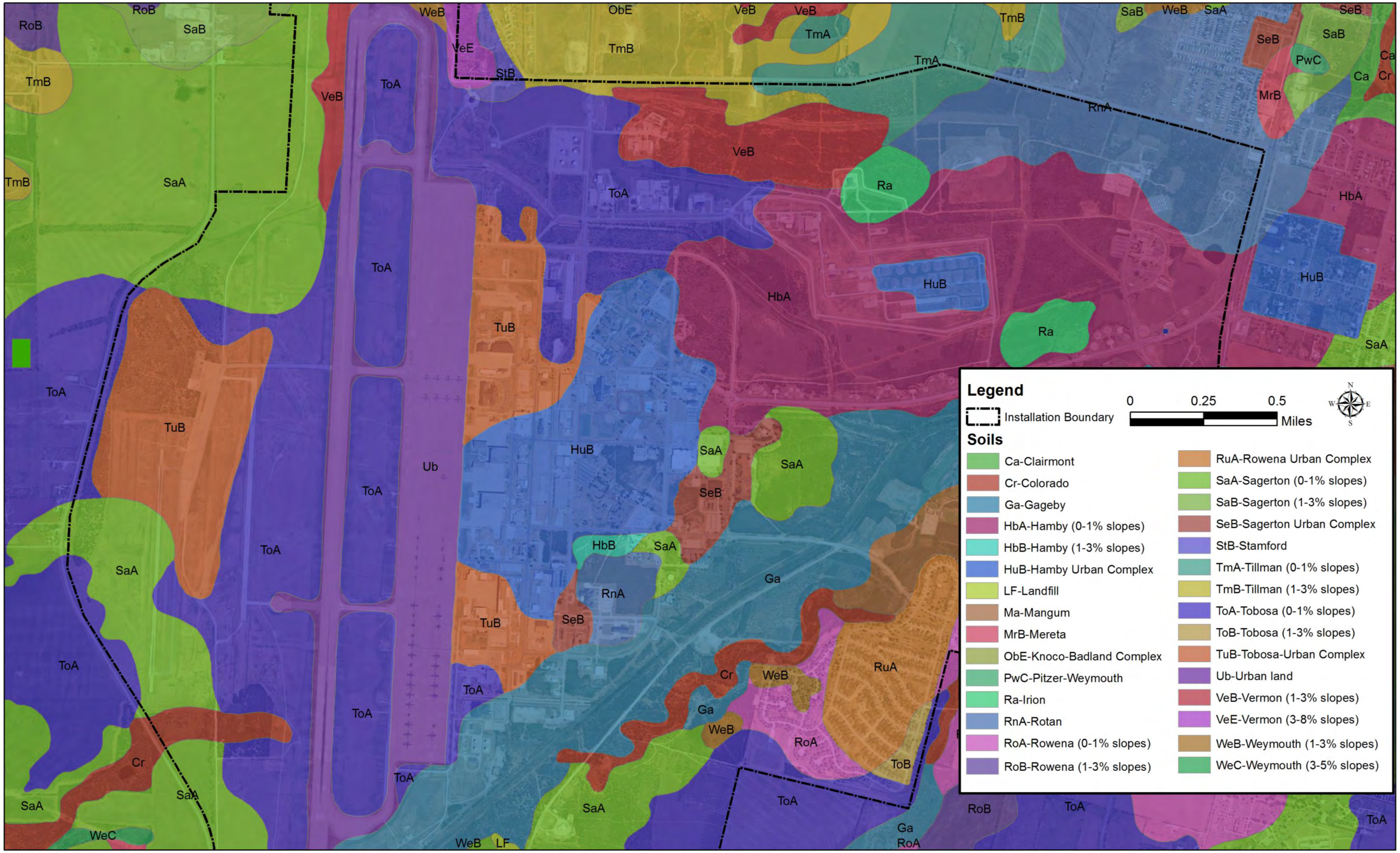

Figure 3-2. Dyess AFB Soil Types

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3.4.2 Water Resources

3.4.2.1 Definition of the Resource

Water resources at Dyess AFB include surface water, wetlands, floodplains, and groundwater. Surface water resources include lakes, rivers, and creeks, and are important for a variety of reasons, including economic, ecological, recreational, and human health factors. Wetlands are areas of transition between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water (Mitsch and Gosselink 2000). Floodplains are lowland areas adjacent to surface water bodies (i.e., lakes, rivers, oceans) where flooding events periodically cover areas with water. Floodplains provide value by serving as natural flood and erosion control, maintaining surface water quality by filtering nutrients and impurities, increasing biological productivity, and providing societal benefits such as open space for recreational opportunities and enhanced agricultural lands. Groundwater resources include all water reserves contained in soil and geologic deposits below the ground surface. These resources are important for a variety of reasons, including drinking water, irrigation, power generation, recreation, food control, and human health.

The CWA was established to ensure the "restoration and maintenance of the chemical, physical, and biological integrity of the Nation's waters" (Section 402). Under the act, it is illegal to discharge pollutants from a "point source" into any surface water without a National Pollutant Discharge Elimination System (NPDES) permit. Furthermore, any applicant for a federal license or permit to conduct activities that may result in the discharge of a pollutant into Waters of the United States must also obtain certification from the state in which the discharge would originate or, if appropriate, from the interstate water pollution control agency with jurisdiction over the affected waters at the point where the discharge would originate.

Therefore, all projects that have a federal component and may affect state water quality (including projects that require federal agency approval, such as issuance of a Section 404 permit) must also comply with the CWA. The USEPA sets standards for the quality of wastewater discharges. For projects at Dyess AFB, the State of Texas implements and enforces the provisions of the CWA, while the USEPA retains oversight responsibilities.

Under the TCEQ, the NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb 1 acre or more to obtain coverage under an NPDES Construction General Permit (CGP) for stormwater discharges.

Wetlands are currently regulated by the U.S. Army Corps of Engineers (USACE) under Section 404 of the CWA as a subset of all "Waters of the United States." Waters of the United States are defined as (1) traditional navigable waters, (2) wetlands adjacent to navigable waters, (3) non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow perennially or have continuous flow at least seasonally (e.g., typically 3 months), and (4) wetlands that directly adjoin such tributaries under Section 404 of the CWA, as amended, and are regulated by the USEPA and USACE. The CWA requires that Texas establish a Section 303(d) list to identify impaired waters and establish total maximum daily loads (TMDL) for the sources causing the impairment.

Section 404 of the CWA authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredge or fill into wetlands and other Waters of the United States. Any discharge of dredge or fill into Waters of the United States requires a permit from the USACE.

Furthermore, EO 11990, *Protection of Wetlands,* requires federal agencies to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies must avoid, to the extent possible, destruction or modification of wetlands wherever there is a practicable alternative. Consequently, before an action adversely impacting wetlands may proceed, EO 11990 requires the head of the responsible federal agency to find that there is no practicable alternative to conducting the action in wetlands. However, if no practicable alternative exists to the proposed action, mitigation must be taken to minimize direct and indirect impacts in or adjacent to wetlands.

Floodplains are defined by EO 11988, *Floodplain Management,* as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, the area subject to a 1 percent or greater chance of flooding in any given year" (that area inundated by a 100-year flood). Recent federal guidance (EO 13690) refers to the 500-year flood. The 500-year flood is a flood that has a 0.2 percent chance of occurring in any given year. Floodplains and riparian habitat are biologically unique and highly diverse ecosystems providing a rich diversity of aquatic and terrestrial species, as well as promoting stream bank stability and regulating water temperatures. EO 11988 requires federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative.

3.4.2.2 Existing Conditions

3.4.2.2.1 Surface Water

Major surface water features on Dyess AFB include Little Elm Creek and Lake Totten (Figure 2-1). Little Elm Creek is an intermittent creek that collects surface water runoff from the southern portion of the airfield and then flows northeast across the installation. An unnamed tributary of Little Elm Creek drains the northern end of the airfield and flows southeast across the installation before it joins Little Elm Creek near the center of the installation. Little Elm Creek exits the installation south of the main gate. Both Little Elm Creek and the unnamed tributary have been channelized and lined with concrete.

Lake Totten is a shallow, man-made, recreational water body with a surface area of approximately 10 acres when full. Runoff from base housing and a channelized, unnamed tributary feed the lake from the southeast. When the lake is full, water exits over a spillway at the east end (Dyess AFB 2016b). Lake Totten meets the exemption under Section 11.142 of the Texas Water Code for permitting because of its small size.

Minor surface water features on base include various drainage ditches and ponds. Two manmade ditches capture stormwater flow and are channeled into Little Elm Creek. Two storage ponds have been recently constructed to supply the new effluent irrigation system. One pond, located in the central portion of the golf course, encompasses approximately 4.5 acres and has a capacity of 9 million gallons. The second pond is located east of the hospital and south of the picnic grounds and encompasses approximately 2.75 acres. This pond has a capacity of nearly 13 million gallons. Water levels are maintained through a pipeline from the City of Abilene (Dyess AFB 2016b).

3.4.2.2.2 Wetlands

Twelve (12) wetland sites encompassing a total of 3.2 acres on Dyess AFB are classified as jurisdictional wetlands (Dyess AFB 2016b). Two of these sites are naturally occurring playas, or intermittent lakes, and the remaining 10 are manmade wetlands. The wetlands are located at multiple, dispersed sites, primarily in the vicinity of Little Elm Creek. Most of the wetlands are small, with the largest encompassing 0.6 acres (Dyess AFB 2016a).

3.4.2.2.3 Floodplains

The Federal Emergency Management Agency (FEMA) 500-year floodplain has been partially mapped within the southern and eastern portions of Dyess AFB. For areas where FEMA Flood Insurance Rate Map (FIRM) analysis for the 500-year floodplain has not been completed, a geographic information system (GIS) analysis was performed using the FEMA FIRM 100-year base floodplain elevations for the installation. Per EO 13690, an additional 3 feet was added to those elevations to identify the locations of areas that have an elevation of 3 feet above the 100-year floodplain. These locations were then plotted using a digital elevation model to identify areas near the existing 100-year floodplain that were greater than the 100-year floodplain base elevations and less than or equal to the 100-year plus 3 feet elevation. The results are shown on Figure 2-1.

FEMA floodplains mapped at Dyess AFB are located along Little Elm Creek and the unnamed tributary located in the northern portion of the base. These include a 100-year and 500-year floodplain along Little Elm Creek and a 100-year mapped floodplain along the unnamed tributary. FEMA floodplains have also been mapped in two areas west of the airfield.

3.4.2.2.4 Groundwater

No major aquifers are near Dyess AFB (Texas Almanac 2017). The Quaternary Alluvium of Little Elm Creek is the source of shallow groundwater at Dyess AFB and consists of a sand and gravel layer overlying a layer of alluvial/shale bedrock. The shallow groundwater is typically unconfined, and the saturated thickness of the Quaternary Alluvium ranges from 2 to 12 feet. The confining layer underlying the Quaternary Alluvium is Vale Formation Shale (Dyess AFB 2016c).

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

For the purposes of this EA, sensitive and protected biological resources include plant and animal species that are federally (USFWS) or state (Texas Parks and Wildlife Department [TPWD]) listed for protection. Identifying which species occur in an area affected by an action may be accomplished through literature reviews and coordination with appropriate federal and state regulatory agency representatives, resource managers, and other knowledgeable experts.

The ROI for biological resources includes Taylor County, Texas, as presented on Figure 1-1.

3.5.2 Existing Conditions

3.5.2.1 Vegetation

Descriptions of vegetation and plant community associations at Dyess AFB are provided in the base's *Integrated Natural Resources Management Plan* (INRMP) (Dyess AFB 2011). Dyess AFB is located within the Southwest Plateau and Plains Dry Steppe and Shrub ecoregion (Bailey 1995). Specifically, the base is located within the Rolling Plains section and the Central Lowlands geomorphic province, and the Kansan biotic province. Subsection classification is the Mesquite Plains (Dyess AFB 2016b).

Vegetation at Dyess AFB consists of local grasslands, deciduous woodlands, riparian vegetation, and turf and landscaped areas. There are no sensitive vegetation areas on Dyess AFB (Dyess AFB 2010). Common species include honey mesquite trees (*Prosopis glandulosa*), blueberry juniper (*Juniperus asheii*) and redberry juniper (*J. pinchotti*). Shade-tolerant Texas wintergrass (*Nassella leucotricha*) is the dominant groundcover plant within the mesquite woodlands. What remains of local grasslands are short to mid-grass grasslands, which include silver bluestem (*Bothriochloa saccharoides*), perennial threeawn (*Aristida purpurea*), buffalograss (*Bouteloua dactyloides*), Texas grama (*B. rigidiseta*), sideoats grama (*B. curtipendula*), and white tridens (*Tridens albescens*).

According to the INRMP, vegetation classification types at Dyess AFB include: grassland, mesquite savannah, woodlands, riparian, and turf and landscaped areas (Dyess AFB 2016b). Vegetation community types found on the base are described in the INRMP. Descriptions of the habitat types are provided in the following subsections.

3.5.2.1.1 Grassland

Local grassland communities include short- to mid-height grasses, such as Texas wintergrass, perennial threeawn, sand dropseed (*Sporobolus cryptandrus*), white tridens, Texas grama, silver bluestem, buffalograss, and sideoats grama. Native forb species common to these communities include western ragweed (*Ambrosia psilostachya*), western yarrow (*Achillea millefolium*), Texas thistle (*Cirsium texanum*), Indian blanket (*Gaillardia pulchella*), gray goldenaster (*Heterotheca canescens*), prairie coneflower (*Ratibida columnifera*), and verbena (*Verbena officinalis*). Red-berry (*J. pinchotii*) and blue-berry juniper (*J. ashei*) are sparsely scattered within the mesquite-grasslands in the northeastern portion of the base (Dyess AFB 2016b).

3.5.2.1.2 Mesquite Savannah

The honey mesquite/Texas wintergrass association is widely distributed and dominates on upland clay soils. Mesquite is a deciduous, thorny shrub or small tree exhibiting a high degree of variation in growth form. Allowed to mature naturally, the tree will reach heights of 20-30 feet with an open crown. If the aboveground growth is damaged or removed, dormant buds located on the underground stem initiate new growth, resulting in the many-stemmed bushes or small trees, often 10 to 15 feet tall (Dyess AFB 2016b).

3.5.2.1.3 Woodlands

Deciduous woodlands consist of mature mesquite, which grow in dense even-aged stands. Understory species include prickly pear (*Opuntia* sp.), lotebush (*Ziziphus obtusifolia*), catclaw acacia (*Senegalia greggii*), littleleaf sumac (*Rhus microphylla*), tasajillo (*Cylindropuntia leptocaulis*), horsecrippler, ephedra (*Ephedra sp.*), broomweed (*Gutierrezia sarothrae*), western ragweed, western yarrow, common lambsquarters (*Chenopodium album*), dwarf senna (*Senna pumilio*), sow thistle (*Sonchus oleraceus*), Texas thistle (*Cirsium texanum*), and verbena. Common grass species include Texas wintergrass, rescuegrass (*Bromus catharticus*), sand dropseed, silver bluestem, and white tridens (Dyess AFB 2016b).

3.5.2.1.4 Riparian Vegetation

Riparian vegetation includes vegetation along historic and channelized streambeds and drainages associated with Little Elm Creek and its tributaries. Riparian systems are found in transition zones between aquatic and upland ecosystems. Vegetation includes cattail (*Typha* spp.)

knotgrass (*Paspalum distichum*), rabbitfoot grass (*Polypogon monspeliensis*), white sweet clover (*Melilotus albus*), chufa (*Cyperus esculentus*), smartweed (*Polygonum* sp.), black willow (*Salix nigra*), buttonbush (*Cephalanthus occidentalis*), various sedges, various bulrushes, and various dock species (*Rumex* sp.) (Dyess AFB 2016b).

3.5.2.1.5 Turf and Landscaped Areas

Of the total acreage at Dyess AFB, approximately 2,645 acres are maintained grounds subject to mowing and scheduled landscape maintenance. Of the 2,645 maintained acres, 1,645 acres are maintained near the runway, drop zones, flight safety CZs, fire breaks, and secure weapons storage areas. Approximately 1,000 acres consist of turf and landscaped areas including the golf course, Airplane Park, picnic grounds, industrial and administrative facilities, base housing, and the hospital. The predominant turf grass is Bermuda grass (*Cynodon dactylon*); common shrubs include red tip photinia (*Photinia fraseri*) and holly (*Ilex aquifolium*); and trees consist mostly of Afghan pine (*Pinus eldarica*), live oak (*Quercus virginiama*), red oak (*Q. rubra*), pecan (*Carya illinoinensis*), bur oak (*Q. macrocarpa*), green ash (*Fraxinus pennsylvanica*), mesquite (*Prosopis* sp.), and desert willow (*Chilopsis linearis*) (Dyess AFB 2016b).

3.5.2.2 Wildlife

Information on wildlife occurring on Dyess AFB is provided in the INRMP (Dyess AFB 2016b). Mature mesquite woodlands and old growth mesquite/scrub communities support most of the terrestrial wildlife habitat found at Dyess AFB. Resident wildlife associated with mature mesquite woodlands commonly include the cottontail rabbit (*Sylvilagus audubonii*), ornate box turtle (*Terrapene ornata ornata*), Texas horned lizard (*Phrynosoma cornutum*), southern plains woodrat (*Neotoma micropus*), hispid cotton rat (Sigmodon hispidus), striped skunk (*Mephitis mephitis*), nine-banded armadillo (*Dasypus novemcinctus*), porcupine (*Erethizon dorsatum*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and badger (*Taxidea taxus*) (Dyess AFB 2016b).

Avian species observed at Dyess AFB are diverse. Common species include golden-fronted woodpecker (*Melanerpes aurifrons*), ladder-backed woodpecker (*Dryobates scalaris*), curved-billed thrasher (*Toxostoma curvirostre*), cactus wren (*Campylorhynchus brunneicapillus*), canyon towhee (*Melozone fusca*), northern cardinal (*Cardinalis cardinalis*), pyrrhuloxia (*C. sinuatus*), mockingbird (*Mimus polyglottos*), Bewick's wren (*Thryomanes bewickii*), and greater roadrunner (*Geococcyx californianus*). Resident game birds present on Dyess AFB include the mourning dove (*Zenaida macroura*), white-winged dove (*Z. asiatica*), northern bobwhite quail (*Colinus virginianus*), and wild turkey (*Meleagris gallopavo*). Many migrants utilize the old growth forests as nesting habitat in spring and summer, including the yellow-billed cuckoo (*Coccyzus americanus*), eastern bluebird (*Sialia sialis*), ash-throated flycatcher (*Myiarchus cinerascens*), Bell's vireo (*Vireo bellii*), painted bunting (*Passerina ciris*), scissor-tailed flycatcher (*Tyrannus forficatus*), and western kingbird (*T. verticalis*) (Dyess AFB 2016b).

Raptors commonly observed at Dyess AFB include the American kestrel (*Falco sparverius*), Cooper's hawk (*Accipiter cooperii*), sharp-shinned hawk (*A. striatus*), red-tailed hawk (*Buteo jamaicensis*), Swainson's hawk (*B. swainsoni*), northern harrier (*Circus cyaneus*), Mississippi kite (*Ictinia mississippiensis*), barn owl (*Tyto alba*), great horned owl (*Bubo virginianus*), turkey vulture (*Cathartes aura*), and black vulture (*Coragyps atratus*) (Dyess AFB 2016b).

3.5.2.3 Special Status Species

Special status plant and wildlife species are subject to regulations under the authority of federal and state agencies. The ESA (16 *USC* 1532 et seq.) of 1973, as amended, was enacted to protect and recover imperiled species and the ecosystems upon which they depend. The USFWS maintains a list of special status species considered endangered, threatened, or candidate.

"Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. Candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened, but for which development of a proposed listing regulation is precluded by other higher priority listing activities. All federal agencies are required to implement protection programs for endangered and threatened species and to use their authority to further the purposes of the act.

The MBTA prohibits actions resulting in the pursuit, capture, killing, and/or possession of any protected migratory bird, nest, egg, or parts thereof. The USFWS maintains a list of designated migratory birds occurring in various regions of the United States. The USFWS regulations allow for the incidental take of migratory birds for military readiness activities. It is DoD policy to promote and support Partners in Flight (PIF) in the protection and conservation of neo-tropical migratory birds and their habitat by protecting vital habitat, enhancing biodiversity, and maintaining healthy and productive natural systems consistent with the military mission. Birds of Conservation Concern (BCCs) are a subset of MBTA-protected species identified by the USFWS as those in the greatest need of additional conservation action to avoid future listing under the ESA. BCCs have been identified at three geographic scales: National, USFWS Regions, and Bird Conservation Regions (BCRs). BCRs are the smallest geographic scale at which BCCs have been identified, and the lists of BCC species at this scale are expected to be the most useful for governmental agencies to consider in complying with the MBTA and EO 13186 (USFWS, 2008). According to the *USFWS Birds of Conservation Concern* (USFWS 2008), the ROI for the proposed actions at Dyess AFB is located within the Central Mixed-grass Prairie region, also known as BCR 19. Twenty-seven (27) BCCs occur within the ROI (Appendix B) (USFWS 2008).

USFWS and TPWD special status species lists, by county, were obtained to identify species with the potential to occur within Taylor County, Texas (USFWS 2016a; TPWD 2016a). Table 3-3 presents the federally-listed species identified under the USFWS Information for Planning and Conservation (IPaC) system. The TPWD list of rare species commonly found in Taylor County, Texas, is included in Appendix B (TPWD 2016a).

Table 3-3. Federally Listed Species with Potential to Occur in Taylor County, Texas

Common Name	Scientific Name	Protection Status	Habitat	Potential for Occurrence at Dyess AFB
Birds				
Black-capped Vireo	*Vireo atricapilla*	Endangered	Habitat includes rangelands with scattered clumps of shrubs separated by open grassland; oak-juniper woodlands with distinctive patchy, two-layered aspect with open shrub and tree layer. Black-capped vireos require foliage reaching to ground level for nesting cover. They return to same territory, or one nearby, year after year. Black-capped vireos nest in Texas March through July.	None. Suitable habitat not present.
*Red Knot	*Calidris canutus rufa*	Threatened	Red knots migrate long distances in flocks northward through the contiguous United States mainly during April-June, and southward July-October. Habitat includes seacoasts on tidal flats and beaches, herbaceous wetland, and tidal flat/shore. Red knots prefer the shoreline of coast and bays and rarely use mudflats.	Rare migrant

Table 3-3. Federally Listed Species with Potential to Occur in Taylor County, Texas (Continued)

Common Name	Scientific Name	Protection Status	Habitat	Potential for Occurrence at Dyess AFB
Birds (Continued)				
*Piping Plover	*Charadrius melodus*	Threatened	Habitat includes sandy beaches and lakeshores. Texas is the wintering home for 35 percent of the known population of piping plovers. Piping plovers arrive in late July or early August, and will remain for up to 9 months.	Rare migrant
*Least Tern	*Sterna antillarum*	Endangered	Open habitat. Least terns prefer sand and gravel bars within a wide, unobstructed river channel, or open flats along shorelines of lakes and reservoirs that provide favorable nesting habitat. As natural nesting sites have become scarce, the birds have used manmade sites. In Texas, Interior Least Terns are found at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas.	Rare migrant
Fish				
Smalleye Shiner	*Notropis buccula*	Endangered	Endemic to the Brazos River drainage; presumed to have been introduced into the Colorado River. Historically found in lower Brazos River as far south as Hempstead, Texas.	None. Suitable habitat not present.
Sharpnose Shiner	*Notropis oxyrhynchus*	Endangered	Endemic to Brazos River drainage. Naturally found in the Red River drainage, when a tributary to the Brazos River was captured into the Red River drainage. Introduced in the Colorado River drainage.	None. Suitable habitat not present.
Clams				
Texas Fawnsfoot	*Truncilla macrodon*	Candidate	Found in a mixture of mud, sand, and gravel on the bottoms of streams and rivers. Require good water quality, stable stream channels, and flowing water.	None. Suitable habitat not present.

Note: *Species only applies for wind energy projects and is thus not discussed further in this analysis.
Source: USFWS 2016a,b; TPWD 2016a,b,c,d; TSUa,b; NatureServe 2015

Additionally, the USFWS Critical Habitat Portal was accessed to determine if designated critical habitat is present on or near Dyess AFB. No critical habitat for USFWS special status species is present in Taylor County, Texas (USFWS 2016c).

No federally-listed plant or animal species are known to occur on Dyess AFB. The bald eagle *(Haliaeetus leucocephalus*) was delisted by the USFWS in 2007, but continues to be listed as threatened by TPWD. Occurrences of bald eagles at Dyess AFB may include over-flights during their spring and fall migrations; however, any occasional presence would be transient in nature. Preferred suitable habitat for the bald eagle does not occur at Dyess AFB; therefore, the bald eagle will not be discussed further in this analysis.

The TPWD indicates that two reptile species of state significance are known to occur or have the potential to occur within Taylor County. These species include the spot-tailed earless lizard (*Holbookia lacerata*) (no status) and the Texas horned lizard (*Phrynosoma cornutum*) (state threatened) (TPWD 2016a).

The spot-tailed earless lizard prefers habitat consisting of rocky desert flats, areas with sparse vegetation or mesquite-prickly pear associations, and uplands of the Edwards Plateau in central

Texas (Dyess AFB 2016b). Although potential habitat for the spot-tailed earless lizard exists in most parts of Dyess AFB, there have been no confirmed observations to date (Walton 2017).

The Texas horned lizard inhabits open, sandy to gravelly grasslands and deserts which support grass, mesquite, and cactus. Potential habitat for this species exists throughout the installation; however, the prevalence of tight clay soils may inhibit or limit reproduction. The Texas horned lizard has been occasionally observed by base employees (Dyess AFB 2016b).

3.5.2.3.1 Birds of Conservation Concern

Dyess AFB is located within BCR 19, Central Mixed-grass Prairie region. Of the 27 listed BCC species for BCR 19 (Appendix B), TPWD and PIF identified five (5) species with breeding populations on Dyess AFB. These include the loggerhead shrike (*Lanius ludovicianus*), Bell's vireo, Cassin's sparrow (*Aimophila cassinii*), Mississippi kite, and scissor-tailed flycatcher (Dyess AFB 2016b). Migratory birds traverse the area, presenting a bird-aircraft strike hazard (BASH); however, the 7 BW Flight Safety Office implements the BASH plan to reduce this risk to aircraft (Dyess AFB 2004).

3.5.2.4 Natural Resource Area of Concern

The USFWS IPaC system was accessed to identify any National Refuge lands, Coastal Barrier Resource Units, and invasive species management practices with potential to be affected by the proposed actions. No refuges or other areas of concern were identified near Dyess AFB (USFWS 2016a).

3.6 CULTURAL RESOURCES

3.6.1 Definition of the Resource

Cultural resources are districts, sites, buildings, structures, or objects considered important to a culture or community for scientific, traditional, religious, or other purposes. They include archaeological resources, historic architectural/engineering resources, American Indian sacred sites, and traditional resources. Historic properties are any prehistoric, historic, or traditional resource included in or eligible for inclusion on the NRHP (36 *CFR* 800.16(l)). The APE for cultural resources is the footprint of the proposed actions and the area immediately surrounding each proposed action.

3.6.2 Existing Conditions

3.6.2.1 Architectural Resources

Historical building inventories at Dyess AFB have identified six Cold War-era facilities (Buildings 4314, 5020, 8129, 8130, 8131, and 7007) (Figure 3-3) potentially eligible for listing on the NRHP. Dyess AFB has concluded that no other NRHP-eligible buildings are present on the installation and the SHPO has concurred (Dyess AFB 2012).

Figure 3-3. NRHP-Eligible Facilities at Dyess AFB

3.6.2.2 Archaeological Resources

Previous archeological surveys at Dyess AFB have identified five prehistoric, two historic, and one prehistoric/historic archeological sites at Dyess AFB. None of these sites were determined eligible for listing on the NRHP, and there is no indication of any future eligibility of any other site or location at the installation (Dyess AFB 2012).

3.6.2.3 American Indian Sacred Site and Traditional Resources

Pursuant to Sections 101(d)(6)(B) and 106 of the NHPA and implementing regulations at 36 *CFR* Section 800.2(c)(2), the USAF consulted on a government-to-government basis with six tribes culturally affiliated with the installation. These tribes were asked to provide information on any properties to which they attach religious and cultural significance (Appendix A). No known tribal sacred sites or properties of traditional religious and cultural importance are in the vicinity of Dyess AFB.

3.7 LAND USE

3.7.1 Definition of the Resource

Land use describes the way the natural landscape has been modified or managed to provide for human needs. In developed and urbanized areas, land uses typically include residential, commercial, industrial, utilities and transportation, recreation, open space, and mixes of these basic types. Other uses such as mining, agriculture, forestry, and specially protected areas (e.g., monuments, parks, and preserves) are usually found on the fringes or outside of urbanized areas. Plans and policies guide how land resources are allocated and managed to best serve multiple needs and interests. Ordinances and regulations define specific limitations on uses.

The attributes of land use addressed in this analysis include general land use patterns within and surrounding Dyess AFB and the land use regulatory setting. The regulatory setting is the framework for managing land use and approving new development. It pertains to federal, state, and local statutes, regulations, plans, programs, and ordinances.

The following is a list of the typical land use categories found on most USAF bases:

- Airfield (Primary Surface and CZs)
- Airfield (Runways, Taxiways and Aprons)
- Aircraft Operations and Maintenance
- Industrial
- Administrative
- Community Commercial
- Community Service
- Housing (Accompanied)
- Housing (Unaccompanied)
- Medical
- Outdoor Recreation
- Open Space

The ROI for the land use analysis in this EA includes the land area inside the boundary fence of Dyess AFB. The land use analysis does not consider land outside the base because none of the projects would result in any land use changes outside of the installation boundary.

3.7.2 Existing Conditions

In the 2016 IDP, land use for Dyess AFB is divided into 11 categories (Dyess AFB 2016a). Table 3-4 lists the categories and describes the typical facility types found in each category.

Table 3-4. Land Use Categories and Typical Facilities/Features

Land Use Category	Typical Facilities/Features
Administrative	HQ, security operations, office space, training space
Airfield	Runways, taxiways, aprons, overruns
Airfield Operations and Maintenance	Hangars, aircraft maintenance units, squadron operations, tower, fire station
Community Commercial	Bowling center, fitness center, base exchange, credit union, and shopette
Community Service	Child development center and chapel
Housing – Accompanied	Family housing (privatized)
Housing – Unaccompanied	Airmen housing, visitor housing – visitor quarters, temporary lodging facilities
Industrial	Munitions storage, fuels storage, maintenance shops, warehousing
Medical	Medical center, pharmacy
Open Space	Conservation areas, buffer space
Outdoor Recreation	Outdoor pool and courts, picnic areas, athletic fields and golf course

USAF guidance and the visioning process associated with the IDP (Dyess AFB 2016a) resulted in the establishment of nine master planning districts on Dyess AFB. Each planning district was created based on established land use patterns and relationships to the existing transportation network and geographic features. Future planning areas were defined in the nine planning districts, where appropriate, to focus future analyses or development studies. Figure 3-4 illustrates the nine master planning districts on Dyess AFB.

Figure 3-4 illustrates the various land use types in each of the master planning districts. Districts 1, 2, and 3 adjoin the flightline and all support deployment and aircraft operations at Dyess AFB. Facilities in District 4 support logistics and mission support functions which provide a strong “second tier” of support for airfield operations. District 4 contains a mix of administrative, aircraft operations, and maintenance and industrial land uses. District 5 consists primarily of administration functions, with a mix of some industrial land use classifications. District 6 is the center of the cantonment area and essentially functions as “downtown Dyess”. District 6 contains a mix of community commercial, administrative, outdoor recreation, community service, and housing land uses. District 7 hosts the unaccompanied housing campus, which includes dormitories, dining facilities, recreational areas, and facilities that provide day-to-day services for unaccompanied Airmen. Land use in District 7 is dominated by unaccompanied housing and administrative land uses. District 8 is a large area of the installation that includes the MSA, the medical center, and the Tye and main gates. The primary land uses in this area are industrial, open space, and medical. District 9 is the privatized family housing area.

Patriot Acres is one of the housing areas in District 9 on Dyess AFB.

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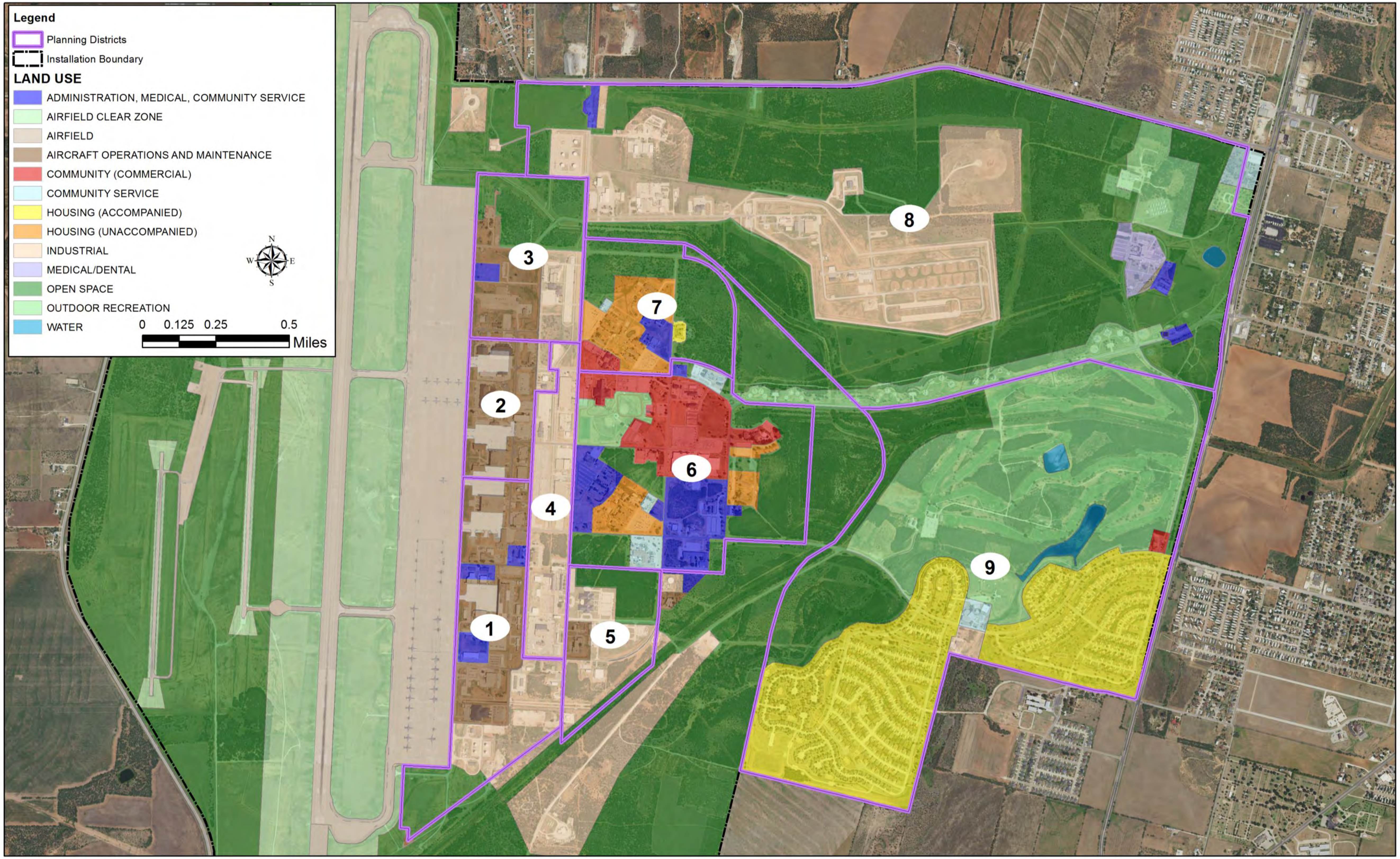

Figure 3-4. Dyess AFB Master Planning Districts

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3.8 INFRASTRUCTURE

3.8.1 Definition of the Resource

Infrastructure, within the context of this EA, is associated with utilities. The utilities described and analyzed for potential impacts from the implementation of the proposed actions include potable water, wastewater, electricity, natural gas, and the stormwater system. The description of each utility focuses on existing infrastructure, current utility use, and any predefined capacity or limitations as set forth in permits or regulations. The ROI for infrastructure is Dyess AFB.

3.8.2 Existing Conditions

3.8.2.1 Potable Water

The City of Abilene supplies potable water to Dyess AFB. Fort Phantom Hill Lake is the primary source of potable water, with O.H. Ivie Reservoir and Hubbard Creek Lake as alternate sources. Dyess AFB has a contract with the City of Abilene to receive up to 5 million gallons per day (MGD). Typical usage at the installation is between 0.5 and 3 MGD, with peak summer usage of 4 MGD. Potable water at Dyess AFB is stored in a 755,000-gallon ground-level storage tank, a 500,000-gallon elevated storage tank, and a 25,000-gallon clear well tank. Water is delivered by the main distribution system throughout the majority of the installation. Dyess AFB also utilizes a piped effluent water system to irrigate the golf course and other areas of the installation, significantly reducing the consumption of potable water.

The overall condition of the Dyess AFB potable water system is rated as adequate. The distribution system was rated as degraded, but the installation has implemented improvements. The supply, treatment, and storage systems are rated as adequate (Dyess AFB 2016a).

3.8.2.2 Wastewater

Domestic and industrial wastewater at Dyess AFB is discharged to the City of Abilene's Hamby Wastewater Treatment Plant in Hamby, Texas. The installation's sewer system is a gravity collection system. Dyess AFB is permitted to discharge 3 MGD, with typical volumes of 0.3 to 1.8 MGD. No septic systems are in use on the installation. Although the overall condition of the Dyess AFB wastewater system is rated as degraded, the pumping stations are rated as adequate (Dyess AFB 2016a).

3.8.2.3 Electricity

Electricity to Dyess AFB is provided by two American Electric Power 69-kilovolt (kV) feeders that serve three on-base American Electric Power substations. These two 69-kV feeders loop around the installation. Approximately 26 percent of the primary and 53 percent of the secondary lines are underground. The remaining lines are overhead. The total electrical power capacity is 40.43 megavolt amperes (mVA), with a total peak load of about 13.5 mVA.

Recent energy efficiency improvements have resulted in declining loads on the electrical system. The overall condition of Dyess AFB's electrical distribution system is rated as adequate (Dyess AFB 2016a).

3.8.2.4 Natural Gas

Atmos Energy Corporation provides natural gas to Dyess AFB via one 4-inch and one 6-inch coated and wrapped steel transmission line. The 4-inch line feeds the eastern portion of the installation's natural gas system, and the 6-inch line feeds the western portion. The eastern and western portions of the natural gas system are connected via shutoff valves which allow for maintenance and the capability to back feed from either portion. Natural gas is distributed throughout the majority of the main base and base housing areas through more than 47 miles of recently upgraded polyethylene lines. The natural gas capacity at Dyess AFB is 3,000 thousand cubic feet per day (MCF/day), with a consumption rate of 457 MCF/day. The overall condition of Dyess AFB's natural gas distribution system is rated as adequate (Dyess AFB 2016a).

3.8.2.5 Stormwater System

The stormwater drainage system at Dyess AFB consists of storm sewers and various surface water features (i.e., ditches, creeks, culverts, ponds, and swales). Little Elm Creek flows west to east and is the primary stormwater conveyance feature. An unnamed tributary to Little Elm Creek originates at the northern end of the airfield and drains stormwater from the northern end of the installation. Lake Totten is a small reservoir located in the eastern portion of the installation between the golf course and housing area. This lake is the primary receiver of stormwater from the housing area. Dyess AFB has a Storm Water Pollution Prevention Plan (SWPPP) and an active approach to stormwater management (Dyess AFB 2013).

The infrastructure review performed in 2014 did not evaluate or rate the stormwater drainage system (Dyess AFB 2016a). Additional information regarding stormwater and surface water management is located in Section 3.4 of this EA.

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4 is organized by resource area. The potential impacts associated with implementing the individual projects are evaluated both independently and collectively. For some resource areas, such as air quality, the potential impacts associated with each project are identified in a table. The collective impacts of implementing all of the projects together are identified in the same table as the aggregated impacts of all the projects.

4.1 NOISE

4.1.1 Impacts of Proposed Actions

Impacts to noise resulting from implementation of the proposed actions would result primarily from construction and demolition (C&D) activities. All of the proposed projects would result in temporary, minor noise increases resulting from C&D activities. Implementation of the various C&D activities would result in temporary, localized increases in noise levels that could be disruptive and annoying. However, the installation and surrounding area is exposed to frequent loud aircraft operations noise and ground vehicle traffic noise under baseline conditions. Additionally, demolition and construction activities would be conducted during normal business hours. In this context, the temporary and localized noise generated by C&D activities on the installation could be disruptive and annoying but would not be significant.

Relocation of the inert grenade range has the potential to result in noise impacts. Grenade launchers used at the existing range produce noise levels similar to other small arms used by military forces. Only inert rounds (i.e., rounds that do not make noise upon impact) would be used at the range. Table 4-1 highlights the complaint risk of a 40-mm grenade launcher using inert rounds. This risk was calculated based on hearing conservation criteria and known measurements from grenade launches (Army National Guard 2015). As shown in Table 4-1, the risk of noise complaints resulting from grenade launches is considered low if non-participating observers are more than 984 feet (300 meters) to the side of the grenade range or 361 feet (100 meters) to the rear of the launcher. The nearest residential area to the inert grenade range is base housing located approximately 1,700 feet (518 meters) to the north and east of the range. Therefore, no adverse impacts to the acoustic environment are anticipated to result from relocating the inert grenade range.

Table 4-1. Complaint Risk of 40mm Grenade Launcher Inert Round Fire

Risk of Complaints	Perceptibility	To the Side of the Grenade Range		To the Rear of the Grenade Launcher	
		Distance	Noise Level (dBP)	Distance	Noise Level (dBP)
Low	Audible	> 984 feet (300 meters)	<115 dB	> 361 feet (110 meters)	<115 dB
Moderate	Noticeable, Distinct	213 - 984 feet (65-300 meters)	115 dB	82 - 361 feet (25-110 meters)	115 dB
High	Very Loud, May Startle	< 213 feet (65 meters)	>130 dB	< 82 feet (25 meters)	>130 dB
Risk of Hearing Damage for Unprotected Ears	Painful	< 62 feet (19 meters)	>140 dB	< 23 feet (7 meters)	>140 dB

4.1.2 Impacts of No Action

Implementation of the No Action Alternative would not result in any new construction or demolition, and the inert grenade range would continue to operate in violation of ETL 11-18, as it is today. Therefore, no adverse noise impacts would result from the No Action Alternative. Existing noise disturbances would occur in their current state.

4.2 AIR QUALITY

In order to evaluate air emissions and their impact on the overall ROI, the emissions associated with the proposed projects were compared on a pollutant-by-pollutant basis with the ROI total emissions per the 2014 NEI data. Potential impacts to air quality are evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 *CFR* § 1508.27. This requires the significance of the action to 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.

The Air Conformity Applicability Model (ACAM) Version 5.0.7 was used to provide a level of consistency with respect to emissions factors and calculations. The ACAM provides estimated air emissions from proposed federal actions in areas designated as attainment, nonattainment and/or maintenance for each specific criteria and precursor pollutant as defined in the NAAQS. The ACAM was utilized to calculate emissions from construction, demolition, renovation, and worker commutes. Equations and emissions factors are contained in Appendix C.

GHGs were included in the analysis. The primary source of carbon dioxide emissions would be fuel combustion from equipment and worker vehicles during construction, demolition, and renovation activities. Air quality calculations are contained in Appendix C.

4.2.1 Impacts of Proposed Actions

While some proposed projects have alternatives, these alternatives are not appreciably different from an air emissions standpoint, as the differences between alternatives may only be the location of ground disturbance, or a few hundred square feet of disturbance. In each instance, the difference in air emissions would either be zero or negligible. Consequently, although air emissions were calculated for all alternatives and are contained in Appendix C, this section presents the impacts from the preferred alternative for each project (as identified in Section 2.3) and the combined emissions impacts if all of the proposed projects were implemented. Emissions associated with the proposed projects were calculated and are summarized in Table 4-2. For conservative purposes, emissions are aggregated from all activities and as occurring during one calendar year period. Impacts would amount to 0.55 percent or less of each of the criteria pollutants. GHG emissions would be less than 0.48 percent of annual ROI emissions.

Based on air emissions modeling and analysis, the proposed actions, under any alternative combination, would not be expected to result in any significant increase in criteria pollutant air emissions, and no adverse impacts would occur.

The potential effects of GHG emissions are by nature global and cumulative impacts, as worldwide sources of GHGs contribute to climate change. Table 4-2 shows that infrastructure development for the proposed actions at Dyess AFB would produce a total of 5,001 metric tons of CO_2e emissions per year.

Table 4-2. Proposed Action Air Emissions Compared with Taylor County Emissions

Activity Phase	Annual Emissions (tons/year)						
	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOCs	CO_2e
CO1, Construct 317th Airlift Group Headquarters Building	3.7	4.1	1.5	0.2	0.02	1.0	834.9
CO2, Construct Armament Management Building	4.1	7.7	3.1	0.3	0.01	1.3	1222.6
CO3, Construct Enlisted Dormitory	2.4	3.6	3.1	0.2	0.008	1.0	979.5
CO4, Construct Temporary Lodging Facility	1.0	1.5	0.09	0.06	0.003	0.4	317.6
CO5, Construct Joint Forces Deployment Control Center	1.7	2.4	2.3	0.1	0.005	0.7	600.5
C06, Construct Crash Evaluation Facility	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CO7, Demolish Current Bowling Center, Construct New Bowling Center	3.2	3.6	0.8	0.2	0.007	0.7	728.8
IO1, Construct Government Vehicle Parking Lot	0.1	0.2	0.2	0.008	0.0003	0.02	31.4
IO2, Construct 6" Water Pipeline	0.1	0.1	0.3	0.006	0.0003	0.02	26.0
RO1, Renovate Building 9265, Visitor Control Center	1.0	1.3	2.8	0.06	0.003	0.2	275.1
RO2, Consolidate Security Forces Facility	1.8	2.5	0.8	0.1	0.005	0.6	550.7
DO1, Demolish Library Building	0.1	0.2	0.1	0.008	0.0004	0.02	38.5
O01, Relocate the Grenade Range	0.06	0.07	0.02	0.003	0.0001	0.01	15.4
O02, Clear Trees South of Runway 164/344	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	19.3	27.3	15.1	1.2	0.1	6.0	5,621.0
ROI Baseline[a]	16,418.5	4,958.3	11,394.8	1,657.8	66.6	18,008.3	1,034,391.7
Percentage of Baseline	*0.12%*	*0.55%*	*0.13%*	*0.072%*	*0.15%*	*0.033%*	*0.54%*

[a] Includes Taylor County, TX.
Source: USEPA 2017c
NO_x = nitrogen oxides

In addition to presenting estimates of GHG emissions that would result from implementation of the proposed actions at Dyess AFB, the following considers how climate change may impact proposed operations at Dyess AFB. For Dyess AFB, the projected climate change impacts of concern are increased temperatures and precipitation, as documented in *Climate Change Impacts in the United States - The Third National Climate Assessment* (USGCRP 2014). This report predicts that the Southern Plains region surrounding Dyess AFB will experience warmer temperatures and decreasing precipitation. These conditions could produce more frequent extreme events (e.g., heat waves, droughts, and scarcities of water supplies).

In an effort to reduce energy consumption, reduce dependence on petroleum, and increase the use of renewable energy resources in accordance with the Energy Policy Act of 2005, the DoD implements the DoD Strategic Sustainability Performance Plan (DoD 2010). From this directive, the USAF implements the Air Force Strategic Sustainability Implementation Plan (USAF 2013a) and the U.S. Air Force Energy Strategic Plan (USAF 2013b). As a result of these objectives, the USAF takes proactive measures to reduce their overall emissions of GHGs. For example, the USAF implements a number of renewable energy projects, such as photovoltaic solar systems, electric vehicles, reclaimed water distribution systems, and wind generators, within their jurisdiction, (DoD 2015). These sustainability initiatives commit the USAF to implement GHG emission reduction strategies into the foreseeable future.

The TCEQ indicated that they conducted a review of the projects for general conformity impact in accordance with 40 *CFR* 93. According to their review, because Dyess AFB is located in Taylor County, which is currently unclassified or in attainment of the NAAQS for all six criteria air pollutants, the general conformity rules do not apply (Appendix A).

4.2.2 Impacts of No Action

The No Action Alternative would not result in any additional impacts to air quality beyond the scope of normal conditions and influences within the ROI.

4.3 SAFETY

This section addresses the potential environmental impacts to ground, AT/FP, explosives, construction jobsite, and flight safety that could occur at or in the vicinity of Dyess AFB with implementation of the proposed actions.

4.3.1 Impacts of Proposed Actions

4.3.1.1 Ground Safety

Although emergency response plans would be updated to capture new, renovated, and demolished facilities, no aspects of the proposed action at Dyess AFB are expected to create new or unique ground safety issues. O&M procedures, as they relate to ground safety, are conducted by base personnel and would not change from current conditions. All activities would continue to be conducted in accordance with applicable regulations, technical orders, and AFOSH standards.

Construction of the 6-inch water pipeline (Project I02) would increase public and installation personnel safety by decreasing fire response times and increasing fire response capabilities in the southern portion of the base. Construction of the Joint Forces DCC (Project C05) would eliminate the health threats to deployed personnel posed by the conditions in the current facility, which would be replaced.

4.3.1.2 Anti-Terrorism/Force Protection

The AT/FP security program would continue in accordance with regulations and force protection standards at Dyess AFB. In addition, the newly constructed buildings would be built in compliance with current AT/FP requirements (DoD 2013). The proposed renovation of Building 9265 (Project R01) would increase public and installation personnel safety by including the new AT/FP measures and bringing the facility into compliance with the minimum antiterrorism standards. The proposed renovation of Building 7232 (Project R02) would consolidate all of the security force functions in one facility, increasing operational efficiencies and thus benefitting safety. All renovation projects that exceed 50 percent of the plant replacement value of the facility must comply with AT/FP standards. All renovation projects listed in the IDP would bring buildings up to standards, thereby creating a positive impact to safety.

4.3.1.3 Explosives, Munitions, and Small Arms Range Safety

The explosives and munitions safety program at Dyess AFB would continue to be conducted in accordance with AFMAN 91-201. Construction of the armament management building

(Project C02) would have a positive impact on explosives and munitions safety at Dyess AFB by removing personnel currently performing non-explosive armament activities within the QD Arcs for the MSA.

Relocation of the inert grenade range (Project O01) would have a beneficial impact on the public, installation personnel, and range safety, and would bring the range into compliance with ETL 11-18. Project O01 would move the inert grenade range and associated SDZ completely within the installation boundary.

4.3.1.4 Construction Jobsite Safety

Short-term safety risks are associated with any construction, renovation, and demolition activity, including those activities proposed as part of the proposed actions at Dyess AFB. However, adherence to standard safety practices would minimize any potential risks. No unique construction practices or materials would be required as part of any of the construction, renovation, or demolition projects associated with the proposed actions. All renovation and construction activities would be conducted in compliance with all applicable OSHA regulations to protect workers. The USAF does not anticipate any significant safety impacts to result from the construction, demolition, or renovation if all applicable AFOSH and OSHA requirements are implemented.

Construction of the GOV Parking Lot Extension for Building 5225 (Project I01) would require the regrading of approximately 300 feet of drainage channel and excavation and construction over an existing natural gas line. Utilities, including this natural gas line, would be located and marked, and a dig permit would be acquired prior to excavation and construction. USAF and OSHA excavation safety procedures and regulations would be followed. No significant impacts to construction safety are anticipated from this project.

4.3.1.5 Flight Safety

Current safety policies and procedures at the base ensure the lowest possible potential for aircraft mishaps. These safety policies and procedures would continue upon implementation of the proposed actions. UFC 3-260-01 would continue to limit the location and heights of objects (i.e., trees) in the immediate vicinity (i.e., CZ) of the Dyess AFB airfield. Clearing the trees south of Runway 164/344 (Project O02) would have a positive impact on flight safety by removing trees from the southern CZ and bringing the LZ into compliance with ETL 09-6.

4.3.2 Impacts of No Action

Under the No Action Alternative, baseline conditions at Dyess AFB would remain as described in Section 3.3. Non-explosive armament activities would remain within the QD Arcs for the MSA in violation of AFMAN 91-201. The inert grenade range SDZ would continue to extend outside the boundary of the installation in violation of ETL 11-18. Runway/LZ 164/344 would remain in violation of ETL 09-6 because of the trees within the southern CZ. The facilities and infrastructure on the southern end of the base would remain at risk of fire, and conditions within the IDRC and IPE warehouse would continue to pose health risks.

4.4 SOILS AND WATER

4.4.1 Soil Resources

This section discusses potential impacts to soil resources located within the footprints of the proposed actions. Potential for soil erosion and soil limitations were considered when evaluating impacts to soils. Generally, impacts can be avoided or minimized if proper construction techniques, erosion-control measures, and structural engineering designs are incorporated into project development. Analysis of impacts to soils and geology examined the suitability of locations for proposed activities.

Impacts to soils can result from disturbances, such as grading during construction activities that exposes soil to wind or water erosion.

4.4.1.1 Impacts of Proposed Actions

All of the proposed construction and land disturbance activities associated with the proposed actions would occur within the Dyess AFB boundary. The estimated land disturbance for each proposed project is shown in Table 4-3.

Table 4-3. Estimated Land Disturbance by Project

Project ID	Project Name	Soil Impact	Estimated Land Disturbance (acres)
Facility Construction Projects			
C01	Construct 317 AG HQ Building	Tobosa clay, Tobosa-Urban land complex	0.35
C02	Construct Armament Management Building	Tobosa clay	3.3
C03	Construct Dormitory	Hamby-Urban land complex	1.17
C04	Construct Temporary Lodging Facility	Sagerton-Urban land complex	1.17
C05	Construct Joint Forces DCC	Tobosa clay, Tobosa-Urban land complex	3.88
C06	Construct Crash Evaluation Facility	Gageby clay loam, Sagerton clay loam	NA[a]
C07	Construct the Bowling Center	Hamby-Urban land complex	1.5
Infrastructure Construction Projects			
I01	Construct GOV Parking Lot Extension 5225 AMU	Tobosa clay	1.0
I02	Construct 6-Inch Water Pipeline	Sagerton clay loam	1.84
Renovation and Repair Projects			
R01	Renovate Building 9265, VCC	Hamby fine sandy loam	0.54
R02	Renovate Building 7232	Hamby-Urban land complex	1.38
Demolition Projects			
D01	Demolish Library Building	Hamby-Urban land complex	NA[b]
Other Projects			
O01	Relocate the Inert Grenade Range	Tobosa clay, Sagerton clay loam	7.6
O02	Clear Trees South of Runway 164/344	Colorado soils, Sagerton clay loam	3.0
		Total Estimated Land Disturbance (acres)	**26.73**

[a] Not applicable because only a chain-link fence would be required.
[b] Footprint of proposed project occurs within area of previously disturbed soil. Therefore, land disturbance was not calculated.

Much of the activity associated within the footprints of the proposed actions would primarily occur on Tobosa clay, Tobosa-Urban land complex (C01, C02, C05, I01, and O01), Sagerton-Urban land complex, Sagerton clay loam (C04, C06, I02, and O02), and Hamby-Urban land complex (C03, C07, R01, R02, and D01) soils (Figure 4-1). With proper drainage measures, there are no major limitations that would preclude these soil types from development.

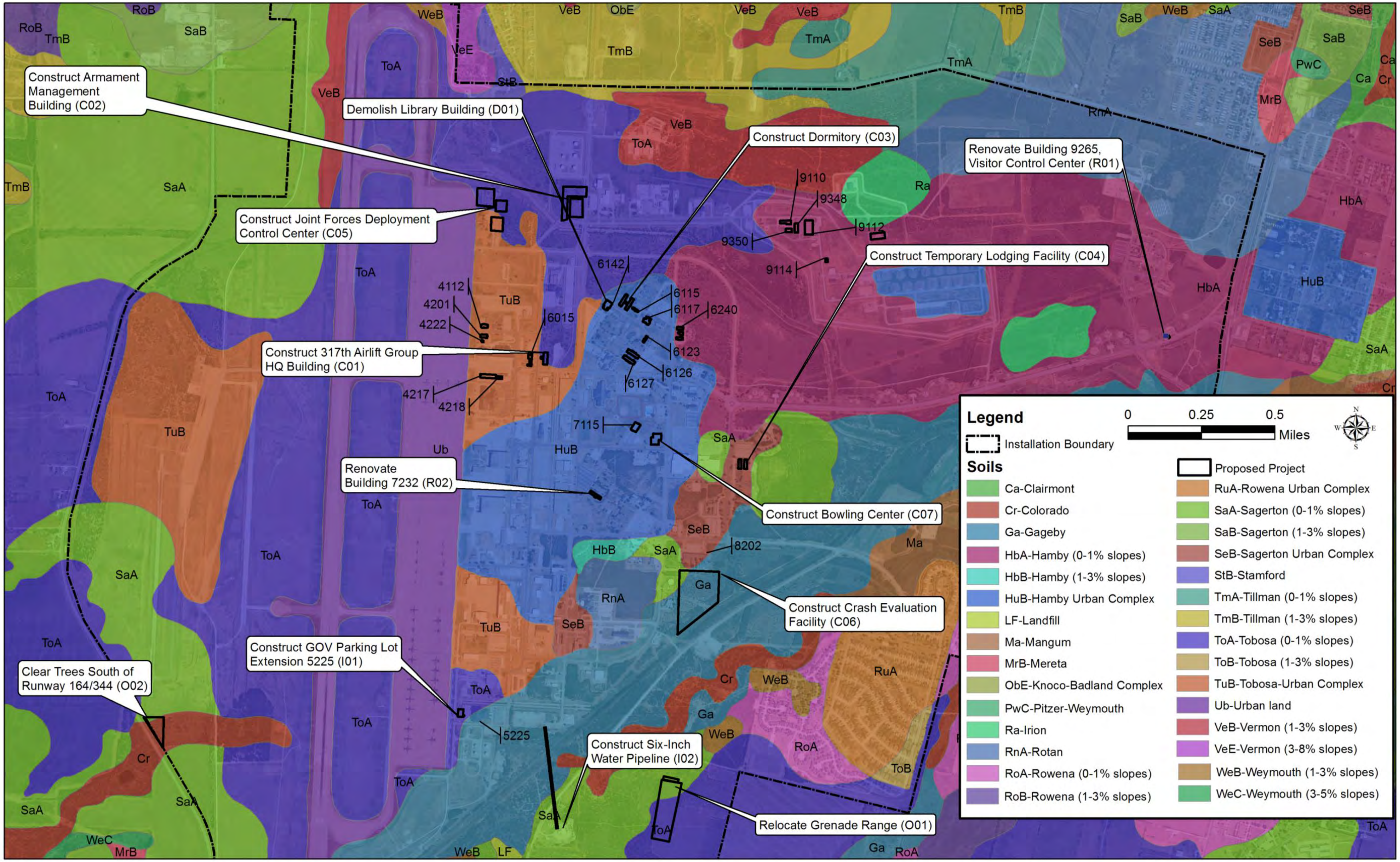

Figure 4-1. Dyess AFB Soil Type by Project

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Tobosa clay, Tobosa-Urban land complex and Hamby-Urban land complex soils are suitable for development, as they have only a slight erosion hazard. Dyess AFB is not located on any seismic faults, has little erosional characteristics, and would not suffer from expansive soils (Dyess AFB 2016b).

As shown in Table 4-3, the total disturbed area for Projects C01 and R01 would be less than 1 acre and would not require coverage under a CGP (TXR150000). Soils at each of the construction sites would require preparation prior to construction. This could include the removal of mowed grass areas and landscaping, excavation, compaction, and grading and leveling. These minor, short-term changes to soils would not result in significant impacts.

Projects C02, C03, C04, C05, C07, R02, I01, I02, O01, and O02 would exceed 1 acre of ground disturbance and would therefore require CGP (TXR150000) coverage. For any projects that result in soil disturbance, Dyess AFB would ensure that all construction activities are conducted in accordance with the applicable stormwater discharge permit to control erosion and prevent sediment, debris, or other pollutants from entering the stormwater system. The Dyess AFB SWPPP (Dyess AFB 2013) describes control practices that are generally used at the base to reduce the potential for soil erosion and sediment transport off site. Dyess AFB would implement best management practices (BMPs) to mitigate any potential impacts to soils or subsequent impacts to wetlands, surface water, and groundwater. With application of BMPs and adherence to the CGP stipulations, potential impacts to soil resources would not be anticipated. Significant impacts to soil resources would not result from implementation of the proposed actions.

Projects C01, C02, C03, C05, and R02 include demolitions associated with the proposed action. No impacts to soils are anticipated within the footprints of these proposed projects, because they are within areas of previously disturbed soil. The U.S. Department of Agriculture (USDA) indicated that the proposed project areas are exempt from the provisions of the Farmland Protection Policy Act (FPPA) and strongly encouraged the use of acceptable erosion control methods during construction (Appendix A).

4.4.1.2 Impacts of No Action

Under the No Action Alternative, soils would remain in their present condition. Implementation of the No Action Alternative would have no effect on soils at Dyess AFB.

4.4.2 Water Resources

Potential impacts to water resources were evaluated with respect to the extent, context, and intensity of the impact in relation to relevant regulations, guidelines, and scientific documentation. The CEQ defines significance in terms of context and intensity in 40 *CFR* § 1508.27. Criteria for evaluating impacts related to water resources are water availability, water quality, loss of a particular resource and/or its functions, and adherence to applicable regulations. Impacts are measured by the potential to (1) reduce water availability or supply to existing users, (2) endanger public health or safety by causing decreased surface water or groundwater quality, or (3) violate laws or regulations adopted to protect or manage water resources. Impacts are also measured by evaluating whether there would be a temporary or permanent loss of water resources or a loss or reduction in their ability to perform their unique functions. An impact to water resources would be significant if it would (1) adversely affect water quality or endanger public health by contributing pollutants to surface water or groundwater, (2) threaten or damage hydrologic characteristics, (3) cause the permanent loss of wetland or floodplains, or (4) violate established laws or regulations that have been adopted to protect or manage water resources of the area.

Based on the analysis presented herein, implementation of any of the projects or associated alternatives under the proposed actions would not reduce water availability or supply to existing users, endanger public health or safety by causing decreased surface water or groundwater quality, or violate laws or regulations adopted to protect or manage water resources. Additionally, none of the projects would adversely affect water quality or endanger public health by contributing pollutants to surface water or groundwater, threaten or damage hydrologic characteristics, cause the permanent loss of wetlands, or violate established laws or regulations that have been adopted to protect or manage water resources of the area.

4.4.2.1 Impacts of Proposed Actions

4.4.2.1.1 Surface Water

Potential indirect impacts from proposed construction activities could result in additional sediment loads being transported to surface waters in the vicinity of proposed construction. Although the additional impervious surfaces resulting from new construction would increase sheet flow and stormwater runoff, it would not result in long-term adverse impacts to water resources on Dyess AFB. Increased runoff and peak discharge volumes as a result of increases to impervious surface can be managed by appropriately designed conveyance structures (e.g., roadways, channels, and culverts) in accordance with site-specific engineering standards that take into consideration the influence of surface water drainage within, adjacent to, and downstream of the project. In addition, implementing features that manage surface water runoff into the design of the project would avoid or minimize conflicts with city, county, state, or federal regulations and would prevent from adversely affecting adjacent properties and/or the project area itself. These measures could include the use of porous materials, directing runoff to permeable areas, and use of detention basins to release runoff over time. All necessary permits, including a NPDES CGP for stormwater discharges, would be obtained prior to construction of the proposed projects. The USAF would specify compliance with the stormwater discharge permit in all of the contractor construction requirements. The TCEQ Office of Water does not anticipate significant long-term environmental impacts as long as construction and associated waste disposal activities are completed in accordance with applicable local, state, and federal environmental permits, statutes, and regulations. Further, they recommended that the USAF take steps necessary to ensure that BMPs are used to control runoff from construction sites to prevent impacts to surface and ground water (Appendix A).

4.4.2.1.2 Wetlands

The tree clearing project (O02) is located in a jurisdictional wetland area. Trees in the jurisdictional wetland area would be cleared by hand without the use of any mechanized equipment. All trees would be cut at the base level just above the soil and the root systems would remain undisturbed. As long as trees are cleared by hand, no Section 404 wetlands permit would be required. Although the hand clearing of trees would result in short-term minor impacts to the jurisdictional wetland area, no long-term significant adverse impacts to wetlands would result from the tree clearing because no loss of wetlands would occur. None of the other proposed projects are located in jurisdictional wetland areas and no other impacts to wetlands are anticipated to result from implementation of the proposed projects.

4.4.2.1.3 Floodplains

EO 11988, *Floodplain Management*, as amended by EO 13690, *Establishing a Federal Flood Risk Management Standard and Process for Further Soliciting and Considering Stakeholder*

Input, requires the USAF to avoid, to the extent practicable, any possible long-and short-term adverse impacts associated with the occupancy and modification of floodplains, and to avoid direct and indirect support of floodplain development when there is a practicable alternative.

The Dyess AFB INRMP, FEMA FIRMs, and a GIS analysis used to map the 100-year floodplain plus 3 feet elevation were examined to identify floodplains at Dyess AFB. Figure 2-1 shows the project interactions with floodplains. Projects C06, I02, and O02 are located in the 100-year floodplain. Projects C02, C03, C05 and I01 are located in the 100-year plus 3 feet elevation (i.e., estimated 500-year floodplain) or mapped 500-year floodplain.

Although seven projects (C02, C03, C05, C06, I01, I02 and O02) are located within the floodplains at Dyess AFB, only three (C02, C03, and C05) would have the potential for minor impacts to approximately 8.35 acres of floodplains. Implementation of the other four projects (C06, I01, I02, and O02) would occur in floodplains but would not result in long-term impacts or changes to floodplains. Construction of the parking lot (I01), construction of the water line (I02), and the tree clearing (O02) would not result in any permanent changes to floodplains. Although construction of the Crash Evaluation Facility (C06) would interact with the 100 and 500-year floodplains, no long-term impacts to floodplains are anticipated because only a chain-link fence would be required and this construction does not have the potential to alter the National Flood Insurance Program (NFIP) flood hazard area.

Approximately 3.3 acres of the 100-year plus 3 feet floodplain would be impacted by construction of the Armament Management Building (C02). Although alternatives outside of the floodplain were evaluated for construction of this building, none were carried forward for further analysis because they did not meet the selection standards. A location along the flightline was evaluated but eliminated because the flightline space is reserved for future missions. Because this building needed to be located outside of the QD arcs associated with the MSA and needed to be located along Ammo Road between the MSA and the flightline, no other practicable alternatives were identified.

Approximately 1.17 acres of the 100-year plus 3 feet floodplain would be impacted by construction of the Dormitory (C03). Although the installation completed a preliminary analysis of reasonable options for fulfilling the need for this project, no other practicable alternatives were identified because the central dormitory area of the installation includes amenities such as the BX/Commissary, the fitness center, the dining facility, and other functions important in the daily life of airmen.

Project C05 is located within the 100-year plus 3-feet floodplain. This project would impact approximately 3.88 acres of floodplain. The floodplain is present on all sides of the proposed building, cargo pad, and an associated parking area. No other alternatives were identified that would meet the Selection Standards for applicability.

The Texas Water Development Board (TWDB) conducted a review of the projects and indicated that, as a participant in the NFIP, Dyess AFB has authority for projects within its jurisdiction. The TWDB recommended that the USAF coordinate with the local Floodplain Administrator (Appendix A).

4.4.2.1.4 Groundwater

No significant impacts to groundwater resources are anticipated to result from implementation of the proposed projects. Construction activities are not anticipated to require significant amounts of groundwater. Other potential impacts to groundwater during construction include potential contamination from minor spills or leaks associated with construction vehicles and machinery. Fuels and other petroleum products would be stored and transferred on-site during construction activities. Spill prevention plans would be in place to minimize the potential for spills and to guide the quick clean up any spills that would occur. The confined nature and depths of the aquifers in the vicinity of the project site limits the potential for spills to migrate into aquifers used for drinking water.

4.4.2.2 Impacts of No Action

Under the No Action Alternative, no effects to water resources would be expected. New facilities would not be constructed, and the site would not be altered from its current state. Any soil erosion that currently occurs at the site due to stormwater runoff would continue at the same rate and would be maintained in accordance to the procedures outlined in the SWPPP. No additional activities would be performed that would impact water resources.

4.5 BIOLOGICAL RESOURCES

Impacts to biological resources could result from implementation of the proposed projects, including direct physical impacts, habitat alteration/loss (including some land clearing), and short-term disturbance during construction or demolition activities.

The analysis of biological resources considered potential impacts to vegetation communities and wildlife, including special status species. The plant and animal resources potentially affected are identified based on vegetation community type and previously documented occurrence. Projected conditions were compared with baseline conditions within the context of regional habitat availability and species populations and a determination was made as to whether impacts would be adverse. An adverse impact would degrade habitat quality or diminish species health. Impacts to biological resources would be considered significant if implementation of the proposed projects would jeopardize the continued existence of a species or result in an overall decrease in population diversity, abundance, or fitness.

Based on the analysis presented below, potential impacts to general wildlife species have been identified due to habitat loss associated with land-clearing activities. However, none of the proposed projects are likely to jeopardize the continued existence of a species or result in an overall decrease in population diversity, abundance, or fitness. Consequently, the USAF has not identified any significant adverse impacts to biological species.

4.5.1 Impacts of Proposed Actions

Some of the proposed projects would occur in developed, improved, or maintained areas. Examples of these types of areas include existing facilities and associated parking lots, turf, and landscaped or mowed parcels. Although a relatively small number of wildlife species could occur in such areas (generally those tolerant of human presence and activity), the limited habitat value substantially decreases the biological importance of these sites. Therefore, impacts to vegetation and wildlife resulting from projects located within developed or maintained areas are generally considered minor and are not analyzed further in this EA. These projects include C04, C07, I01, R01, R02, and D01.

The remaining projects could affect mesquite savannah, woodland, and riparian habitats and thus would have potential to impact biological resources. Projects occurring in mesquite savannah, woodland, and riparian habitats are shown in Table 4-4.

Table 4-4. Habitat Type Affected, by Project

Project ID & Name	Mesquite Savannah	Woodlands	Riparian
C01 -Construct 317 AG HQ Building	0.35 acres	NA	NA
C02 - Construct Armament Management Building	3.3 acres	NA	NA
C03 - Construct Dormitory	1.17 acres	NA	NA
C05 - Construct Joint Forces DCC	3.88 acres	NA	NA
C06 - Construct Crash Evaluation Facility	NA	NA	NA
I02 - Construct 6-Inch Water Pipeline[a]	0.64 acres	0.94 acres	0.26 acres
O01 -Relocate the Inert Grenade Range	7.6 acres	NA	NA
O02- Clear Trees South of Runway 164/344	3.0 acres	NA	NA
TOTAL AREA OF POTENTIAL IMPACT	19.94 acres	0.94 acres	0.26 acres

[a] A 50-foot wide ROW would be required.
NA – not applicable

4.5.1.1 Vegetation

No sensitive vegetation communities are located at Dyess AFB (Dyess AFB 2016b). Therefore, impacts to vegetation would not be significant. The proposed projects would affect an estimated 19.94 acres of mixed mesquite savannah habitat, 0.94 acres of woodland habitat, and 0.26 acres of riparian habitat. Mesquite savannah is widely distributed throughout the Rolling Plains areas in the State of Texas (TPWD 1984). Disturbances to the woodland and riparian areas would be temporary, and these areas would likely revegetate over time.

4.5.1.2 Wildlife

The proposed actions would result in minor impacts to wildlife at Dyess AFB. Wildlife within the proposed project areas could be temporarily disturbed or displaced due to an increase in noise and human activity associated with C&D. It is expected that these effects would be short term and would only affect wildlife in the immediate project areas. Those affected would generally be able to return to the area(s) after completion of activities. While some wildlife might avoid project sites long-term, the affected areas would be small compared with other, similar habitat available nearby.

In addition to temporary wildlife disturbance during construction activities, vegetation removal would represent long-term habitat loss to wildlife. Some projects would result in only minor vegetation removal (e.g., I02, Construct 6-Inch Water Pipeline), while other projects would involve site clearance (e.g., O02, Clear Trees South of Runway 164/344). Trees and other vegetation subject to clearing could support foraging, nesting, and other behaviors for mammals, birds (including migratory birds), and reptiles. While any habitat loss could adversely affect individual animals, the amount of impacted habitat would be relatively small compared to similar habitat available in the vicinity, and several of the potentially affected sites would occur in areas near current human activity. Overall, population-level effects to any species are not expected. To the extent practicable, Dyess AFB would time tree removal to occur outside of times of increased migratory bird activity. Increased activity typically occurs from late March through early May (TPWD 2005).

4.5.1.3 Special Status Species

According to the TPWD, no records of rare, threatened, or endangered species have been documented within 1.5 miles of Dyess AFB in the Texas Natural Diversity Database (TNDD) (Appendix A). Accordingly, the USAF has determined that the proposed actions would have no effect on federally-listed birds, fish, or clams (Table 3-3), because the installation does not support suitable habitat for any of these species.

Of the two reptile species of state significance with potential to occur at Dyess AFB, only the Texas horned lizard has been observed at Dyess AFB. The presence of listed species is monitored, and updates to the INRMP are completed every 5 years. Consistent with TPWD recommendations, Dyess AFB requires that site-specific surveys be conducted for the state-listed threatened Texas horned lizard during the warm months when the lizards are active and prior to any proposed habitat disturbance activity. Prior to implementation of the proposed actions, the Dyess AFB Environmental Management System will identify areas of potential Texas horned lizard habitat and coordinate species surveys to be conducted by a permitted biologist. If Texas horned lizards are found on any project site, the USAF would contact TPWD to develop relocation plans (Appendix A). To minimize impacts to Texas horned lizards, BMPs, as described in the *Texas Horned Lizard Watch – Management and Monitoring Packet,* would be implemented.

4.5.1.3.1 Birds of Conservation Concern

Potential habitat for breeding populations of loggerhead shrike, Bell's vireo, Cassin's sparrow, Mississippi kite, and the scissor-tailed flycatcher could occur in grassland and mesquite savannah habitats at Dyess AFB (Dyess AFB 2016b). The TPWD recommended excluding vegetation clearing during the nesting season, March through August (Appendix A). To the extent practicable, Dyess AFB would time tree removal to occur outside of the nesting season. While any habitat loss could adversely affect individual birds, the amount of impacted habitat is relatively small compared to similar habitat available within the immediate vicinity of the proposed project areas. Overall, population-level effects to any species are not expected.

4.5.1.4 Natural Resource Area of Concern

No refuges or other areas of concern near Dyess AFB were identified by the USFWS IPaC system; therefore, no impacts to natural resource areas of concern would occur as a result of the proposed actions.

4.5.2 Impacts of No Action

Under the No Action Alternative, no effects to biological resources would be expected. Baseline conditions at Dyess AFB would continue.

4.6 CULTURAL RESOURCES

4.6.1 Impacts of Proposed Actions

Impact analysis for cultural resources focuses on assessing whether implementation of the proposed actions would have the potential to affect cultural resources that are eligible for listing on the NRHP or have traditional significance for tribes. For this EA, impact analysis for cultural resources focuses on, but is not limited to, guidelines and standards set forth in NHPA Section 106's implementing regulations (36 *CFR* 800). Under Section 106 of the NHPA, the proponent of the action is responsible for determining whether any historic properties are located in the area, assessing whether the proposed undertaking would adversely affect the resources, and notifying the SHPO of any adverse effects. An adverse effect is any action that may directly or indirectly change the characteristics that make the historic property eligible for listing on the NRHP. If an adverse effect is identified, the federal agency consults with the SHPO and federally recognized tribes to develop measures to avoid, minimize, or mitigate the adverse effects of the undertaking.

Archaeological and historic architectural resources at Dyess AFB were characterized using existing survey and analysis information from the Integrated Cultural Resources Management Plan (ICRMP), archaeological survey reports, historic buildings survey reports, local histories, and the records of the NRHP and National Historic Landmarks. These documents provided information on known locations of significant resources. In compliance with Section 106 of the NHPA, the USAF has consulted with the Texas SHPO regarding the APE and potential cultural resource concerns relative to the proposed actions. On 17 April 2017, the Texas SHPO concurred with the USAF determination of the APE and that the projects included in this EA as the proposed actions would not affect any historic properties. Correspondence regarding the findings, concurrence, and resolution of any adverse effects is included in Appendix A.

The potential for traditional resources at Dyess AFB was identified using the ICRMP and information provided by base cultural resource management staff. Potentially interested tribes were contacted to request information on potential concerns about the proposed actions.

The assessment of adverse effects takes into account both the potential for physical damage or destruction of historic properties at the base, and the potential adverse effects of visual intrusions, noise, and vibration on historic properties at the base.

4.6.1.1 Architectural Resources

Implementation of the proposed actions would include nine construction projects, two renovation projects, one demolition project, a tree clearing, and relocation of an inert grenade range. None of these projects are anticipated to have interactions with cultural resources at Dyess AFB. All of the buildings listed for renovation or demolition have been determined ineligible by Dyess AFB, and the Texas Historical Commission has concurred on the findings of eligibility. None of the NRHP-eligible buildings present at Dyess AFB would be impacted by the proposed actions, because all NRHP-eligible buildings are outside of the APE. Indirect impacts on cultural resources from population increase or visual intrusions would be extremely unlikely. None of the proposed actions would result in a population increase. New construction would occur in the context of an active USAF base, where changes in the infrastructure are common. The viewshed of remaining historic properties would not be affected by the proposed construction.

4.6.1.2 Archaeological Resources

No impacts to archaeological resources are anticipated to result from implementation of the proposed actions. The base has been inventoried for archaeological resources, and no NRHP-eligible archaeological resources have been identified within the installation boundaries. Because ground-disturbing activities would occur in previously disturbed areas, it is extremely unlikely that any previously undocumented archaeological resources would be encountered during facility demolition, renovation, addition, or construction. In the case of unanticipated or inadvertent discoveries, the USAF would comply with Section 106 of the NHPA.

4.6.1.3 American Indian Sacred Site and Traditional Resources

No tribal resources are located at Dyess AFB. Consultation has been initiated with the six affiliated tribes associated with Dyess AFB (Appendix A).

4.6.2 Impacts of No Action

Under the No Action Alternative, there would be no interaction with cultural resources; therefore, no adverse impacts would occur. Existing resources at Dyess AFB would continue to be managed in accordance with the ICRMP.

4.7 LAND USE

Potential impacts to land use are evaluated with respect to the extent, context, and intensity of the impact relative to current regulations, guidelines, and scientific documentation. The methodology to assess impacts on individual land uses requires identifying those uses and determining the degree to which they would be affected by each alternative. Significance of potential land use impacts is based on the level of land use sensitivity in affected areas. In general, land use impacts would be significant if they were to:

- Be inconsistent or in noncompliance with applicable land use plans or policies.
- Preclude the viability of existing land use.
- Preclude continued use or occupation of an area.
- Be incompatible with adjacent land uses or land uses in the vicinity to the extent that public health or safety is threatened.
- Conflict with airfield planning criteria established to ensure the safety and protection of human life and property.

Based on the analysis presented above, the USAF has not identified any significant adverse land use impacts from any of the proposed projects. None of the project alternatives considered for the proposed actions would result in any substantive land use changes or significant impacts based on the criteria listed herein. None of the proposed projects would have any impact on land use, because there would be no change to the existing land use designation for the potentially affected area or because the change would be negligible and the new land use would be compatible with the adjacent land uses. These projects would also not have any specific restrictions within the applicable planning districts and future planning areas as defined in the IDP (Dyess AFB 2016a).

4.7.1 Impacts of Proposed Actions

Of the 14 projects proposed for this EA, three (C01, C05 and I01) are proposed in the aircraft operations and maintenance land use area. Construction of the 317 AG HQ building (C01), the Joint Forces DCC (C05), and the GOV parking lot extension for Building 5225 all support aircraft operations and maintenance on Dyess AFB. Being located adjacent to the flightline, projects C05 and I01 would be exposed to high noise levels. However personnel working in these areas are required to utilize hearing protection. Although the 65-75 dB DNL noise contour extends into the area proposed for project C01, noise would not be considered a significant issue for this facility because an HQ building is considered a compatible use for this level of noise (Dyess AFB 2015). Although the parking lot extension would remain within the QD arc for the B-1 parking spaces, the DCC (C05) would be constructed outside of any QD arcs.

Three of the projects (C03, C04, and D01) are proposed in the unaccompanied housing land use area. Besides the demolition of the former library Building 6142 (Project D01), both C03 (construct dormitory) and C04 (construct temporary lodging facility) would support the housing land use and are appropriately sited for their functional use. Per the 2016 IDP, both of these projects are located in developable land on Dyess AFB and would not be exposed to noise levels above 65 dB DNL.

Of the projects proposed in the administrative land use area (C06, R01, and R02), two projects (R01 and R02) are renovations of existing buildings. Building renovation would not change the functional use of either building and would thus not cause any impacts to land use.

Project C06 is the construction of the crash evaluation facility. The site for this facility must be within walking distance of Building 8202 and must be compatible to host various aircraft parts (e.g., wheel, tail, or rudder assemblies) without being obtrusive to visitors and personnel working on Dyess AFB.

The preferred alternative for this project is located directly behind Building 8202 in an open area that backs up to open space land use type (a grassy area with scattered mesquite trees). The only changes proposed for this area would be to mow and maintain the vegetation, construct a chain link fence, and distribute the aircraft parts. Implementation of this project would not affect land use.

The proposed location for project C06 is a grassy field area with scattered mesquite trees.

Construction of the new bowling center (C07) would be located adjacent to the existing bowling center in the community commercial land use area. No impact to land use would result from this project.

Construction of the Armament Management building (C02) would be located in the industrial land use area north of Ammo Road. Armament management personnel at Dyess AFB work closely with equipment, personnel and munitions in the base MSA, which is also located in the industrial land use area on the north end of the base. The area proposed for this facility is located outside any of the explosive QD arcs associated with the MSA and is appropriately sited for its functional use. Therefore, no impacts to land use would result from this project.

Relocation of the inert grenade range (O01) and the tree clearing project (O02) would both be located in open space land use types, and construction of the water line (I02) would be located in the industrial land use type. The relocated inert grenade range would be in an area that is approximately 1,500 feet from the existing inert grenade range. The base has developed the SDZ for the relocated range. None of these projects would cause permanent changes to any land use classifications; therefore, no impact to land use would result (see Figure 4-2).

4.7.2 Impacts of No Action

Under the No Action Alternative, no additional land use impacts would occur beyond the scope of normal conditions and influences within the land use ROI. None of the proposed projects would be implemented and the existing land use designations at Dyess AFB would remain unchanged.

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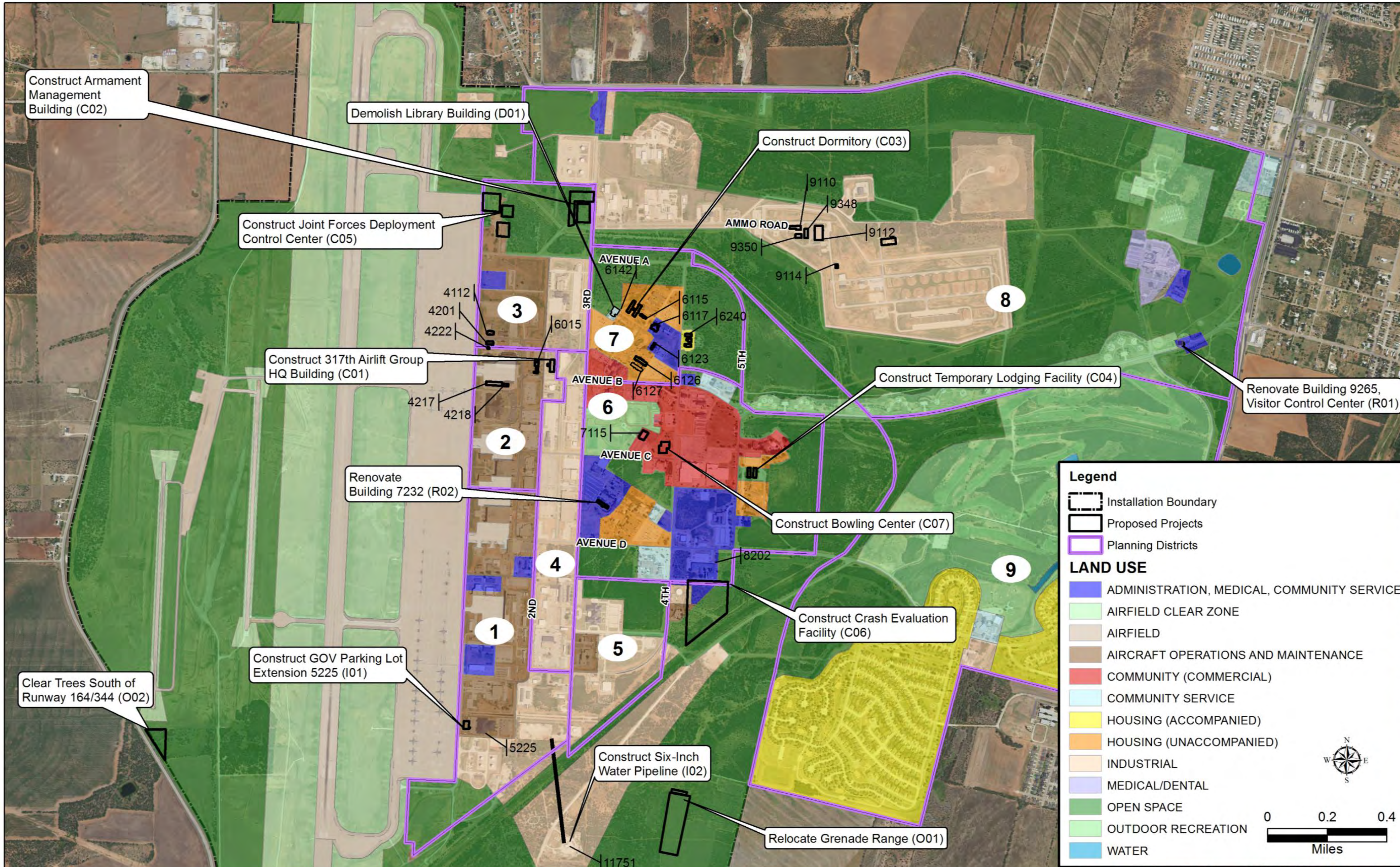

Figure 4-2. Proposed Projects at Dyess AFB Relative to Land Use

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4.8 INFRASTRUCTURE

Refer to Section 3.8 for a description of existing infrastructure system capacities and conditions at Dyess AFB. The proposed actions were used to determine impacts on infrastructure capacities and conditions. Some of the projects associated with the proposed actions would require changes to the existing infrastructure at Dyess AFB. The analysis below indicates that implementation of the proposed actions would have no significant impacts on base infrastructure. All existing utility infrastructure supplies and capacities are adequate for implementation of the proposed actions. All infrastructure utility upgrades would comply with energy efficient and sustainable development mandates.

4.8.1 Impacts of Proposed Actions

4.8.1.1 Potable Water

Projects C01, C02, C03, C04, C05, C07, I02, and R01 would require new potable water lines and would connect to tie-in points and the existing base distribution system. Projects D01, C01, C02, C03, C04, C05, C07, and R02 include the demolition of buildings. Potable water lines connected these building would be properly disconnected. Minor, short-term impacts and interruptions could be experienced during the proposed actions when buildings are being disconnected or connected to the potable water infrastructure. Disruptions to the potable water supply and infrastructure would be temporary and coordinated with area users.

Implementation of the proposed actions would have no negative impact on potable water supplies at Dyess AFB, because no new permanent base personnel would be added. Minor, long-term, beneficial impacts are expected to potable water supplies from the construction of new and more efficient buildings and the consolidation of individual base functions into a single facility. Typical usage would continue at levels well below the base's contracted daily supply volume.

Project I02, Construct 6-Inch Water Pipeline, would have a positive impact on the potable water infrastructure by delivering water from the cantonment area to the southern portion of the installation. This portion of the installation does not currently have a potable water supply.

4.8.1.2 Wastewater

Projects C01, C02, C03, C04, C05, C07, and R01 would require new wastewater lines and would connect to tie-in points and existing base infrastructure. Projects D01, C01, C02, C03, C04, C05, C07, and R02 include the demolition of buildings. Wastewater lines connected to these buildings would be properly disconnected. Minor, short-term impacts and interruptions could be experienced during the proposed actions when buildings are being disconnected or connected to the wastewater infrastructure. Disruptions to the wastewater lines and infrastructure would be temporary and coordinated with area users.

Implementation of the proposed actions would have no negative impact on wastewater capacity at Dyess AFB, because no new permanent base personnel would be added. Wastewater volumes would continue at levels well below the base's permitted discharge volume.

4.8.1.3 Electricity

Projects C01, C02, C03, C04, C05, C07, and R01 would require new electric power lines and would connect to tie-in points and the existing base distribution system. Projects D01, C01, C02, C03, C04, C05, C07, and R02 include the demolition of buildings. Electric power lines connected to these buildings would be properly disconnected. Minor, short-term impacts and interruptions could be experienced during the proposed actions when buildings are being disconnected or connected to the electric power infrastructure. Disruptions to the electric power supply would be temporary and coordinated with area users.

Implementation of the proposed actions would have no negative impact on electric power supply at Dyess AFB, because no new permanent base personnel would be added. Minor, long-term, beneficial impacts are expected to the electric power supply from the construction of new and more efficient buildings and the consolidation of single base functions into one facility. Typical usage would continue at levels well below the base's contracted daily supply volume.

4.8.1.4 Natural Gas

Projects C01, C02, C03, C04, C05, C07, and R01 would require new natural gas supply lines and would connect to tie-in points and the existing base distribution system. Projects D01, C01, C02, C03, C04, C05, C07, and R02 include the demolition of buildings. Natural gas lines connected to these buildings would be properly disconnected. Minor, short-term impacts and interruptions could be experienced during the proposed actions when buildings are being disconnected or connected to the natural gas infrastructure. Disruptions to the natural gas supply would be temporary and coordinated with area users.

Implementation of the proposed actions would have no negative impact on the natural gas supply at Dyess AFB, because no new permanent base personnel would be added. Minor, long-term, beneficial impacts are expected to the natural gas supply from the construction of new and more efficient buildings and the consolidation of single base functions into one facility. Typical usage would continue at levels well below the system's capacity.

Project I01, Construct GOV Parking Lot Extension 5225, would require the regrading of approximately 300 feet of drainage channel and excavation and construction over an existing natural gas line. Utilities, including this natural gas line, would be located and marked, and a Dyess AFB dig permit would be acquired prior to excavation. No impacts to the natural gas infrastructure are anticipated from this action.

4.8.1.5 Stormwater System

The proposed action would require demolition of facilities, construction of new facilities, and additions to existing facilities. Table 1-1 identifies and Section 2.3 further describes the projects associated with the proposed actions. The total potential disturbed area associated with these projects would exceed 5 acres (the area for new construction) and would thus require Dyess AFB to have a SWPPP in place and to obtain a stormwater permit by submitting a Notice of Intent (NOI) to TCEQ (TCEQ 2017). Minor, short-term impacts to the stormwater system could be experienced during the construction, renovation, and demolition activities associated with the proposed actions. During these activities, all contractors would be required to comply with applicable statutes, standards, regulations, and procedures regarding stormwater management. During the design phase, a variety of stormwater controls could be incorporated into construction plans. These could include planting vegetation in disturbed areas as soon as possible after construction, and constructing retention and infiltration facilities and implementing structural controls (e.g., interceptor dikes, swales [excavated depressions], silt fences, straw bales, and other storm drain inlet protection), as necessary, to prevent sediment from entering inlet structures. Minor, long-term, beneficial impacts are expected to the stormwater system from the use of sustainable development techniques and the use of natural retention, infiltration, and absorption features to reduce runoff and delay stormwater discharges. Additional stormwater information and requirements are described in Section 3.4. Overall, the potential impacts of the proposed actions to the stormwater system would not be significant.

4.8.2 Impacts of No Action

Under the No Action Alternative, baseline conditions at Dyess AFB would remain as described in Section 3.8. None of the construction, renovation, or demolition associated with the proposed actions would occur at the base. No impacts to infrastructure would occur.

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5.0 CUMULATIVE EFFECTS

The CEQ regulations stipulate that the cumulative effects analysis in an EA should consider 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 non-federal) or person undertakes such other actions" (40 *CFR* 1508.7).

Actions that have a potential to interact with the proposed actions at Dyess AFB are included in this cumulative effects analysis. This approach enables decision makers to have the most current information available so that they can evaluate the range of environmental consequences that would result from implementation of the proposed actions at Dyess AFB.

In this chapter, the USAF has identified past and present actions in the region of Dyess AFB. In addition, this analysis also evaluated reasonably foreseeable future actions that are in the planning phase in this region.

The assessment of cumulative effects begins with defining the scope of other project actions and the potential interrelationship with the proposed action (CEQ 1997). The scope of the analysis must consider other projects that coincide with the location and timetable of implementation of the proposed projects at Dyess AFB. Cumulative effects can arise from single or multiple actions and through additive or interactive processes acting individually or in combination with each other. Actions that are not part of the proposal, but that could be considered as actions connected in time or space (40 *CFR* 1508.25) (CEQ 1997), could include projects that affect areas on or near Dyess AFB. This analysis addresses three questions to identify cumulative effects:

1. Does a relationship exist such that elements of the proposed action or alternatives might interact with elements of past, present, or reasonably foreseeable actions?
2. If one or more of the elements of the alternatives and another action could be expected to interact, would the alternative affect or be affected by impacts of the other action?
3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the alternative is considered alone?

For the proposed actions under consideration to have cumulatively significant impacts on an environmental resource, two conditions must be met. First, the combined impacts of all identified past, present, and reasonably foreseeable projects, activities, and processes on a resource, including the impacts of the proposed action, must be significant. Second, the proposed action must make a substantial contribution to that significant cumulative impact. Proposed actions of limited scope do not typically require as comprehensive an assessment of cumulative impacts as proposed actions that have significant environmental impacts over a large area (CEQ 2005).

In the following sections, the cumulative significance is based on the context, intensity, and timing of the projects discussed in Chapter 4, related to the past, present, and reasonably foreseeable actions. A summary of the cumulative effects is provided in a table, followed by a discussion of the resource areas that have potentially significant cumulative effects based on the above evaluation criteria.

5.1 PAST, PRESENT AND REASONABLY FORESEEABLE ACTIONS

This section provides decision makers with the cumulative effects of the projects proposed at Dyess AFB, as well as the incremental contribution of past, present, and reasonably foreseeable actions.

Table 5-1 summarizes past, present, and reasonably foreseeable actions within the region that could interact with implementation of the proposed projects at Dyess AFB. Table 5-1 briefly describes each identified action, presents the proponent or jurisdiction of the action and the timeframe (e.g., past, present/ongoing, future), and indicates which resources could potentially interact with the projects at Dyess AFB. No other actions were identified during the data gathering and field survey phases at Dyess AFB for this EA.

As part of the analysis for this EA, several people were contacted to obtain information regarding reasonably foreseeable actions that could interact with the proposed projects to cause cumulative impacts. In the Abilene area, The Village at Allen Ridge is the largest development proposed for this region. The 90-acre site for this development is located approximately 7 miles north of the base. As described in Table 5-1, this development will include a mix of commercial and residential development and is serving as a catalyst for other, secondary development. According to the Abilene Planning Manager, most of the growth for Abilene has transitioned to the northeast side of Abilene along the Interstate 20 corridor (Rainbow 2017).

Past activities are those actions that occurred within the geographic scope of cumulative effects that have shaped the current environmental conditions of the project area. For most resource areas (e.g., soils and water, biological resources, and infrastructure), the impacts of past actions are now part of the existing environment and are incorporated in the description of the affected environment in Chapter 3.

Table 5-1. Past, Present, and Reasonably Foreseeable Actions at Dyess AFB and Associated Region

Action	Proponent/ Location	Timeframe	Description	Resource Interaction
Military Actions				
Top Five MILCON Projects	Dyess AFB	Present, future		Noise, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure
State and Local Actions				
The Village at Allen Ridge	Private developer/ City of Abilene	Present	The Village at Allen Ridge is a 90-acre mixed residential/retail community near Abilene Christian University, approximately 7 miles northeast of the base. This community will include seven apartment buildings, a town center, an eight-screen theater, a hotel, shops, restaurants, and office space.	Noise, Air Quality, Soils and Water, Biological Resources, Infrastructure
Highway and Road Improvements	Texas Department of Transportation/ Taylor County	Present	Based on review of the Texas Department of Transportation Project Tracker website, approximately 84 road and bridge projects are finalized or scheduled for construction in Taylor County. Projects range from small seal coat projects to large bridge or road replacements.	Noise, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure
Lone Star Wind Farm	Private developer/ Shackelford and Callahan Counties	Past	The Lone Star Wind Farm is located approximately 16 miles northeast of Dyess AFB. This wind farm has the potential for future expansion.	Biological Resources, Infrastructure
South Trent Mesa Wind Farm	Private developer/ Taylor County	Past	The South Trent Mesa Wind Farm is approximately 15 miles west of Dyess AFB and also has the potential for future expansion.	Biological Resources, Infrastructure
Cedar Ridge Reservoir	USACE/ Throckmorton County	Future	The Cedar Ridge Reservoir would encompass 6,635 acres on the Clear Fork of the Brazos River and hold 74 billion gallons of water. The estimated project cost is $192.9 million.	Noise, Air Quality, Safety, Soils and Water, Biological Resources, Land Use, Infrastructure

5.2 CUMULATIVE IMPACT ANALYSIS

This section evaluates the cumulative effects from the past, present, and reasonably foreseeable future actions (see Table 5-1) and the proposed projects at Dyess AFB. Table 5-2 provides a summary of the cumulative effects. As shown in Table 5-2, safety, cultural resources, and land use are not anticipated to contribute to cumulative effects. Cumulative effects are discussed for noise, air quality, soils and water, biological resources, and infrastructure.

Table 5-2. Summary of Cumulative Effects for Dyess AFB

Resource Area	Infrastructure Development Projects	Past, Present, and Reasonably Foreseeable Actions	Cumulative Effects
Noise	◘	◘	◘
Air Quality	◘	◘	◘
Safety	○	○	○
Soils and Water	◘	◘	◘
Biological Resources	◘	◘	◘
Cultural Resources	○	○	○
Land Use	○	○	○
Infrastructure	◘	◘	◘

Key: ○ – not affected or beneficial impacts, ◘ – affected but not significant, short to medium term, impacts that range from low to high intensity

5.2.1 Noise

C&D projects associated with the proposed projects would take place near other ongoing and future C&D projects during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Dyess AFB. Noise generated during C&D projects would be localized and temporary, and construction work is generally limited to normal working hours (i.e., 7:00 A.M. to 5:00 P.M.). Furthermore, the projects are or would be located in an acoustic environment that includes aircraft operations noise. Should multiple C&D projects affect a single area at the same time, construction noise would be a slightly more noticeable component of the acoustic environment, but would still not be expected to result in impacts that would be considered significant.

Cumulative impacts resulting from implementation of the proposed infrastructure development projects in conjunction with past, present, and reasonably foreseeable future actions on the acoustic environment at Dyess AFB would not be significant.

5.2.2 Air Quality

C&D projects associated with the proposed infrastructure development projects would take place near other ongoing and future C&D projects during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Dyess AFB. These projects would generate the same types of construction-related impacts as described for the proposed infrastructure development projects (e.g., fugitive dust emissions, increases in construction-related criteria pollutant emissions). Cumulative impacts resulting from implementation of the proposed infrastructure development projects in conjunction with past, present, and reasonably foreseeable future actions on air quality at Dyess AFB would not be significant.

5.2.3 Soils and Water

C&D projects associated with the proposed infrastructure development projects would take place near other ongoing and future C&D projects during the same time periods. C&D projects have been and will continue to be a regular occurrence on and near installations such as Dyess AFB. These construction projects would increase the amount of soil disturbed and have the potential to increase erosion and sedimentation into surface water features. Cumulative impacts resulting from implementation of the proposed infrastructure development projects in conjunction with past, present, and reasonably foreseeable future actions on the soil and water resources at Dyess AFB would not be significant.

5.2.4 Biological Resources

The additional C&D projects described in Table 5-1 would be anticipated to have similar types of impacts to vegetation, wildlife, and special status species as those impacts described for the proposed infrastructure development projects. Cumulative impacts resulting from implementation of the proposed infrastructure development in conjunction with past, present, and reasonably foreseeable future actions on biological resources at Dyess AFB would not be significant.

5.2.5 Infrastructure

When considered in combination with the projects in Table 5-1, the C&D projects associated with the proposed infrastructure development at Dyess AFB would not be expected to significantly increase the demand on existing infrastructure. Cumulative impacts resulting from implementation of the proposed infrastructure development in conjunction with past, present, and reasonably foreseeable future actions on infrastructure at Dyess AFB would not be significant.

5.3 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

The irreversible environmental changes that would result from implementation of the proposed infrastructure development at Dyess AFB involve the consumption of material resources and energy resources. The use of these resources is considered permanent. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that use of these resources will have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). Irretrievable resource commitments also involve the loss in value of an affected resource that cannot be restored as a result of the action.

For the proposed infrastructure development at Dyess AFB, most resource commitments would be neither irreversible nor irretrievable. Most impacts would be short-term and temporary (e.g., air emissions from construction), or longer lasting but negligible. Those limited resources that could involve a possible irreversible or irretrievable commitment would be used in a beneficial manner.

Construction and renovation of base facilities and infrastructure would require the consumption of limited amounts of material typically associated with interior renovations (wiring, insulation, windows, and drywall) and exterior construction (concrete, steel, sand, mortar, brick, and asphalt). An undetermined amount of energy to conduct renovation, construction, and operation of these facilities would be expended and irreversibly lost, but energy would be used in an efficient and sustainable manner throughout the useful life cycle of the facilities.

Construction activities would continue to involve the consumption of nonrenewable resources, such as gasoline used in vehicles and equipment. None of these activities are expected to significantly decrease the availability of minerals or petroleum resources. Personal vehicle use by construction contractors and those continuing to support the existing missions would consume fuel, oil, and lubricants. The amount of these materials used would increase slightly; however, this additional use is not expected to significantly affect the availability of the resources in the West Texas region or the nation.

6.0 MITIGATIONS AND BEST MANAGEMENT PRACTICES

No significant adverse impacts have been identified in this EA that would require mitigative measures. However, there are special requirements such as permits that would be required for implementation of the proposed projects. This chapter identifies special requirements such as permits, as well as standard operating procedures (those that are already part of standard management activities or other operations at Dyess AFB), recommended operating procedures (not currently part of Dyess AFB operations but recommended to further minimize adverse impacts), and special operating requirements (adjustments to proposed activities that would serve to further minimize any identified adverse impacts). No special requirements or operating procedures have been identified for land use.

6.1 NOISE

Demolition and construction activities would be conducted during normal business hours and construction equipment would be properly fitted with mufflers to prevent excessive noise during construction.

6.2 AIR QUALITY

During construction, impacts to air quality can be minimized using various control measures. Fugitive dust control and soil retention practices would include:

- Water trucks to keep all areas of vehicle movement damp enough to prevent dust from leaving the construction area;
- Minimize the amount of disturbed ground area at a given time;
- Suspension of all soil disturbance activities when winds exceed 25 miles per hour or when visible dust plumes emanate from the site; and
- Designating personnel to monitor the dust control program and to order increased watering, as necessary, to minimize the generation of dust.

6.3 SAFETY

All renovation and construction activities would be conducted in compliance with all applicable OSHA regulations to protect workers. USAF and OSHA excavation safety procedures and regulations would be followed.

6.4 SOILS AND WATER

An NPDES CGP issued by the TCEQ would be required for ground-disturbing activities associated with the proposed construction activities. Under this permit, Dyess AFB would be required to implement BMPs as part of the Erosion, Sedimentation & Pollution Control Plan requirements.

Grading and excavation activities associated with construction have the potential to increase runoff, erosion, and sedimentation in waterbodies. Any potential impacts to surface water and groundwater would be prevented or minimized by implementing permit-related erosion BMPs during and after construction. Permit conditions would specify BMPs and control measures required to prevent fugitive soil, sediment, and other potential contaminants from entering waterbodies. Such conditions could include minimization of earth-moving activities during wet weather/conditions, covering soil stockpiles, installation of silt fencing and sediment traps, and revegetation of disturbed areas with native plants as soon as possible to contain and prevent any off-site migration of sediment or eroded soils from the project areas.

Site drainage plans for development areas should provide effective engineering controls and adequate naturally vegetated buffers around unused wetlands to prevent any soil, sediment, or other potential contaminants resulting from stormwater runoff from impervious surfaces (e.g., roads and roofs) from entering these sensitive natural resources. Following construction, disturbed areas not covered with impervious surfaces would be reestablished with appropriate vegetation and native seed mixtures and managed to minimize future erosion potential.

6.5 BIOLOGICAL RESOURCES

The following standard operating procedures would be implemented as part of normal natural resource management requirements on Dyess AFB as outlined in the Dyess INRMP.

- Provide education to all installation personnel, through the Installation Supplement briefing and other established outreach efforts, on the presence of and the requirement to protect listed species.
- In order to reduce the potential for impacts to bird nesting activity and the risk of harm to migratory birds, conduct tree-clearing activities between 1 September and 31 March to the extent practicable.
- Prior to implementation of the proposed actions, the Dyess AFB Environmental Management System will identify areas of potential Texas horned lizard habitat and coordinate species surveys to be conducted by a permitted biologist. Any lizards identified to be at risk by the proposed projects would be relocated in coordination with the TPWD permit guidelines (Walton 2017).

6.6 CULTURAL RESOURCES

In the case of unanticipated or inadvertent cultural resources discoveries, the USAF would comply with Section 106 of the NHPA and follow the standard operating procedures outlined in the ICRMP.

6.7 INFRASTRUCTURE

Incorporate Leadership in Energy and Environmental Design (LEED) and sustainable development concepts into construction projects to achieve optimum resource efficiency, sustainability, and energy conservation, except to the extent limited or prohibited by law.

7.0 PERSONS AND AGENCIES CONTACTED

Point-of-Contact	Agency	Type of Contact
Dr. Alfredo Armendariz	U.S. Environmental Protection Agency	Interagency Coordination
Ms. Tanya Sommer	U.S. Fish and Wildlife Service	Interagency Coordination
Chief of Regulatory Division	U.S. Army Corps of Engineers	Interagency Coordination
Mr. Michael Segner	Federal Emergency Management Agency	Interagency Coordination
Mr. Salvador Salinas	U.S. Department of Agriculture	Interagency Coordination
Mr. Mark Wolfe	Texas Historical Commission	SHPO
Mr. Chikaodi Agumadu	Texas Commission on Environmental Quality	Interagency Coordination
Mr. Richard Hanson	Texas Parks and Wildlife Department	Interagency Coordination
Mr. Doug Peters	Abilene Chamber of Commerce	Interagency Coordination
Mr. Mike Peel	Taylor County Environmental Department	Interagency Coordination
Mr. Don Green, A.A.E.	Dyess AFB Joint Land Use Study	Interagency Coordination
Mayor Roy Votaw	Mayor of Tye, Texas	Interagency Coordination
Mayor Norm Archibald	Mayor of Abilene, Texas	Interagency Coordination
Point-of-Contact	**Federally Recognized Native American Tribe**	**Type of Contact**
Mr. Jimmy Arterberry	Comanche Nation of Oklahoma	Tribal
Chairman Bobby Komardley	Apache Tribe of Oklahoma	Tribal
President Wainwright Velarde	Jicarilla Apache Nation	Tribal
Chairman Jeff Haozous	Fort Sill Apache Nation of Oklahoma	Tribal
President Danny Breuninger	Mescalero Apache Tribe	Tribal
Chairman Matthey Komalty	Kiowa Indian Tribe of Oklahoma	Tribal

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9.0 LIST OF PREPARERS

Government Agency Development Team	
Name/Title	**Role**
Air Force Civil Engineer Center (AFCEC) Mr. Joshua Adkins	Environmental Planning Function (EPF)/Lead Environmental Impact Statement (EIS) Development
Dyess Air Force Base Mr. Tommy Downing Mr. David Laurence Mr. Tony Robertson	Proponent
Global Strike Command	Lead Command

Contractor Development Team			
Name/Title	**Project Role**	**Subject Area**	**Qualifications**
John Cruse Senior Environmental Technician A.S. Web Technology	Section Author ACAM Data Population/Report Development	Air Quality	9 years environmental science
Tom Daues, PMP Biologist M.S. Natural Resources B.S. Biology	Project Manager, Editor	Water Resources	23 years environmental science
Denise DeLancey Electronic Publishing Specialist B.A. English/Communications	Production	Document Production	17 years document production
Dave Dischner Senior Environmental Analyst B.A. Urban Affairs	Quality Assurance/ Quality Control and Section Author	Quality Assurance/ Quality Control, Safety and Land Use	37 years environmental science
Anthony Finley Electronic Publishing Specialist B.A. English	Production	Document Production	9 years document production
Heather Gordon GIS Specialist M.S. Geography B.A. Environmental Studies	Figures	Geographic Information System (GIS)	16 years environmental science; GIS applications
Nathan Gross, CHMM Environmental Scientist B.S. Wildlife and Fisheries Management	Section Author	Hazardous Materials and Waste, Project Support	15 years environmental science
Sarah Rauch Conservation Ecologist B.S. Plant Biology, Environmental Science and Ecology	Section Author	Biological Resources	9 years environmental science
Paul Rollinson Senior Environmental Engineer M.A. Applied Science	Section Author	Air Quality	30 years environmental science
Brian Tutterow Environmental Scientist B.S. Biology	Section Author	Cultural Resources	18 years environmental science
Sarah Willis B.A. Fine Arts	Production	Document Production	4 years document production

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Appendix A
Correspondence and Outreach

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INTERAGENCY COORDINATION LETTER

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15 March 2017

Mr. David Laurence
USAF AFGSC 7 CES/CEIE
710 3rd St.
Dyess AFB, TX 79607

Name/Title
(address being mailed to)
(address being mailed to)
(City, State Zip)

See Section 7.0 for persons and agencies contacted.

SUBJECT: Introduction of the Environmental Assessment for Installation Development at Dyess Air Force Base

Dear *{Merged Name from list}*

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development to evaluate the potential environmental impacts associated with fourteen (14) proposed projects in compliance with the National Environmental Policy Act of 1969 (NEPA) (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061.

The intent of the ongoing installation development at Dyess AFB is to provide infrastructure improvements necessary to support the missions at Dyess AFB. Table 1 presents the 14 projects that are identified as priorities for installation development. All of projects would be constructed on Air Force property.

Table 1. Dyess AFB Installation Development Projects

Project ID	Project Name	Description of the Proposed Action
		Facility Construction Projects
C01	Construct 317th Airlift Group HQ Building	Construct a two story building to house the 317 Airlift Group (AG) Headquarters functions. This project includes the demolition of Building 6015.
C02	Construct Armament Management Building	Construct a 55,000 square foot facility and demolish existing structures no longer required. Demolitions will include Buildings 9110, 9112, 9114, 9348 and 9350.
C03	Construct Dormitory	Construction of the new dormitory would include a parking area.
C04	Construct Temporary Lodging Facility	Construction of 16 two-bedroom temporary lodging facility units.
C05	Construct Joint Forces Deployment Control Center	Construct a 38,481 square foot building and a 129,167 square foot cargo pad, and parking area. Demolition of Buildings 4112, 4217 and 4218 would be part of this project.
C06[a]	Construct Crash Evaluation Facility	Designate an area where aircraft parts can be randomly distributed simulating an aircraft crash site.
C07	Construct the Bowling Center	Construct a 16-lane bowling center combined with a family fun center. The project will also include the demolition of the existing bowling facility (Building 7115).

Table 1. Dyess AFB Installation Development Projects (Continued)

Project ID	Project Name	Description of the Proposed Action
		Infrastructure Construction Projects
I01[a]	Construct GOV Parking Lot Extension 5225	Construct asphalt paved parking lot on west side of Building 5225.
I02[a]	Construct Six-Inch Water Pipeline	Construct a looped water main to Cantonment Area with fire hydrants.
		Renovation Projects
R01	Renovate Building 9265	This project would renovate and expand the existing facility by demolishing a portion of the existing facility and adding on to the existing facility.
R02	Renovate Building 7232	Renovate Building 7232 to allow for consolidation of Security Forces. Five buildings (4201, 4222, 6115, 6117 and 6123) will be demolished as part of this project
		Demolition Projects
D01	Demolish Library	Demolish Building 6142 to remove the vacant and obsolete facility on Dyess AFB.
		Other Projects
O01	Relocate the Grenade Range	Relocate the grenade range to the east of former landfill. This project would require some brush clearing and parking lot construction.
O02	Clear Trees South of Runway 164/344	Clear trees in the designated area south of Runway 164/344.

[a] Denotes potential floodplain impact

The Intergovernmental Coordination Act and Executive Order (EO) 12372, Intergovernmental Review or Federal Programs, requires Federal agencies to cooperate with, and consider state and local views in implementing a Federal proposal. In accordance with EO 12372, we invite your agency to review the attached Description of Proposed Action and Alternatives (DOPAA) and to provide comments on the Proposed Action. Please provide your comments relative to specific issues your office may have, based on your expertise or regulatory jurisdiction. Please provide any technical information, mitigation or permitting requirements that may be necessary for project implementation. Any preliminary data your office can provide will be evaluated and incorporated into the EA.

The USAF looks forward to your participation in this NEPA process. Please provide written comments within 30 days from the date of this letter to Mr. Tony Robertson, USAF AFGSC 7 CES/CEIE, 710 3rd St., Building 8006, Dyess AFB, TX 79607, douglas.robertson.6@us.af.mil. If you need further information or have any questions, please contact Mr. Robinson at 325-696-5663. Thank you for your assistance in this matter.

Sincerely,

David E. Laurence

DAVID E. LAURENCE
Chief, Environmental

1 Attachment:
1. Draft Description of Proposed Action and Alternatives

ATTACHMENT 1. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

(This attachment has been removed from this letter. See Chapters 1 & 2 of the EA for this attachment)

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INTERAGENCY COORDINATION LETTER RESPONSES

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Texas Water Development Board

P.O. Box 13231, 1700 N. Congress Ave.
Austin, TX 78711-3231, www.twdb.texas.gov
Phone (512) 463-7847, Fax (512) 475-2053

March 22, 2017

Mr. Tony Robinson
USAF AFGSC
7 CES/CEIE
710 3rd St. Building 8006
Dyess AFB, TX 79607

Re: Environmental Assessment for Installation Development Projects at Dyess Air Force Base

Dear Mr. Robinson:

This is in response to your letter of March 15, 2017, over the Environmental Assessment for 14 installation development projects at Dyess Air Force Base.

After review of the information provided for possible activity in a floodplain, our findings indicate that as a participant in the National Flood Insurance Program (NFIP), Dyess Air Force Base has authority for projects within its jurisdiction. Please ensure coordination with the local Floodplain Administrator.

Thank you for bringing this matter to our attention.

Sincerely,

Michael Segner, MBA, CFM
State Coordinator, National Flood Insurance Program

USDA

United States Department of Agriculture

Natural Resources
Conservation Service

State Office

101 S. Main Street
Temple, TX 76501
Voice 254.742.9800
Fax 254.742.9819

March 27, 2017

USAF AFGSC 7 CES/CEIE
710 3rd St.
Building 8006
Dyess AFB, Texas 79607

Attention: Mr. Tony Robertson

Subject: Dyess Air Force Base Installation Development Plans
Environmental Assessment
NEPA/FPPA Evaluation
Taylor County, Texas

We have reviewed the information provided in your correspondence dated March 15, 2017 concerning the proposed construction projects located on Dyess AFB in Taylor County, Texas. This review is part of the National Environmental Policy Act (NEPA) evaluation for the U.S. Department of Defense (DOD). We have assembled an environmental assessment of resources and evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

The proposed site may involve soils designated as areas of Prime Farmland; however, we now consider the location to be "land committed to urban development" due to its location within an area of land with a density of 30 structures per 40-acre area. Due to these reasons, the proposed project is exempt from provisions of FPPA and no further consideration from protection is required.

Please find the attached Custom Soil Resources Report. The soil physical and chemical properties are presented, along with additional restrictions or interpretations for the project area.

The proposed sites involve three main soil types. The most limiting soils are the Tobosa soils. These soils are clayey throughout the soil profile and have high shrink-swell potential. Extra measures should be taken in soil preparation to help prevent improper foundation settling or problems. The Hamby and Sagerton soils have similar subsoil material as Tobosa soils; however, they have a loamy surface about seven to 10 inches thick. The remaining sites are located on Gageby soils, which are highly productive soils in wetter areas or drainage ways. Some of these areas may flood following severe rain events. Caution should be exercised while transporting construction equipment and construction traffic should be limited as to reduce soil erosion. Refer to the soils report for additional resources concerning limitations. A description of each soil series is attached.

Additionally, the proposed site does not involve USDA-NRCS floodwater retarding structures (FRS) or Wetland Reserve Program (WRP) conservation easements on or near the project area.

We strongly encourage the use of acceptable erosion control methods during the construction of this project.

If you have further questions, please contact me at 254.742.9836 or by email at carlos.villarreal@tx.usda.gov.

Sincerely,

CARLOS VILLARREAL

Digitally signed by CARLOS VILLARREAL
Date: 2017.03.29 14:56:27 -05'00'

Carlos J. Villarreal
NRCS Soil Scientist

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

March 29, 2017

Mr. Tony Robertson
USAF AFGSC 7 CES/CEIE
710 3rd Street, Building 8006
Dyess AFB, Texas 79607
Via: email

Re: TCEQ NEPA Request #2017-093, Introduction of the Environmental Assessment for Installation Development at Dyess Air Force Base; Abilene, Texas; Taylor County

Dear Mr. Robertson:

The Texas Commission on Environmental Quality (TCEQ) has reviewed the above-referenced project and offers the following comments:

A review of the project for general conformity impact in accordance with 40 CFR Part 93 indicates that the proposed action is located in Taylor County, which is currently unclassified or in attainment of the National Ambient Air Quality Standards for all six criteria air pollutants. Therefore, general conformity rules do not apply.

The Office of Water does not anticipate significant long term environmental impacts from this project as long as construction and waste disposal activities associated with it are completed in accordance with applicable local, state, and federal environmental permits, statutes, and regulations. We recommend that the applicant take necessary steps to ensure that best management practices are used to control runoff from construction sites to prevent detrimental impact to surface and ground water.

Any debris or waste disposal should be at an appropriately authorized disposal facility.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA Coordinator, at (512) 239-3500 or NEPA@tceq.texas.gov.

Sincerely,

Ryan Vise
Division Director
Intergovernmental Relations

April 5, 2017

Mr. Tony Robertson
USAF AFGSC 7 CES/CEIE
710 3rd St., Building 8006
Dyess AFB, TX 79607

RE: Introduction of the Environmental Assessment for Installation Development at Dyess Air Force Base

Dear Mr. Robertson:

Texas Parks and Wildlife Department (TPWD) has received the request for input regarding the proposed project referenced above. TPWD staff has reviewed the information provided and offers the following comments and recommendations concerning this project.

TPWD Wildlife Habitat Assessment Program is now accepting projects through electronic submittal. Future project review requests can be submitted to WHAB@tpwd.texas.gov. If submitting requests electronically, please include unzipped geographic location files when available (e.g. GIS shape file, .kmz, etc.).

Please be aware that a written response to a TPWD recommendation or informational comment received by a state governmental agency may be required by state law. For further guidance, see the Texas Parks and Wildlife Code, Section 12.0011, which can be found online at http://www.statutes.legis.state.tx.us/Docs/PW/htm/PW.12.htm#12.0011. For tracking purposes, please refer to TPWD project number 37764 in any return correspondence regarding this project.

Project Description

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development to evaluate the potential environmental impacts associated with fourteen proposed projects at Dyess Air Force Base (AFB). The intent of the ongoing installation development at Dyess AFB is to provide infrastructure improvements necessary to support the missions at Dyess AFB.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.texas.gov

Federal Laws

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) prohibits taking, attempting to take, capturing, killing, selling/purchasing, possessing, transporting, and importing of migratory birds, their eggs, parts and nests, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The U.S. Fish and Wildlife Service (USFWS) Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

> **Recommendation:** If migratory bird species are found nesting on or adjacent to the project area, they must be dealt with in a manner consistent with the MBTA. TPWD recommends excluding vegetation clearing activities during the general bird nesting season, March through August, to avoid adverse impacts to this group. If clearing vegetation during the migratory bird nesting season is unavoidable, TPWD recommends surveying the area proposed for disturbance to ensure that no nests with eggs or young will be disturbed by operations. Any vegetation (trees, shrubs, and grasses) where occupied nests are located should not be disturbed until the eggs have hatched and the young have fledged.

State Laws

Parks and Wildlife Code, Section 68.015

Section 68.015 of the Parks and Wildlife Code regulates state-listed species. Please note that there is no provision for the capture, trap, take, or kill (incidental or otherwise) of state-listed species. A copy of *TPWD Guidelines for Protection of State-Listed Species*, which includes a list of penalties for take of species, can be found on-line at http://tpwd.texas.gov/huntwild/wild/wildlife_diversity/habitat_assessment/media/tpwd_statelisted_species.pdf. State-listed species may only be handled by persons with appropriate authorization from the TPWD Wildlife Permits Office. For more information, please contact the Wildlife Permits Office at (512) 389-4647.

Texas horned lizard (*Phrynosoma cornutum*) – State-listed Threatened

The Texas horned lizard can be found in open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees. The Texas horned lizard may occur at Dyess AFB where suitable habitat is present.

If present in the project area, the Texas horned lizard could be impacted by ground disturbing construction activities. Horned lizards may hibernate on-site in the loose soils a few inches below ground during the cool months from September/October to March/April. Construction in these areas could harm hibernating lizards. Horned lizards are active above ground when temperatures exceed 75 degrees Fahrenheit. If horned lizards (nesting, gravid females, newborn young, lethargic from cool temperatures or hibernation) cannot move away from noise and approaching construction equipment in time, they could be affected by construction activities.

> **Recommendation:** TPWD recommends that a pre-construction survey be conducted to determine if horned lizards are present on the project site or directly adjacent to the construction area. A useful indication that the Texas horned lizard may occupy the site is the presence of harvester ant (*Pogonomyrmex barbatus*) nests since harvester ants are the primary food source of horned lizards. The survey should be performed during the warm months of the year when the horned lizards are active. Fact sheets, including survey protocols and photos of Texas horned lizard can be found on-line at http://tpwd.texas.gov/huntwild/wild/wildlife_diversity/texas_nature_trackers/horned_lizard/facts/ and http://tpwd.texas.gov/huntwild/wild/species/thlizard/.
>
> If horned lizards are found on site, TPWD recommends contacting this office to develop plans to relocate them, particularly if there is likelihood that they would be harmed by project activities. To minimize impacts to the Texas horned lizard, TPWD recommends the use of the best management practices (BMPs) described in the *Texas Horned Lizard Watch – Management and Monitoring Packet* which can be found on-line at http://tpwd.texas.gov/publications/pwdpubs/media/pwd_bk_w7000_0038.pdf and *Texas Tortoise Best Management Practices* which can be found

at http://tpwd.texas.gov/huntwild/wild/wildlife_diversity/habitat_assessment/media/texas_tortoise_bmps.pdf Please note that Texas tortoise BMPs are applicable to the Texas horned lizard.

Rare Species

In addition to state and federally-protected species, TPWD tracks special features, natural communities, and rare species that are not listed as threatened or endangered. TPWD actively promotes their conservation and considers it important to evaluate and, if necessary, minimize impacts to rare species and their habitat to reduce the likelihood of endangerment and preclude the need to list. These species and communities are tracked in the TXNDD. The most current and accurate TXNDD data can be requested at: TexasNatural.DiversityDatabase@tpwd.texas.gov.

No records of rare, threatened, or endangered species, have been documented within 1.5 miles of Dyess AFB in the TXNDD. Please note that the absence of TXNDD information in an area does not imply that a species is absent from that area. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Although it is based on the best data available to TPWD regarding rare species, the data from the TXNDD do not provide a definitive statement as to the presence, absence or condition of special species, natural communities, or other significant features within your project area. These data are not inclusive and cannot be used as presence/absence data. This information cannot be substituted for on-the-ground surveys.

Recommendation: Please review the TPWD county list for Taylor County, as rare species could be present, depending upon habitat availability. These lists are available online at http://tpwd.texas.gov/gis/rtest/. If during construction, the project area is found to contain rare species, natural plant communities, or special features, TPWD recommends that precautions be taken to avoid impacts to them. The USFWS should be contacted for species occurrence data, guidance, permitting, survey protocols, and mitigation for federally-listed species. For the USFWS threatened and endangered species lists by county, please visit http://ecos.fws.gov/ipac/.

> Determining the actual presence of a species in a given area depends on many variables including daily and seasonal activity cycles, environmental activity cues, preferred habitat, transiency and population density (both wildlife and human). The absence of a species can be demonstrated only with great difficulty and then only with repeated negative observations, taking into account all the variable factors contributing to the lack of detectable presence. If encountered during construction, measures should be taken to avoid impacting wildlife.

TPWD appreciates the opportunity to provide comments on this EA. Please contact me at (806) 761-4936 or Richard.Hanson@tpwd.texas.gov if you have any questions or need additional assistance.

Sincerely,

Rick Hanson

Rick Hanson
Wildlife Habitat Assessment Program
Wildlife Division

RH: 37764

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STATE HISTORIC PRESERVATION OFFICE LETTER

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

15 March 2017

MEMORANDUM FOR MR. MARK WOLFE
EXECUTIVE DIRECTOR - TEXAS HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICER
P.O. BOX 12276
AUSTIN, TEXAS 78711-2276

FROM: Mr. David Laurence
USAF AFGSC 7 CES/CEIE
710 3rd Street
Dyess AFB, Texas 79607

SUBJECT: Introduction of the Environmental Assessment for Installation Development and Section 106 Consultation for Dyess Air Force Base

1. The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061. This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

2. Table 1 presents the 14 projects that are identified as priorities for installation development. The Area of Potential Effect (APE) will be the footprint of these projects. All projects would be constructed on Air Force property.

Table 1. Dyess AFB Installation Development Projects

Project ID	Project Name	Description of the Proposed Action
		Facility Construction Projects
C01	Construct 317th Airlift Group HQ Building	Construct a two story building to house the 317 Airlift Group (AG) Headquarters functions. This project includes the demolition of Building 6015.
C02	Construct Armament Management Building	Construct a 55,000 square foot facility and demolish existing structures no longer required. Demolitions will include Buildings 9110, 9112, 9114, 9348 and 9350.
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C05	Construct Joint Forces Deployment Control Center	Construct a 38,481 square foot building and a 129,167 square foot cargo pad, and parking area. Demolition of Buildings 4112, 4217 and 4218 would be part of this project..
C06	Construct Crash Evaluation Facility	Designate an area where aircraft parts can be randomly distributed simulating an aircraft crash site.
C07	Construct the Bowling Center	Construct a 16-lane bowling center combined with a family fun center. The project will also include the demolition of the existing bowling facility (Building 7115).

Table 1. Dyess AFB Installation Development Projects (Continued)

Project ID	Project Name	Description of the Proposed Action
		Infrastructure Construction Projects
I01	Construct GOV Parking Lot Extension 5225	Construct asphalt paved parking lot on west side of Building 5225.
I02	Construct Six-Inch Water Pipeline	Construct a looped water main to Cantonment Area with fire hydrants.
		Demolition Project
D01	Demolish Library	Demolish Building 6142 to remove the vacant and obsolete facility on Dyess AFB.
		Renovation Projects
R01	Renovate Building 9265	This project would renovate and expand the existing facility by demolishing a portion of the existing facility and adding on to the existing facility.
R02	Renovate Building 7232	Renovate Building 7232 to allow for consolidation of Security Forces. Five buildings (4201, 4222, 6115, 6117 and 6123) will be demolished as part of this project
		Other Projects
O01	Relocate the Grenade Range	Relocate the grenade range to the east of former landfill. This project would require some brush clearing and parking lot construction.
O02	Clear Trees South of Runway 164/344	Clear trees in the designated area south of Runway 164/344.

3. The USAF is providing information for your review and concurrence in accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) §800. A Draft Description of Proposed Action and Alternatives (DOPAA), which has been prepared to support the EA is provided as Attachment 1. This information is provided to satisfy requirements listed under 36 CFR §800.11(d)(3)(e). The USAF requests concurrence with the APE as shown on the attached figure (Attachment 2) and with a finding of no adverse impacts to historic properties.

4. In accordance with the Dyess AFB *Integrated Cultural Resource Management Plan* (ICRMP) (September 2012), there are no buildings potentially eligible for listing in the National Register of Historic Places (NRHP) in the APE of the proposed sites. As indicated in the ICRMP, a base-wide intensive cultural resources study has been conducted and no concerns were identified at the proposed sites. The probability of encountering subsurface archeological materials outside of known sites is low. In the unlikely event that cultural resources are found during construction, the installation's Inadvertent Discovery Plan, found in the ICRMP, would be followed and your office would be notified.

5. The USAF is also in the process of consulting with Federally-Recognized American Indian Tribes concerning this undertaking. (Attachment 3). It is considered unlikely that traditional resources will be identified within the APE; however, should traditional resources be identified within the APE, an amended consultation letter will be sent to your office.

6. Based on the evidence and data provided above, the USAF determines that the present undertaking will not affect any historic properties that are eligible or potentially eligible for listing on the NRHP and we respectfully seek your concurrence with our determination of "no historic properties affected".

7. Please review the enclosed material and provide your comments directly to Mr. David Laurence, USAF AFGSC 7 CES/CEIE, 710 3rd St., Building 8006, Dyess AFB, TX 79607, (325) 696-5664, david.laurence@us.af.mil. Thank you for your assistance in this matter.

Sincerely,

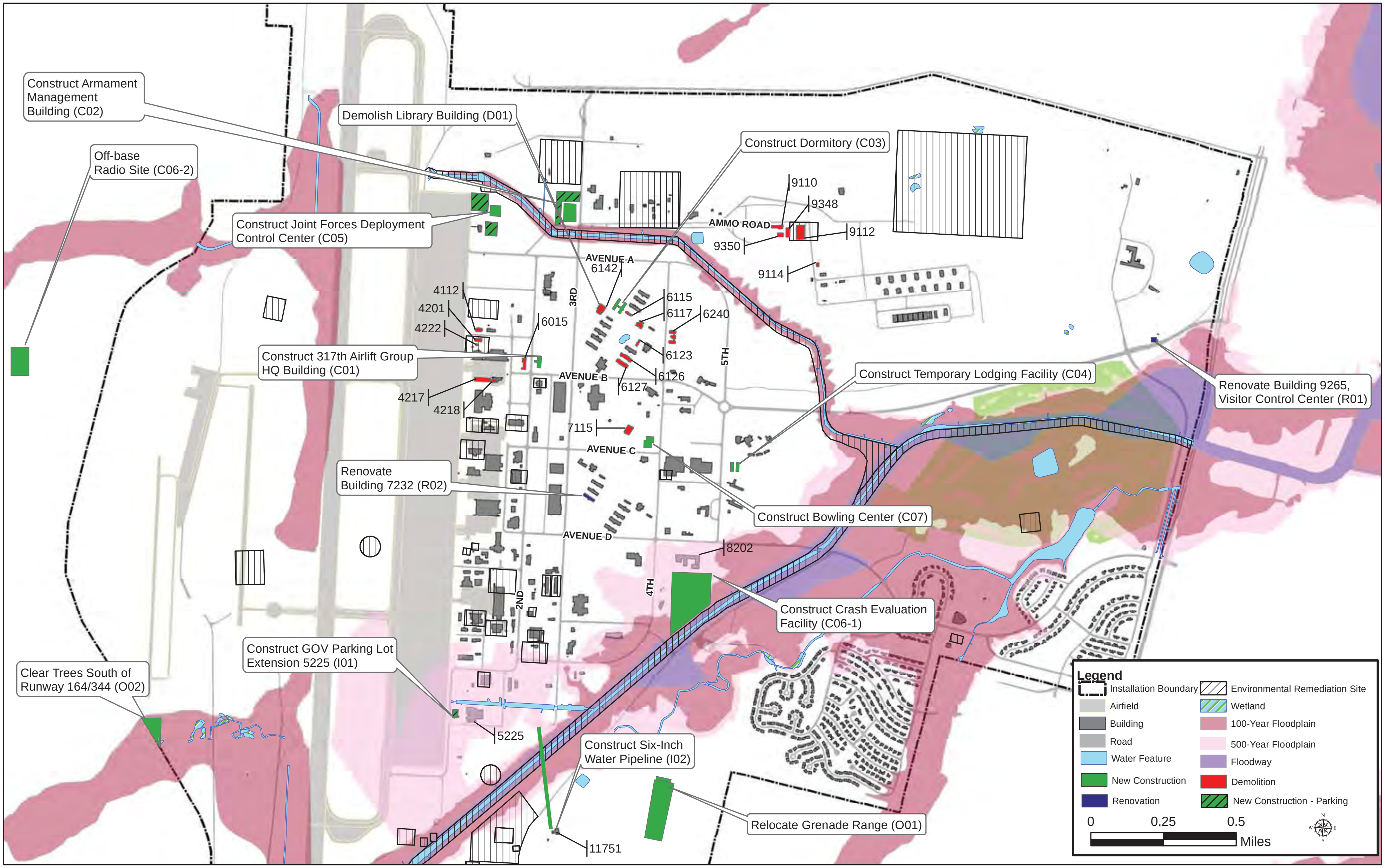
DAVID E. LAURENCE
Chief, Environmental

3 Attachments:
Attachment 1. Description of the Proposed Action and Alternatives (DOPAA)
Attachment 2. Installation Development Projects at Dyess AFB
Attachment 3. List of Federally-Recognized American Indian Tribes

ATTACHMENT 1. DESCRIPTION OF PROPOSED ACTION AND ALTERNATIVES

(This attachment has been removed from this letter. See Chapters 1 & 2 of the EA for this attachment)

ATTACHMENT 2. INSTALLATION DEVELOPMENT PROJECTS AT DYESS AFB



Construct Armament Management Building (C02)
Demolish Library Building (D01)
Off-base Radio Site (C06-2)
Construct Dormitory (C03)
Construct Joint Forces Deployment Control Center (C05)
9110
9348
AMMO ROAD
9112
9350
9114
AVENUE A
6142
3RD
4112
4201
4222
6015
6115
6117
6240
Construct 317th Airlift Group HQ Building (C01)
6123
5TH
AVENUE B
6126
6127
Construct Temporary Lodging Facility (C04)
Renovate Building 9265, Visitor Control Center (R01)
4217
4218
7115
AVENUE C
Renovate Building 7232 (R02)
Construct Bowling Center (C07)
AVENUE D
8202
4TH
2ND
Construct Crash Evaluation Facility (C06-1)
Construct GOV Parking Lot Extension 5225 (I01)
Clear Trees South of Runway 164/344 (O02)
5225
Construct Six-Inch Water Pipeline (I02)
Relocate Grenade Range (O01)
11751
Legend
Installation Boundary
Airfield
Building
Road
Water Feature
New Construction
Renovation
Environmental Remediation Site
Wetland
100-Year Floodplain
500-Year Floodplain
Floodway
Demolition
New Construction - Parking
0
0.25
0.5
Miles

ATTACHMENT 3. LIST OF FEDERALLY-RECOGNIZED AMERICAN INDIAN TRIBES CONTACTED CONCERNING THIS UNDERTAKING

LIST OF FEDERALLY-RECOGNIZED AMERICAN INDIAN TRIBES CONTACTED CONCERNING THIS UNDERTAKING

- **The Comanche Nation**
- **The Mescalero Apache Tribe**
- **The Fort Sill Apache Tribe of Oklahoma**
- **The Jicarilla Apache Nation**
- **The Kiowa Indian Tribe of Oklahoma**
- **The Apache Tribe of Oklahoma**

STATE HISTORIC PRESERVATION OFFICE LETTER RESPONSE

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

15 March 2017

MEMORANDUM FOR MR. MARK WOLFE
EXECUTIVE DIRECTOR - TEXAS HISTORICAL COMMISSION
STATE HISTORIC PRESERVATION OFFICER
P.O. BOX 12276
AUSTIN, TEXAS 78711-2276

FROM: Mr. David Laurence
USAF AFGSC 7 CES/CEIE
710 3rd Street
Dyess AFB, Texas 79607

SUBJECT: Introduction of the Environmental Assessment for Installation Development and Section 106 Consultation for Dyess Air Force Base

1. The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061. This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

2. Table 1 presents the 14 projects that are identified as priorities for installation development. The Area of Potential Effect (APE) will be the footprint of these projects. All projects would be constructed on Air Force property.

Table 1. Dyess AFB Installation Development Projects

Project ID	Project Name	Description of the Proposed Action
		Facility Construction Projects
C01	Construct 317th Airlift Group HQ Building	Construct a two story building to house the 317 Airlift Group (AG) Headquarters functions. This project includes the demolition of Building 6015.
C02	Construct Armament Management Building	Construct a 55,000 square foot facility and demolish existing structures no longer required. Demolitions will include Buildings 9110, 9112, 9114, 9348 and 9350.
C03	Construct Dormitory	Construction of the new dormitory would include a parking area.
C04	Construct Temporary Lodging Facility	Construction of 16 two-bedroom temporary lodging facility units.
C05	Construct Joint Forces Deployment Control Center	Construct a 38,481 square foot building and a 129,167 square foot cargo pad, and parking area. Demolition of Buildings 4112, 4217 and 4218 would be part of this project..
C06	Construct Crash Evaluation Facility	Designate an area where aircraft parts can be randomly distributed simulating an aircraft crash site.
C07	Construct the Bowling Center	Construct a 16-lane bowling center combined with a family fun center. The project will also include the demolition of the existing bowling facility (Building 7115).

Table 1. Dyess AFB Installation Development Projects (Continued)

Project ID	Project Name	Description of the Proposed Action
		Infrastructure Construction Projects
I01	Construct GOV Parking Lot Extension 5225	Construct asphalt paved parking lot on west side of Building 5225.
I02	Construct Six-Inch Water Pipeline	Construct a looped water main to Cantonment Area with fire hydrants.
		Demolition Project
D01	Demolish Library	Demolish Building 6142 to remove the vacant and obsolete facility on Dyess AFB.
		Renovation Projects
R01	Renovate Building 9265	This project would renovate and expand the existing facility by demolishing a portion of the existing facility and adding on to the existing facility.
R02	Renovate Building 7232	Renovate Building 7232 to allow for consolidation of Security Forces. Five buildings (4201, 4222, 6115, 6117 and 6123) will be demolished as part of this project
		Other Projects
O01	Relocate the Grenade Range	Relocate the grenade range to the east of former landfill. This project would require some brush clearing and parking lot construction.
O02	Clear Trees South of Runway 164/344	Clear trees in the designated area south of Runway 164/344.

3. The USAF is providing information for your review and concurrence in accordance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations, 36 Code of Federal Regulations (CFR) §800. A Draft Description of Proposed Action and Alternatives (DOPAA), which has been prepared to support the EA is provided as Attachment 1. This information is provided to satisfy requirements listed under 36 CFR §800.11(d)(3)(e). The USAF requests concurrence with the APE as shown on the attached figure (Attachment 2) and with a finding of no adverse impacts to historic properties.

4. In accordance with the Dyess AFB *Integrated Cultural Resource Management Plan* (ICRMP) (September 2012), there are no buildings potentially eligible for listing in the National Register of Historic Places (NRHP) in the APE of the proposed sites. As indicated in the ICRMP, a base-wide intensive cultural resources study has been conducted and no concerns were identified at the proposed sites. The probability of encountering subsurface archeological materials outside of known sites is low. In the unlikely event that cultural resources are found during construction, the installation's Inadvertent Discovery Plan, found in the ICRMP, would be followed and your office would be notified.

5. The USAF is also in the process of consulting with Federally-Recognized American Indian Tribes concerning this undertaking. (Attachment 3). It is considered unlikely that traditional resources will be identified within the APE; however, should traditional resources be identified within the APE, an amended consultation letter will be sent to your office.

6. Based on the evidence and data provided above, the USAF determines that the present undertaking will not affect any historic properties that are eligible or potentially eligible for listing on the NRHP and we respectfully seek your concurrence with our determination of "no historic properties affected".

7. Please review the enclosed material and provide your comments directly to Mr. David Laurence, USAF AFGSC 7 CES/CEIE, 710 3rd St., Building 8006, Dyess AFB, TX 79607, (325) 696-5664, david.laurence@us.af.mil. Thank you for your assistance in this matter.

Sincerely,

David E. Laurence

DAVID E. LAURENCE
Chief, Environmental

3 Attachments:
Attachment 1. Description of the Proposed Action and Alternatives (DOPAA)
Attachment 2. Installation Development Projects at Dyess AFB
Attachment 3. List of Federally-Recognized American Indian Tribes

CONCUR
by William A. Martin
for Mark Wolfe
State Historic Preservation Officer
Date 4/17/17
Track# 201705294

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TRIBAL LETTERS

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

MAY 2 4 2017

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

Chairman Bobby Komardley
Apache Tribe of Oklahoma
P.O. Box 1330
Anadarko, Oklahoma 73005

Dear Mr. Chairman Komardley

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process.*" This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Apache Tribe of Oklahoma to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program.*

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Apache Tribe of Oklahoma to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of

which we may be unaware, particularly those that may be affected by the projects described in Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other:____

____

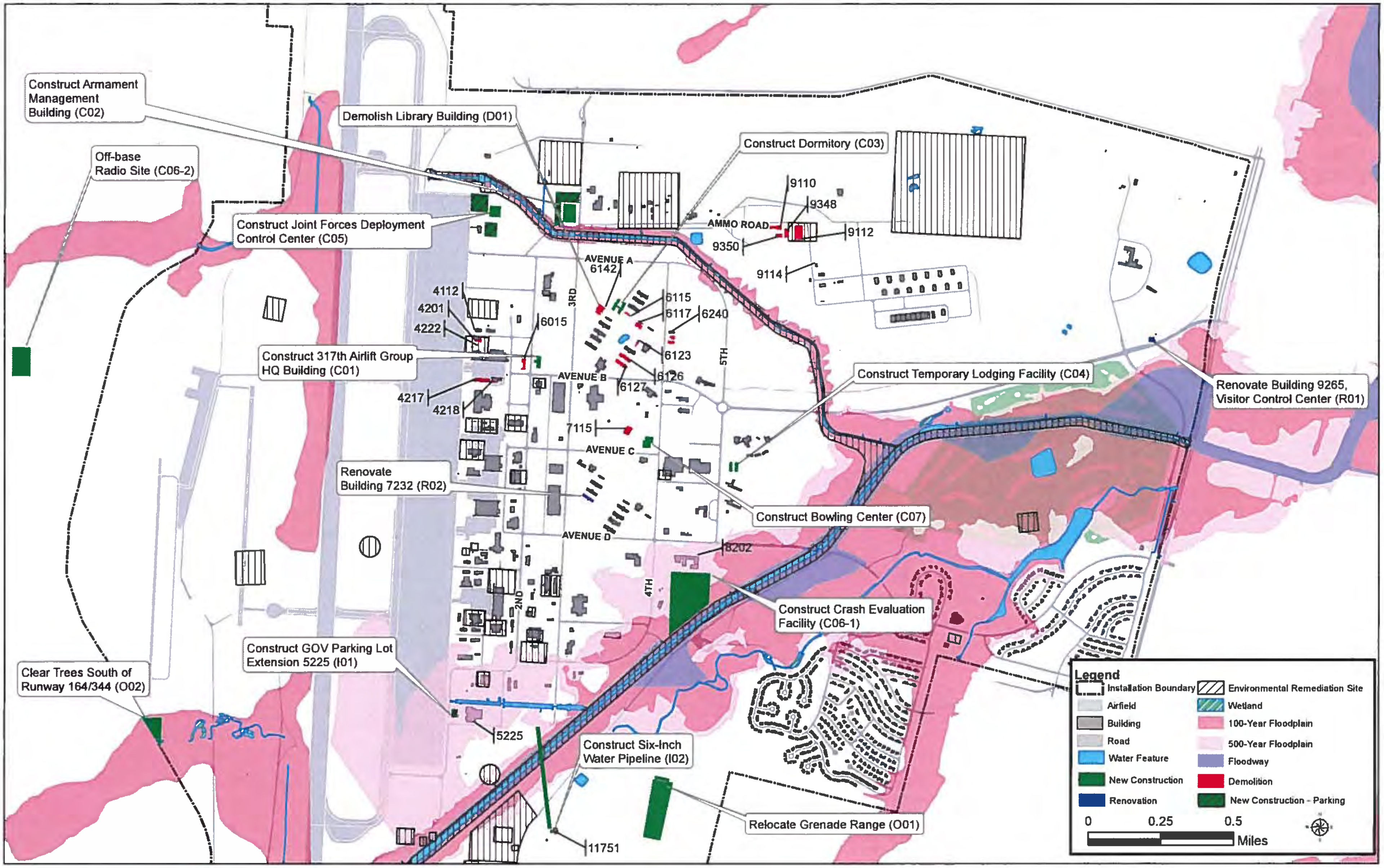
____

____
Signature & Position

ATTACHMENT 1. PROJECT TABLE AND FIGURE

Dyess AFB Installation Development Project Table

Project ID	Project Name	Description of the Proposed Projects
		Facility Construction Projects
C01	Construct 317th Airlift Group HQ Building	Construct a two story building to house the 317 Airlift Group (AG) Headquarters functions. This project includes the demolition of Building 6015.
C02	Construct Armament Management Building	Construct a 55,000 square foot facility and demolish existing structures no longer required. Demolitions will include Buildings 9110, 9112, 9114, 9348 and 9350.
C03	Construct Dormitory	Construction of the new dormitory would include a parking area.
C04	Construct Temporary Lodging Facility	Construction of 16 two-bedroom temporary lodging facility units.
C05	Construct Joint Forces Deployment Control Center	Construct a 38,481 square foot building and a 129,167 square foot cargo pad, and parking area. Demolition of Buildings 4112, 4217 and 4218 would be part of this project..
C06	Construct Crash Evaluation Facility	Designate an area where aircraft parts can be randomly distributed simulating an aircraft crash site.
C07	Construct the Bowling Center	Construct a 16-lane bowling center combined with a family fun center. The project will also include the demolition of the existing bowling facility (Building 7115).
		Infrastructure Construction Projects
I01	Construct GOV Parking Lot Extension 5225	Construct asphalt paved parking lot on west side of Building 5225.
I02	Construct Six-Inch Water Pipeline	Construct a looped water main to Cantonment Area with fire hydrants.
		Demolition Project
D01	Demolish Library	Demolish Building 6142 to remove the vacant and obsolete facility on Dyess AFB.
		Renovation Projects
R01	Renovate Building 9265	This project would renovate and expand the existing facility by demolishing a portion of the existing facility and adding on to the existing facility.
R02	Renovate Building 7232	Renovate Building 7232 to allow for consolidation of Security Forces. Five buildings (4201, 4222, 6115, 6117 and 6123) will be demolished as part of this project
		Other Projects
O01	Relocate the Grenade Range	Relocate the grenade range to the east of former landfill. This project would require some brush clearing and parking lot construction.
O02	Clear Trees South of Runway 164/344	Clear trees in the designated area south of Runway 164/344.



Construct Armament Management Building (C02)
Demolish Library Building (D01)
Construct Dormitory (C03)
Off-base Radio Site (C06-2)
Construct Joint Forces Deployment Control Center (C05)
9110
9348
AMMO ROAD
9112
9350
9114
AVENUE A
6142
3RD
6115
6117
6240
4112
4201
4222
6015
6123
Construct 317th Airlift Group HQ Building (C01)
AVENUE B
6126
6127
5TH
Construct Temporary Lodging Facility (C04)
Renovate Building 9265, Visitor Control Center (R01)
4217
4218
7115
AVENUE C
Renovate Building 7232 (R02)
Construct Bowling Center (C07)
AVENUE D
8202
2ND
4TH
Construct Crash Evaluation Facility (C06-1)
Construct GOV Parking Lot Extension 5225 (I01)
Clear Trees South of Runway 164/344 (O02)
5225
Construct Six-Inch Water Pipeline (I02)
Relocate Grenade Range (O01)
11751
Legend
Installation Boundary
Airfield
Building
Road
Water Feature
New Construction
Renovation
Environmental Remediation Site
Wetland
100-Year Floodplain
500-Year Floodplain
Floodway
Demolition
New Construction - Parking
0
0.25
0.5
Miles

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

MAY 24 2017

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

Mr. Jimmy Arterberry
Comanche Nation of Oklahoma
584 NW Bingo Road
Lawton, Oklahoma 73507

Dear Mr. Arterberry

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process.*" This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Comanche Nation of Oklahoma to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program.*

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Comanche Nation of Oklahoma to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of

which we may be unaware, particularly those that may be affected by the projects described in Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other: ____

____

____

____
Signature & Position

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

MAY 2 4 2017

Chairman Jeff Haozous
Fort Sill Apache Tribe of Oklahoma
43187 U.S. Hwy 281
Apache, Oklahoma 73006

Dear Mr. Chairman Haozous

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process*". This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Fort Sill Apache Tribe of Oklahoma to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program*.

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Fort Sill Apache Tribe of Oklahoma to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of

which we may be unaware, particularly those that may be affected by the projects described in Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other:____

____

____

____
Signature & Position

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

MAY 2 4 2017

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

President Wainwright Velarde
Jicarilla Apache Nation
P.O. Box 507
Dulce, New Mexico 87528

Dear Mr. President Velarde

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process.*" This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Jicarilla Apache Nation to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program.*

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Jicarilla Apache Nation to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of which we may be unaware, particularly those that may be affected by the projects described in

Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other:____

Signature & Position

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 7TH BOMB WING (AFGSC)
DYESS AIR FORCE BASE TEXAS

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

MAY 24 2017

Chairman Matthew M. Komalty
Kiowa Indian Tribe of Oklahoma
100 Kiowa Way
Carnegie, Oklahoma 73015

Dear Mr. Chairman Komalty

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process.*" This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Kiowa Indian Tribe of Oklahoma to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program.*

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Kiowa Indian Tribe of Oklahoma to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of

which we may be unaware, particularly those that may be affected by the projects described in Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other:____

____

____

____

Signature & Position

MAY 2 4 2017

Colonel David M. Benson
Commander
7 Lancer Loop
Dyess Air Force Base, Texas 79607

President Danny Breuninger
Mescalero Apache Tribe
101 Central Avenue
Mescalero, New Mexico 88340

Dear Mr. President Breuninger

The purpose of this letter is twofold: to provide an opportunity for you to review and comment on the proposed activity at Dyess Air Force Base (AFB) in compliance with the National Environmental Policy Act (NEPA) of 1969; and to invite your tribe to participate in government-to-government consultation with Dyess AFB pursuant to Section 106 of the National Historic Preservation Act (NHPA).

The U.S. Air Force is preparing an Environmental Assessment (EA) for installation development on Dyess AFB in compliance with the NEPA (42 *United States Code [USC]* 4331 et seq.), the regulations of the President's Council on Environmental Quality (CEQ) that implement NEPA procedures (40 *Code of Federal Regulations [CFR]* 1500-1508), the Air Force Environmental Impact Assessment Process Regulations at 32 *CFR* 989, and Air Force Instruction (AFI) 32-7061 "*The Environmental Impact Analysis Process.*" This EA will evaluate the effects of the proposed facility construction, infrastructure, demolition, and renovation projects on Dyess AFB.

Pursuant to Section 106 of the NHPA, as amended, Dyess AFB invites the Mescalero Apache Tribe to participate in the EA as a sovereign nation. This consultation is required under Department of Defense Instruction 4710.02, which implements the *Annotated Department of Defense American Indian and Alaska Native Policy* dated 27 October 1999; the National Historic Preservation Act; the Native American Graves and Protection and Repatriation Act; American Indian Religious Freedom Act; Archaeological Resource Protection Act: NEPA, EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; Executive memorandum dated November 5, 2009, *Memorandum on Tribal Consultation*; and AFI 32-7065, *Cultural Resources Management Program.*

The attached project table and associated figure describe and identify the 14 projects that will be evaluated in the EA (Attachment 1). The Area of Potential Effect (APE) will be the footprint of these projects. All of these projects would be constructed on Air Force property.

Dyess AFB is inviting the Mescalero Apache Tribe to review Attachment 1 and determine if you would like to be considered as a consulting party for the EA process. Dyess AFB has conducted a basewide cultural resources inventory and is not aware of any properties of religious and cultural significance within the APE. Nevertheless, we ask for your assistance in identifying such properties of which we may be unaware, particularly those that may be affected by the projects described in

Attachment 1. If you have a record of any historic properties that are of religious or sacred importance or any traditional cultural properties in this area, please notify us as soon as possible so that we can work with you to develop appropriate measures for managing these properties. Dyess AFB will ensure that any impacts of the proposed action on Native American cultural resources will be fully considered in the NEPA document. As per federal regulations, Dyess AFB will protect information you provide regarding the existence of sacred or religious historic properties and the location of Native American archaeological sites.

Dyess AFB looks forward to consulting with you on any concerns that you may have with the proposed project. My staff will be contacting your office by telephone to discuss this project and any potential impacts. For staff questions, comments, or input on the NEPA process, please contact Mr. Tommy Downing, USAF AFGSC 7 CES/CENPL, 710 Third Street, Building #8006, Dyess AFB, TX 79607, (325) 696-2050, tommy.downing@us.af.mil. For matters related to government-to-government consultation, you may contact me directly at 325-696-2863.

Please take this opportunity to complete the questionnaire below, which can be filled out to identify your tribe's interest in consulting about the installation development at Dyess AFB and to facilitate further communication on the matter. Upon completion, please return the questionnaire to us in the stamped and self-addressed envelope, as provided. I look forward to receiving any input you may have regarding this endeavor.

Sincerely

DAVID M. BENSON, Colonel, USAF
Commander

Attachment:
Project Table and Figure

Our tribe has determined that:

☐ Native American Traditional Cultural Properties are not present on Dyess AFB; therefore, the tribe does not desire to be consulted on this or future projects.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, but consultation is not required at this time because the properties will not be affected by the projects identified in Attachment 1.

☐ Native American Traditional Cultural Properties are present on Dyess AFB, and the tribe desires to consult on the projects in Attachment 1 and on future projects.

Other:____

____

____

____
Signature & Position

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U.S. FISH AND WILDLIFE SERVICE CORRESPONDENCE

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FW: Dyess AFB CIP EA and USFWS Federally Protected Species List

From: Rauch, Sarah Bresnan
Sent: Wednesday, November 30, 2016 2:43 PM
To: tanya_sommer@fws.gov
Cc: Daues, Tom V.; Tutterow, Brian W.; joshua.adkins@us.af.mil; david.laurence@us.af.mil; kim.walton@us.af.mil
Subject: Dyess AFB CIP EA and USFWS Federally Protected Species List

Good afternoon Ms. Sommer,

Dyess Air Force Base is preparing an Environmental Assessment (EA) to assess the potential environmental consequences associated with implementation of the Capital Improvement Plan (CIP). The CIP includes facility demolition, construction and renovation of infrastructure within the boundaries of Dyess AFB. In light of the USFWS's IPaC system upgrades to begin December 1, 2016, Dyess Air Force Base (AFB) would like to request an Official species list for Taylor County, Texas.

An IPaC submission was completed on October 20, 2016, (please see attachment) identifying species with the potential to occur within Taylor County, Texas. Table 1-1, lists these species and their habitats.

Table 1-1. USFWS Species Known to or Believed to Occur in Taylor County, Texas

Common Name	Scientific Name	Protection Status	Habitat
Bald Eagle	*Haliaeetus leucocephalus*	Recovery	Bald eagles in Texas are divided into two populations; breeding birds and nonbreeding or wintering birds. Breeding populations occur primarily in the eastern half of the state and along coastal counties. Nonbreeding or wintering populations are located primarily in the Panhandle, Central, and East Texas, and in other areas of suitable habitat throughout the state. Suitable habitat includes near rivers and large lakes, nests in tall trees or on cliffs near water.
Black-capped Vireo	*Vireo atricapilla*	Endangered	Rangelands with scattered clumps of shrubs separated by open grassland; oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year. Black-capped vireos nest in Texas during March through July.
Smalleye Shiner	*Notropis buccula*	Endangered	Endemic to the Brazos River drainage; presumed to have been introduced into the Colorado River. Historically found in lower Brazos River as far south as Hempstead, Texas.
Sharpnose Shiner	*Notropis oxyrhynchus*	Endangered	Endemic to Brazos River drainage. Naturally found in the Red River drainage, when a tributary to the Brazos River was captured into the Red River drainage Introduced in the Colorado River drainage.
Texas Fawnsfoot	*Truncilla macrodon*	Candidate	Found in a mixture of mud, sand, and gravel on the bottoms of streams and rivers. They require good water quality, stable stream channels and flowing water.
Red Knot*****	*Calidris canutus rufa*	Threatened	Red knots migrate long distances in flocks northward through the contiguous U.S. mainly during April-June, and southward July-October. Habitat includes seacoasts on tidal flats and beaches, herbaceous wetland, and tidal flat/shore. Red knots prefer the shoreline of coast and bays and also uses mudflats during rare inland encounters.
Piping Plover*****	*Charadrius melodus*	Threatened	Sandy beaches and lakeshores. Texas is the wintering home for 35 percent of the known population of piping plovers. They begin arriving in late July or early August, and will remain for up to nine months.
Least Tern*****	*Sterna antillarum*	Endangered	Open habitat. Prefer sand and gravel bars within a wide unobstructed river channel, or open flats along shorelines of lakes and reservoirs that provide favorable nesting habitat. As natural nesting sites have become scarce, the birds have used manmade sites. In Texas, Interior Least Terns are found at three reservoirs along the Rio Grande River, on the Canadian River in the northern Panhandle, on the Prairie Dog Town Fork of the Red River in the eastern Panhandle, and along the Red River (Texas/Oklahoma boundary) into Arkansas.

***Species only applies for wind energy projects, not applicable to Dyess AFB**

Dyess AFB would like to request your concurrence with the species list identified in Table 1-1, or request your input in identifying any additional species of concern not identified. If you have any questions, please contact Tom Daues at 314-770-3024.

Thank you,

Sarah Bresnan Rauch | Leidos
Conservation Ecologist

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PUBLIC NOTICE NEWSPAPER ADVERTISEMENT

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Public Notices

bid tabs will be available for public viewing.

Disclosure Statement: Texas Local Government Code Chapter 176 requires vendors to submit a conflict ofinterest questionnairefor identifying certain business relationships with and gifts given topublic officers. A copy ofthe statute and this questionnaire may befound in this bidpackage. Each vendor desiring to do business with Ballinger ISD is required to familiarize themselves with this law and comply with all requirements.
The Ballinger Independent School District reserves the right to reject any or all proposals and to accept any proposal deemed most advantageous to the District.

If additional information should be required, contact Mr. Jeff Butts, Superintendent of Ballinger ISD in writing at 802 Conda Avenue, Texas, 768214 or by e-mail at jeff.butts@ballingerisd.net.

Superintendent of Schools – Ballinger Independent School district
PURCHASNG DEPARTMBIT
802 CONDA AVENUE
BALLINGER, TX 76821
325-365-3588
FAX• 325-365-5920

PUBLIC NOTICE

NOTICE OF INTENT (NOI) TO PREPARE AN ENVIRONMENTAL ASSESSMENT (EA) FOR INSTALLATION DEVELOPMENT AT DYESS AFB, TEXAS

The USAF is preparing an EA for installation development at Dyess AFB. The proposed action consists of 14 facility construction, infrastructure, demolition and renovation projects on Dyess AFB. The projects will improve the physical functionality of Dyess AFB infrastructure to continue to meet mission requirements. Implementation of the Installation Development Plan at Dyess AFB would potentially affect floodplains and/or wetlands and would therefore be subject to Executive Orders (EO) 11988, "Floodplain Management", and EO 11990, "Protection of Wetlands." Consistent with these EOs, state and federal regulatory agencies with special expertise in wetlands and floodplains have been contacted to request comment. This NOI initiates early public review of the proposed action and alternatives which have the potential to affect floodplains and/or wetlands on Dyess AFB. The proposed projects will be analyzed in the forthcoming EA and agencies and the public will have an opportunity to comment on the Draft EA when it is released. If you have any questions regarding this project, please contact:
Mr. David Laurence, USAF
AFGSC 7 CES/CEIE
710 3rd St., Building 8006,
Dyess AFB, TX 79607
Phone: (325) 696-5664
e-mail: david.laurence@us.af.mil

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Appendix B

Biological Resources Supporting Information

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U.S. FISH AND WILDLIFE SERVICE INFORMATION FOR PLANNING AND CONSERVATION (IPaC) REPORT FOR TAYLOR COUNTY, TEXAS

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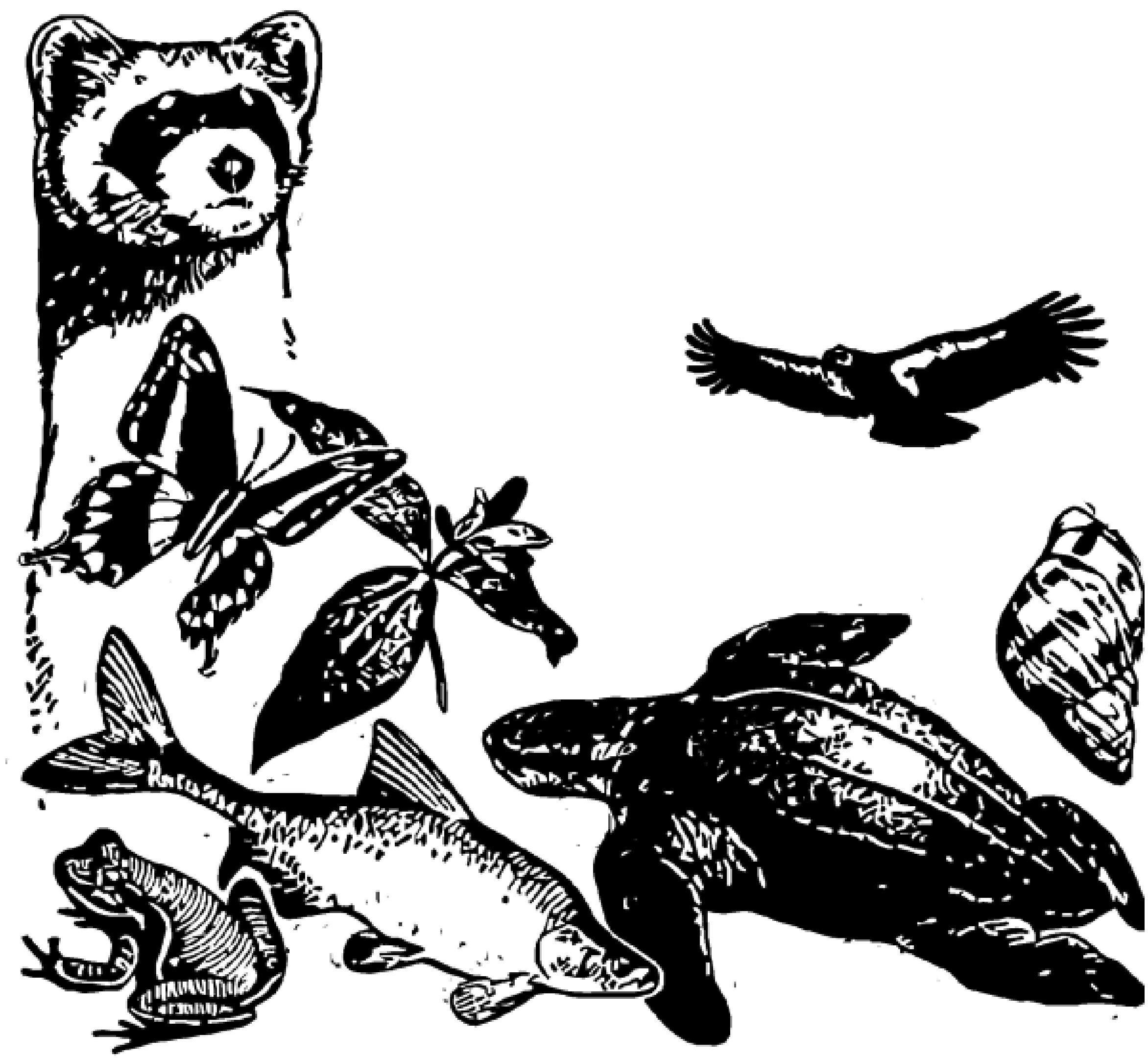
U.S. Fish & Wildlife Service

DAFB

IPaC Trust Resources Report

Generated October 20, 2016 11:56 AM MDT, IPaC v3.0.9

This report is for informational purposes only and should not be used for planning or analyzing project level impacts. For project reviews that require U.S. Fish & Wildlife Service review or concurrence, please return to the IPaC website and request an official species list from the Regulatory Documents page.



IPaC - Information for Planning and Conservation (https://ecos.fws.gov/ipac/): A project planning tool to help streamline the U.S. Fish & Wildlife Service environmental review process.

Table of Contents

U.S. Fish & Wildlife Service

IPaC Trust Resources Report

NAME

DAFB

LOCATION

Taylor County, Texas

DESCRIPTION

Taylor County, TX

IPAC LINK

https://ecos.fws.gov/ipac/project/D4HTI-CZ4UZ-F6DOR-OVX7V-PZ6AQ4

U.S. Fish & Wildlife Service Contact Information

Trust resources in this location are managed by:

Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
(512) 490-0057

Endangered Species

Proposed, candidate, threatened, and endangered species are managed by the Endangered Species Program of the U.S. Fish & Wildlife Service.

This USFWS trust resource report is for informational purposes only and should not be used for planning or analyzing project level impacts.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list from the Regulatory Documents section.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency.

A letter from the local office and a species list which fulfills this requirement can only be obtained by requesting an official species list either from the Regulatory Documents section in IPaC or from the local field office directly.

The list of species below are those that may occur or could potentially be affected by activities in this location:

Birds

Black-capped Vireo Vireo atricapilla

Endangered

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07T

Least Tern Sterna antillarum

Endangered

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B07N

Piping Plover Charadrius melodus

Threatened

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B079

Red Knot Calidris canutus rufa

Threatened

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

Wind Energy Projects

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DM

Clams

Texas Fawnsfoot Truncilla macrodon

Candidate

CRITICAL HABITAT

No critical habitat has been designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=F04E

Fishes

Sharpnose Shiner Notropis oxyrhynchus

Endangered

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

All reservoir projects; in-channel projects such as interbasin transfers, water diversions, small impoundments, etc. that may reduce flows of major tributaries eventually flowing into occupied habtiat; commercial/industrial well field projects.

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E04K

Smalleye Shiner Notropis buccula

Endangered

THIS SPECIES ONLY NEEDS TO BE CONSIDERED IF THE FOLLOWING CONDITION APPLIES

All reservoir projects; in-channel projects such as interbasin transfers, water diversions, small impoundments, etc. that may reduce flows of major tributaries eventually flowing into occupied habtiat; commercial/industrial well field projects.

CRITICAL HABITAT

There is **final** critical habitat designated for this species.

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=E05Z

Critical Habitats

There are no critical habitats in this location

Migratory Birds

Birds are protected by the [Migratory Bird Treaty Act] and the [Bald and Golden Eagle Protection Act].

Any activity that results in the take of migratory birds or eagles is prohibited unless authorized by the U.S. Fish & Wildlife Service.[1] There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured.

Any person or organization who plans or conducts activities that may result in the take of migratory birds is responsible for complying with the appropriate regulations and implementing appropriate conservation measures.

---

1. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

Additional information can be found using the following links:

- Birds of Conservation Concern
  http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Conservation measures for birds
  http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Year-round bird occurrence data
  http://www.birdscanada.org/birdmon/default/datasummaries.jsp

The following species of migratory birds could potentially be affected by activities in this location:

Bald Eagle Haliaeetus leucocephalus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B008

Bell's Vireo Vireo bellii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0JX

Burrowing Owl Athene cunicularia — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0NC

Cassin's Sparrow Aimophila cassinii — Bird of conservation concern
Season: Breeding
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0K2

Chestnut-collared Longspur Calcarius ornatus — Bird of conservation concern
Season: Wintering

Dickcissel Spiza americana — Bird of conservation concern
Season: Breeding

Fox Sparrow Passerella iliaca — Bird of conservation concern
Season: Wintering

Golden Eagle Aquila chrysaetos — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0DV

Harris's Sparrow Zonotrichia querula — Bird of conservation concern
Season: Wintering

Hudsonian Godwit Limosa haemastica — Bird of conservation concern
Season: Migrating

Lark Bunting Calamospiza melanocorys — Bird of conservation concern
Season: Wintering

Lewis's Woodpecker Melanerpes lewis — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HQ

Loggerhead Shrike Lanius ludovicianus — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FY

Long-billed Curlew Numenius americanus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B06S

Mccown's Longspur Calcarius mccownii — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HB

Mississippi Kite Ictinia mississippiensis — Bird of conservation concern
Season: Breeding

Orchard Oriole Icterus spurius — Bird of conservation concern
Season: Breeding

Painted Bunting Passerina ciris — Bird of conservation concern
Season: Breeding

Peregrine Falcon Falco peregrinus — Bird of conservation concern
Season: Wintering
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0FU

Red-headed Woodpecker Melanerpes erythrocephalus — Bird of conservation concern
Season: Year-round

Rufous-crowned Sparrow Aimophila ruficeps — Bird of conservation concern
Season: Year-round
http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0MX

Scissor-tailed Flycatcher Tyrannus forficatus — Bird of conservation concern

Season: Breeding

Short-eared Owl Asio flammeus — Bird of conservation concern

Season: Wintering

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0HD

Snowy Plover Charadrius alexandrinus — Bird of conservation concern

Season: Breeding

Sprague's Pipit Anthus spragueii — Bird of conservation concern

Season: Wintering

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B0GD

Swainson's Hawk Buteo swainsoni — Bird of conservation concern

Season: Breeding

http://ecos.fws.gov/tess_public/profile/speciesProfile.action?spcode=B070

Wildlife refuges and fish hatcheries

There are no refuges or fish hatcheries in this location

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

DATA LIMITATIONS

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

DATA EXCLUSIONS

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

DATA PRECAUTIONS

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

This location overlaps all or part of the following wetlands:

The area of this project is too large for IPaC to load all NWI wetlands in the area. The list below may be incomplete. Please contact the local U.S. Fish & Wildlife Service office or visit the NWI map for a full list.

Freshwater Emergent Wetland

PEM1A
PEM1Ad
PEM1Af

PEM1Ah
PEM1Ax
PEM1C
PEM1Ch
PEM1Cx
PEM1Fh
PEM1J

Freshwater Forested/shrub Wetland

PFO1A
PFO1Ah
PFO1Cx
PFO1Fh
PSS1Ah
PSS1C
PSS1Ch

Freshwater Pond

PUB
PUBF
PUBFh
PUBFx
PUBHh
PUBHx
PUBh
PUSA
PUSAh
PUSAx
PUSC
PUSCh
PUSCx

Lake

L1UBHh
L2UBHh
L2USCh

Riverine

R2UBH
R4SBA
R4SBC
R4SBCx
R5UBH

A full description for each wetland code can be found at the National Wetlands Inventory website: http://107.20.228.18/decoders/wetlands.aspx

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TEXAS PARKS AND WILDLIFE DEPARTMENT (TPWD) THREATENED AND ENDANGERED SPECIES LIST FOR TAYLOR COUNTY

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Last Revision: 2/7/2016 4:02:00 PM

TAYLOR COUNTY

BIRDS		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Baird's Sparrow	*Ammodramus bairdii*		

shortgrass prairie with scattered low bushes and matted vegetation; mostly migratory in western half of State, though winters in Mexico and just across Rio Grande into Texas from Brewster through Hudspeth counties

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Black-capped Vireo	*Vireo atricapilla*	LE	E

oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer

Ferruginous Hawk	*Buteo regalis*		

open country, primarily prairies, plains, and badlands; nests in tall trees along streams or on steep slopes, cliff ledges, river-cut banks, hillsides, power line towers; year-round resident in northwestern high plains, wintering elsewhere throughout western 2/3 of Texas

Mountain Plover	*Charadrius montanus*		

breeding: nests on high plains or shortgrass prairie, on ground in shallow depression; nonbreeding: shortgrass plains and bare, dirt (plowed) fields; primarily insectivorous

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Snowy Plover	*Charadrius alexandrinus*		

formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast

		Federal Status	State Status
Sprague's Pipit	*Anthus spragueii*	C	

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Western Burrowing Owl *Athene cunicularia hypugaea*

open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows

Western Snowy Plover *Charadrius alexandrinus nivosus*

uncommon breeder in the Panhandle; potential migrant; winter along coast

Whooping Crane *Grus americana* LE E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

MAMMALS

Federal Status State Status

Black-tailed prairie dog *Cynomys ludovicianus*

dry, flat, short grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle; live in large family groups

Cave myotis bat *Myotis velifer*

colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore

Gray wolf *Canis lupus* LE E

extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands

Plains spotted skunk *Spilogale putorius interrupta*

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Red wolf *Canis rufus* LE E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

MOLLUSKS

Federal Status State Status

Texas fatmucket *Lampsilis bracteata* C T

streams and rivers on sand, mud, and gravel substrates; intolerant of impoundment; broken bedrock and course gravel or sand in moderately flowing water; Colorado and Guadalupe River basins

REPTILES

Federal Status State Status

Spot-tailed earless lizard *Holbrookia lacerata* central and southern Texas and adjacent Mexico; moderately open prairie-brushland; fairly flat areas free of vegetation or other obstructions, including disturbed areas; eats small invertebrates; eggs laid underground

Texas horned lizard *Phrynosoma cornutum* T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

PLANTS Federal Status State Status

Cory's evening-primrose *Oenothera coryi*

GLOBAL RANK: G3G4; Calcareous prairies in the Plains Country of north Texas and in the Panhandle; Perennial; Flowering April-May

Glass Mountains coral-root *Hexalectris nitida*

GLOBAL RANK: G3; Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

Prairie butterfly-weed *Gaura triangulata*

GLOBAL RANK: G3G4; Open sandy areas; Annual; Flowering March-June

Rock grape *Vitis rupestris*

GLOBAL RANK: G3; Occurs on rocky limestone slopes and in streambeds; Perennial; Flowering March-May; Fruiting May-July

Warnock's coral-root *Hexalectris warnockii*

in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years

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BIRD CONSERVATION REGION (BCR) 19 BIRDS OF CONSERVATION CONCERN (BCC) 2008 LIST

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Table 17 BCR 19 (Central Mixed-Grass Prairie) *BCC 2008* list.[19]

Lesser Prairie-Chicken (a)
Little Blue Heron
Mississippi Kite
Bald Eagle (b)
Swainson's Hawk
Black Rail
Snowy Plover (c)
Mountain Plover (nb)
Solitary Sandpiper (nb)
Upland Sandpiper
Long-billed Curlew
Hudsonian Godwit (nb)
Marbled Godwit (nb)
Buff-breasted Sandpiper (nb)
Short-billed Dowitcher (nb)
Red-headed Woodpecker
Scissor-tailed Flycatcher
Loggerhead Shrike
Bell's Vireo (c)
Sprague's Pipit (nb)
Cassin's Sparrow
Lark Bunting
Henslow's Sparrow
Harris's Sparrow (nb)
McCown's Longspur (nb)
Smith's Longspur (nb)
Chestnut-collared Longspur (nb)

19 (a) ESA candidate, (b) ESA delisted, (c) non-listed subspecies or population of Threatened or Endangered species, (d) MBTA protection uncertain or lacking, (nb) non-breeding in this BCR

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Appendix C

Air Conformity Applicability Model Report

(Included on the CD-ROM on the Back Cover of this Report)

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APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

1. General Information

- Action Location
Base: DYESS AFB
County(s): Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Installation Development at Dyess AFB, TX

- Project Number/s (if applicable):

- Projected Action Start Date: 1 / 2018

- Action Purpose and Need:
The projects are needed to improve the physical infrastructure and functionality of Dyess AFB to meet mission and facility requirements.

- Action Description:
The proposed action consists of 14 facility construction, infrastructure, demolition and renovation projects on Dyess AFB. These include: (1) the construction or renovation of the following buildings: 317th AG HQTRs, Armament Management Facility, Dormitory, Temporary Lodging, Joint Forces Deployment Control Center (DCC), Bowling Center, Visitor Control Center, and Security Forces Facility; (2) the construction of the following parking areas: for the Armament Management Facility, the extension of the Government Vehicle Parking Lot, for the Bowling Center, the relocated Grenade Range, and Security Forces Facility; and (3) the demolition of the following: 5 buildings not needed when the new Armament Management Facility is constructed, existing 317th AG HQTRs, 2 buildings not needed when new Dormitory is constructed, existing Bowling Alley and Bowling Alley parking area, 3 buildings not needed when the DCC is constructed, the vacant Library, and 5 buildings not needed after the renovation of Security Forces Facility. Other projects include the relocation of a Grenade Range, clearing of trees, the installation of a fence, and the construction/laying of a water pipeline.

- Point of Contact

Name:	Paul Rollinson
Title:	President
Organization:	XCEL Engineering, Inc.
Email:	prollinson@xceleng.com
Phone Number:	(865) 766-8541

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Activity List:

Activity Type		Activity Title
2.	Emergency Generator	Installation Development at Dyess AFB
3.	Emergency Generator	Installation Development at Dyess AFB
4.	Construction / Demolition	Installation Development at Dyess AFB
5.	Heating	Installation Development at Dyess AFB
6.	Heating	Installation Development at Dyess AFB
7.	Heating	Installation Development at Dyess AFB
8.	Heating	Installation Development at Dyess AFB
9.	Heating	Installation Development at Dyess AFB
10.	Heating	Installation Development at Dyess AFB
11.	Heating	Installation Development at Dyess AFB
12.	Construction / Demolition	Installation Development at Dyess AFB
13.	Emergency Generator	Installation Development at Dyess AFB
14.	Construction / Demolition	Installation Development at Dyess AFB
15.	Emergency Generator	Installation Development at Dyess AFB
16.	Heating	Installation Development at Dyess AFB
17.	Construction / Demolition	Installation Development at Dyess AFB
18.	Emergency Generator	Installation Development at Dyess AFB
19.	Construction / Demolition	Installation Development at Dyess AFB
20.	Emergency Generator	Installation Development at Dyess AFB
21.	Heating	Installation Development at Dyess AFB
22.	Heating	Installation Development at Dyess AFB
23.	Construction / Demolition	Installation Development at Dyess AFB
24.	Construction / Demolition	Installation Development at Dyess AFB
25.	Heating	Installation Development at Dyess AFB
26.	Emergency Generator	Installation Development at Dyess AFB
27.	Construction / Demolition	Installation Development at Dyess AFB
28.	Construction / Demolition	Installation Development at Dyess AFB
29.	Construction / Demolition	Installation Development at Dyess AFB
30.	Heating	Installation Development at Dyess AFB
31.	Heating	Installation Development at Dyess AFB
32.	Emergency Generator	Installation Development at Dyess AFB
33.	Construction / Demolition	Installation Development at Dyess AFB
34.	Construction / Demolition	Installation Development at Dyess AFB
35.	Heating	Installation Development at Dyess AFB
36.	Construction / Demolition	Installation Development at Dyess AFB

2. Emergency Generator

2.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Activity Description:
Project CO1: Emergency electrical power for the 317th Airlift Group Headquarters building.

- Activity Start Date
Start Month: 3
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

2.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

2.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

2.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

3. Emergency Generator

3.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO1: Fire pump for newly constructed 317th Airlift Group Headquarters Building.

- Activity Start Date
Start Month: 3
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.009207
SO_x	0.007755
NO_x	0.037950
CO	0.025344
PM 10	0.008283

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.008283
Pb	0.000000
NH_3	0.000000
CO_2e	4.4

3.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 220
Average Operating Hours Per Year (hours): 30

3.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.00279	0.00235	0.0115	0.00768	0.00251	0.00251			1.33

3.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO1: Construct the 317th Airlift Group Headquarters building.

- Activity Start Date
Start Month: 1
Start Month: 2019

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.820365
SO_x	0.007140
NO_x	3.441998
CO	3.100007
PM 10	1.419736

Pollutant	Total Emissions (TONs)
PM 2.5	0.164173
Pb	0.000000
NH_3	0.003673
CO_2e	709.1

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

4.1 Demolition Phase

4.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 3
Number of Days: 0

4.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 17352
Height of Building to be demolished (ft): 20

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 20

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0535	0.0006	0.3668	0.3811	0.0225	0.0225	0.0048	58.584
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

- $PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
- 0.00042: Emission Factor (lb/ft^3)
- BA: Area of Building to be demolished (ft^2)
- BH: Height of Building to be demolished (ft)
- 2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

- CEE_{POL}: Construction Exhaust Emissions (TONs)
- NE: Number of Equipment
- WD: Number of Total Work Days (days)
- H: Hours Worked per Day (hours)
- EF_{POL}: Emission Factor for Pollutant (lb/hour)
- 2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

- VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
- BA: Area of Building being demolish (ft^2)
- BH: Height of Building being demolish (ft)
- (1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
- 0.25: Volume reduction factor (material reduced by 75% to account for air space)
- HC: Average Hauling Truck Capacity (yd^3)
- (1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
- HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.2 Site Grading Phase

4.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 0
Number of Days: 23

4.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 152257
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 5634

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Scrapers Composite	3	8
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

4.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2020	0.0026	1.4692	0.8161	0.0594	0.0594	0.0182	262.94
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.3 Trenching/Excavating Phase

4.3.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 0
Number of Days: 5

4.3.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 14462
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 8196

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

4.3.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Scrapers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2020	0.0026	1.4692	0.8161	0.0594	0.0594	0.0182	262.94
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.3.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.4 Building Construction Phase

4.4.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 13
Number of Days: 0

4.4.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

Area of Building (ft^2): 24940
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

4.4.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0953	0.0013	0.7235	0.3981	0.0286	0.0286	0.0086	128.84
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0344	0.0006	0.1923	0.2166	0.0085	0.0085	0.0031	54.473
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0430	0.0006	0.3483	0.2755	0.0168	0.0168	0.0038	61.089
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0343	0.0003	0.1832	0.1842	0.0116	0.0116	0.0031	25.680

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.4.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

4.5 Architectural Coatings Phase

4.5.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 2
Number of Days: 0

4.5.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 24940
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

4.5.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.5.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

4.6 Paving Phase

4.6.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1 **Start Year:** 2019

- Phase Duration
Number of Month: 0
Number of Days: 14

4.6.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 61312

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

4.6.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Scrapers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2020	0.0026	1.4692	0.8161	0.0594	0.0594	0.0182	262.94
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

4.6.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

5. Heating

5.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO1: Operation of comfort heat boiler at the 317th Airlift Group Headquarters building.

- Activity Start Date
Start Month: 3
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.003446
SO_x	0.000376
NO_x	0.062648
CO	0.052624
PM 10	0.004761

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004761
Pb	0.000000
NH_3	0.000000
CO_2e	75.4

5.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 23000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

5.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

5.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

6. Heating

6.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO2: Operation of comfort heat boiler at the Armament Management building.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010703
SO_x	0.001168
NO_x	0.194595
CO	0.163460
PM 10	0.014789

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.014789
Pb	0.000000
NH_3	0.000000
CO_2e	234.3

6.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 55000
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0743

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

6.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

6.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

$HE_{POL} = FC * EF_{POL} / 2000$

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

7. Heating

7.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO3: Operation of comfort heat boiler at the Dormitory building.

- Activity Start Date
Start Month: 12
Start Year: 2018

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.010701
SO_x	0.001167
NO_x	0.194570
CO	0.163439
PM 10	0.014787

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.014787
Pb	0.000000
NH_3	0.000000
CO_2e	234.2

7.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 54993
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0743

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

7.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

7.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

$FC_{HER} = HA * EI / HV / 1000000$

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

$HE_{POL} = FC * EF_{POL} / 2000$

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

8. Heating

8.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO4: Operation of comfort heat boiler at the Temporary Lodging Facility.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.003079
SO_x	0.000336
NO_x	0.055988
CO	0.047030
PM 10	0.004255

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004255
Pb	0.000000
NH_3	0.000000
CO_2e	67.4

8.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 20555
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

8.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

8.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

9. Heating

9.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO1: Operation of a hot water heater in the 317th Airlift Group Headquarters building.

- Activity Start Date
Start Month: 3
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000707
SO_x	0.000077
NO_x	0.012857
CO	0.010800
PM 10	0.000977

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000977
Pb	0.000000
NH_3	0.000000
CO_2e	15.5

9.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 0.3
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

9.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

9.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

10. Heating

10.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO2: Operation of a hot water heater in the Armament Management building.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.004714
SO_x	0.000514
NO_x	0.085714
CO	0.072000
PM 10	0.006514

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006514
Pb	0.000000
NH_3	0.000000
CO_2e	103.2

10.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 2
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

10.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

10.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

11. Heating

11.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

**DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES**

- Activity Description:
Project CO4: Operation of a hot water heater in the Temporary Lodging Facility.

- Activity Start Date
Start Month: 2
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.002357
SO_x	0.000257
NO_x	0.040286
CO	0.017143
PM 10	0.003257

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.003257
Pb	0.000000
NH_3	0.000000
CO_2e	51.6

11.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 1
Type of fuel: Natural Gas
Type of boiler/furnace: Residential (<0.3 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

11.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	94	40	7.6	7.6			120390

11.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO2: Construction of Armament Management building.

- Activity Start Date
Start Month: 10
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2019

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.152526
SO_x	0.006758
NO_x	3.294287
CO	2.805277
PM 10	2.977813

Pollutant	Total Emissions (TONs)
PM 2.5	0.166371
Pb	0.000000
NH_3	0.005422
CO_2e	671.7

12.1 Demolition Phase

12.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 3
Number of Days: 0

12.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 57953.4
Height of Building to be demolished (ft): 20
- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

12.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

12.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000
V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.2 Site Grading Phase

12.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 0

12.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 257907.4
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 16945

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

12.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

12.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.3 Building Construction Phase

12.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 13
Number of Days: 0

12.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 54993
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8
Welders Composite	3	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

12.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0387	0.0003	0.1940	0.1876	0.0133	0.0133	0.0034	25.690

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

12.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase

$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)

BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

12.4 Architectural Coatings Phase

12.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 4
Number of Days: 0

12.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 54993
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

12.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

12.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

12.5 Paving Phase

12.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 12
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 20

12.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 145073.4

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

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- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

12.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

12.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

13. Emergency Generator

13.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB
- Activity Description:
Project CO2: Emergency electrical power for Armament Management building.

- Activity Start Date
Start Month: 9
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.114875
SO_x	0.002006
NO_x	4.155396
CO	1.103827
PM 10	0.129796

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.129796
Pb	0.000000
NH_3	0.000000
CO_2e	213.4

13.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 7

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

13.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

13.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location

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

- Activity Title: Installation Development at Dyess AFB

- Activity Description:

Project CO3: Construct Dormitory building.

- Activity Start Date

Start Month: 1
Start Month: 2018

- Activity End Date

Indefinite: False
End Month: 1
End Month: 2019

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	1.013769
SO_x	0.005978
NO_x	2.725634
CO	2.019161
PM 10	3.057640

Pollutant	Total Emissions (TONs)
PM 2.5	0.123823
Pb	0.000000
NH_3	0.005760
CO_2e	611.6

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date

Start Month: 1
Start Quarter: 1
Start Year: 2018

- Phase Duration

Number of Month: 3
Number of Days: 0

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 57953.376
Height of Building to be demolished (ft): 30

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

14.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

14.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$
V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)

0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.2 Site Grading Phase

14.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 0

14.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 257907.376
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 16945.03
- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

14.2.3 Site Grading Phase Emission Factor(s)

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

14.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment
$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.3 Building Construction Phase

14.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 12
Number of Days: 0

14.3.2 Building Construction Phase Assumptions

- General Building Construction Information

Building Category: Office or Industrial
Area of Building (ft^2): 54993
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings

Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

14.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

14.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$
V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

14.4 Architectural Coatings Phase

14.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 2
Number of Days: 0

14.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 54993
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

14.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

14.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase

VMT_{WT} = (1 * WT * PA) / 800

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

14.5 Paving Phase

14.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 20

14.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 145073.376

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

14.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

14.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

VOC_P = (2.62 * PA) / 43560

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

15. Emergency Generator

15.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO3: Emergency electrical power for the Dormitory building.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

15.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

15.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

15.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

16. Heating

16.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO3: Operation of a hot water heater in the Dormitory building.

- Activity Start Date
Start Month: 12
Start Year: 2018

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.004714
SO_x	0.000514
NO_x	0.085714
CO	0.072000
PM 10	0.006514

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006514
Pb	0.000000
NH_3	0.000000
CO_2e	103.2

16.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 2
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

16.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

16.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO4: Construct Temporary Lodging Facility.

- Activity Start Date
Start Month: 1
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2019

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.335810
SO_x	0.001726
NO_x	0.792064
CO	0.734872
PM 10	0.065872

Pollutant	Total Emissions (TONs)
PM 2.5	0.036855
Pb	0.000000
NH_3	0.000626
CO_2e	168.1

17.1 Site Grading Phase

17.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2019
- Phase Duration
Number of Month: 0
Number of Days: 3

17.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 21000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1554

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

17.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

17.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.2 Building Construction Phase

17.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 8
Number of Days: 0

17.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Multi-Family
Area of Building (ft^2): 20555
Height of Building (ft): N/A
Number of Units: 16

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

17.2.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

17.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = NU * 0.36 * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
NU: Number of Units
0.36: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = NU * 0.11 * HT$

VMT_{VT}: Vender Tips Vehicle Miles Travel (miles)
NU: Number of Units
0.11: Conversion Factor units to trips
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

17.3 Architectural Coatings Phase

17.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1 **Start Year:** 2019
- Phase Duration
Number of Month: 3
Number of Days: 0

17.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Multi-Family
Total Square Footage (ft^2): N/A
Number of Units: 16

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

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

- Worker Trips Vehicle Mixture (%)

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

17.3.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

17.3.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase

$VOC_{AC} = (NU * 850 * 2.7 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
NU: Number of Units
850: Conversion Factor units to square feet (850 ft^2 / unit)
2.7: Conversion Factor total area to coated area (2.7 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

18. Emergency Generator

18.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO4: Emergency electrical power for the Temporary Lodging Facility.

- Activity Start Date
Start Month: 2
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

18.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

18.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

18.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO5: Construct the Joint Forces Deployment Control Center.

- Activity Start Date
Start Month: 4
Start Month: 2019

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.692872
SO_x	0.004010
NO_x	1.718080
CO	1.470305
PM 10	2.256162

Pollutant	Total Emissions (TONs)
PM 2.5	0.075109
Pb	0.000000
NH_3	0.003114
CO_2e	411.5

19.1 Demolition Phase

19.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2019
- Phase Duration
Number of Month: 3 **Number of Days:** 0

19.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 36791.352
Height of Building to be demolished (ft): 15

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

19.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0535	0.0006	0.3668	0.3811	0.0225	0.0225	0.0048	58.584
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

19.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)

(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.2 Site Grading Phase

19.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 1
Number of Days: 0

19.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 207471
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 15382

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

19.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

19.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.3 Building Construction Phase

19.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1 **Start Year:** 2019

- Phase Duration
Number of Month: 10 **Number of Days:** 0

19.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 38481.3
Height of Building (ft): 15
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

19.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0953	0.0013	0.7235	0.3981	0.0286	0.0286	0.0086	128.84
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0344	0.0006	0.1923	0.2166	0.0085	0.0085	0.0031	54.473
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

19.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

19.4 Architectural Coatings Phase

19.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 3
Number of Days: 0

19.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 38481.3
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

19.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

19.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

20. Emergency Generator

20.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO5: Emergency electrical power for the Joint Forces Deployment Control Center.

- Activity Start Date
Start Month: 1
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

20.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

20.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

20.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year

AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

21. Heating

21.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO5: Operation of comfort heat boiler at the Joint Forces Deployment Control Center.

- Activity Start Date
Start Month: 1
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.006531
SO_x	0.000712
NO_x	0.118741
CO	0.099743
PM 10	0.009024

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.009024
Pb	0.000000
NH_3	0.000000
CO_2e	143.0

21.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 38481
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

21.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

21.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

22. Heating

22.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO5: Operation of a hot water heater for the Joint Forces Demployment Control Center.

- Activity Start Date
Start Month: 1
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000707
SO_x	0.000077
NO_x	0.012857
CO	0.010800
PM 10	0.000977

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000977
Pb	0.000000
NH_3	0.000000
CO_2e	15.5

22.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 0.3
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

22.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

22.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

23. Construction / Demolition

23.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO7: Demolition of old Bowling Center and construction of new Bowling Center.

- Activity Start Date
Start Month: 2
Start Month: 2019

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.712772
SO_x	0.006027
NO_x	2.887484
CO	2.844595
PM 10	0.793910

Pollutant	Total Emissions (TONs)
PM 2.5	0.147703
Pb	0.000000
NH_3	0.003865
CO_2e	599.9

23.1 Demolition Phase

23.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 2
Number of Days: 0

23.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 14611
Height of Building to be demolished (ft): 20

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

23.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	000.002	000.200	003.208	000.006	000.005		000.023	00325.859
LDGT	000.340	000.003	000.357	004.561	000.008	000.007		000.024	00421.180
HDGV	000.737	000.005	000.984	015.455	000.018	000.016		000.045	00783.227
LDDV	000.095	000.003	000.134	002.768	000.004	000.004		000.008	00318.007
LDDT	000.236	000.004	000.383	004.740	000.007	000.006		000.008	00451.951
HDDV	000.440	000.013	004.473	001.638	000.165	000.152		000.028	01512.371
MC	002.730	000.003	000.697	012.599	000.026	000.023		000.054	00395.818

23.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23.2 Site Grading Phase

23.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 0
Number of Days: 14

23.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 127162
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 9410

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

23.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

23.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23.3 Building Construction Phase

23.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 10
Number of Days: 0

23.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 20021
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

23.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0953	0.0013	0.7235	0.3981	0.0286	0.0286	0.0086	128.84
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0344	0.0006	0.1923	0.2166	0.0085	0.0085	0.0031	54.473
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

23.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (0.42 / 1000) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)
$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

23.4 Architectural Coatings Phase

23.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 3
Number of Days: 0

23.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 20021
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

23.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

23.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

23.5 Paving Phase

23.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 13
Number of Days: 0

23.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 515200

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

23.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

23.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

24. Construction / Demolition

24.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO7: Demolition of existing parking lot and Tennis Court.

- Activity Start Date
Start Month: 2
Start Month: 2020

- Activity End Date
Indefinite: False
End Month: 2
End Month: 2020

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.012870
SO_x	0.000175
NO_x	0.082968
CO	0.097737
PM 10	0.004131

Pollutant	Total Emissions (TONs)
PM 2.5	0.004129
Pb	0.000000
NH_3	0.000056
CO_2e	17.3

24.1 Demolition Phase

24.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2020

- Phase Duration
Number of Month: 1
Number of Days: 0

24.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 92935
Height of Building to be demolished (ft): 0

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

24.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0006	0.3409	0.3782	0.0195	0.0195	0.0043	58.572
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2117	0.0024	1.5772	0.8005	0.0630	0.0630	0.0191	239.56
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0436	0.0007	0.2744	0.3616	0.0134	0.0134	0.0039	66.897

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	000.002	000.200	003.208	000.006	000.005		000.023	00325.859
LDGT	000.340	000.003	000.357	004.561	000.008	000.007		000.024	00421.180
HDGV	000.737	000.005	000.984	015.455	000.018	000.016		000.045	00783.227
LDDV	000.095	000.003	000.134	002.768	000.004	000.004		000.008	00318.007
LDDT	000.236	000.004	000.383	004.740	000.007	000.006		000.008	00451.951
HDDV	000.440	000.013	004.473	001.638	000.165	000.152		000.028	01512.371
MC	002.730	000.003	000.697	012.599	000.026	000.023		000.054	00395.818

24.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

25. Heating

25.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO7: Operation of comfort heat boiler at the Bowling Center.

- Activity Start Date
Start Month: 10
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.002999
SO_x	0.000327
NO_x	0.054531
CO	0.045806
PM 10	0.004144

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.004144
Pb	0.000000
NH_3	0.000000
CO_2e	65.6

25.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 20020
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0572

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

25.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

25.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

26. Emergency Generator

26.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO7: Emergency electrical power generator for the Bowling Center.

- Activity Start Date
Start Month: 10
Start Year: 2020

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

26.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

26.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

26.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

27. Construction / Demolition

27.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project IO1: Construct new Government Vehicle parking lot.

- Activity Start Date
Start Month: 3
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.024140
SO_x	0.000308
NO_x	0.160085
CO	0.123092
PM 10	0.153743

Pollutant	Total Emissions (TONs)
PM 2.5	0.007855
Pb	0.000000
NH_3	0.000255
CO_2e	31.4

27.1 Demolition Phase

27.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 7

27.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 9000
Height of Building to be demolished (ft): 17

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

27.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

27.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards ($1\ yd^3 / 27\ ft^3$)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27.2 Site Grading Phase

27.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 7

27.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 49500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 605

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

27.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

27.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

27.3 Paving Phase

27.3.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 12

27.3.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 40500

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

27.3.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

27.3.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

28. Construction / Demolition

28.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project RO1: Repair and building addition to Visitor Control Center.

- Activity Start Date
Start Month: 3
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 9
End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.199798
SO_x	0.002715
NO_x	1.262453
CO	0.959998
PM 10	2.809609

Pollutant	Total Emissions (TONs)
PM 2.5	0.057107
Pb	0.000000
NH_3	0.002271
CO_2e	275.1

28.1 Demolition Phase

28.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 5

28.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 709
Height of Building to be demolished (ft): 20

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

28.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

28.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$
V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

28.2 Site Grading Phase

28.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 0

28.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 276278
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 19056

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

28.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

28.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

28.3 Building Construction Phase

28.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 6
Number of Days: 0

28.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 1268
Height of Building (ft): 20
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

28.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

28.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
$VMT_{VT} = BA * BH * (0.38 / 1000) * HT$

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

28.4 Architectural Coatings Phase

28.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 10

28.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 1268
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

28.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

28.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

28.5 Paving Phase

28.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 0

28.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 275000

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

28.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

28.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre ($43560\ ft2 / acre)^2 / acre$)

29. Construction / Demolition

29.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project RO2: Consolidation of Security Forces Facilities.

- Activity Start Date
Start Month: 4
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2019

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.566085
SO_x	0.003840
NO_x	1.811685
CO	1.502728
PM 10	0.778631

Pollutant	Total Emissions (TONs)
PM 2.5	0.084457
Pb	0.000000
NH_3	0.002548
CO_2e	384.4

29.1 Demolition Phase

29.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 3
Number of Days: 0

29.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 22833
Height of Building to be demolished (ft): 20

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

29.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

29.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (0.00042 * BA * BH) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

29.2 Site Grading Phase

29.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 1
Number of Days: 0

29.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 60030
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 4359

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

29.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

29.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase
$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

29.3 Building Construction Phase

29.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 10
Number of Days: 0

29.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 26130
Height of Building (ft): 30
Number of Units: N/A

- Building Construction Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips
Average Vendor Round Trip Commute (mile): 40

- Vendor Trips Vehicle Mixture (%)

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

29.3.3 Building Construction Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1012	0.0013	0.7908	0.4059	0.0318	0.0318	0.0091	128.85
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0371	0.0006	0.2186	0.2173	0.0101	0.0101	0.0033	54.479
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

29.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.42 / 1000): Conversion Factor ft^3 to trips (0.42 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds

EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Vender Trips Emissions per Phase
VMT_{VT} = BA * BH * (0.38 / 1000) * HT

VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
BA: Area of Building (ft^2)
BH: Height of Building (ft)
(0.38 / 1000): Conversion Factor ft^3 to trips (0.38 trip / 1000 ft^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VT} * 0.002205 * EF_{POL} * VM) / 2000
V_{POL}: Vehicle Emissions (TONs)
VMT_{VT}: Vender Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

29.4 Architectural Coatings Phase

29.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 3
Number of Days: 0

29.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category:
Total Square Footage (ft^2): 26130
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

29.4.3 Architectural Coatings Phase Emission Factor(s)

- Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

29.4.4 Architectural Coatings Phase Formula(s)

- Worker Trips Emissions per Phase
$VMT_{WT} = (1 * WT * PA) / 800$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
1: Conversion Factor man days to trips (1 trip / 1 man * day)
WT: Average Worker Round Trip Commute (mile)
PA: Paint Area (ft^2)
800: Conversion Factor square feet to man days (1 ft^2 / 1 man * day)

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

VOC_{AC}: Architectural Coating VOC Emissions (TONs)
BA: Area of Building (ft^2)
2.0: Conversion Factor total area to coated area (2.0 ft^2 coated area / total area)
0.0116: Emission Factor (lb/ft^2)
2000: Conversion Factor pounds to tons

29.5 Paving Phase

29.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 10

29.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 33900

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

29.5.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

29.5.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

30. Heating

30.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project RO2: Operation of comfort heat boiler at the Security Forces Facility.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.004435
SO_x	0.000484
NO_x	0.080630
CO	0.067729
PM 10	0.006128

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.006128
Pb	0.000000
NH_3	0.000000
CO_2e	97.1

30.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 26130
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105
Energy Intensity (MMBtu/ft^2): 0.0648

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

30.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

30.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (ft^2)
EI: Energy Intensity Requirement (MMBtu/ft^2)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

31. Heating

31.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project RO2: Operation of a hot water heater in the Security Forces Facility.

- Activity Start Date
Start Month: 1
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.001768
SO_x	0.000193
NO_x	0.032143
CO	0.027000
PM 10	0.002443

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.002443
Pb	0.000000
NH_3	0.000000
CO_2e	38.7

31.2 Heating Assumptions

- Heating
Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method
Rated Capacity of boiler/furnance (MM Btu): 0.75
Type of fuel: Natural Gas
Type of boiler/furnace: Commercial/Institutional (0.3 - 9.9 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

31.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	100	84	7.6	7.6			120390

31.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year
FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year
HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

32. Emergency Generator

32.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project RO2: Emergency electrical power for the Security Forces Facility.

- Activity Start Date
Start Month: 2
Start Year: 2019

- Activity End Date
Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.016411
SO_x	0.000287
NO_x	0.593628
CO	0.157690
PM 10	0.018542

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.018542
Pb	0.000000
NH_3	0.000000
CO_2e	30.5

32.2 Emergency Generator Assumptions

- Emergency Generator
Type of Fuel used in Emergency Generator: Diesel
Number of Emergency Generators: 1

- Default Settings Used: No

- Emergency Generators Consumption
Emergency Generator's Horsepower: 1528
Average Operating Hours Per Year (hours): 30

32.3 Emergency Generator Emission Factor(s)

- Emergency Generators Emission Factor (lb/hp-hr)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
0.000716	0.0000125	0.0259	0.00688	0.000809	0.000809			1.33

32.4 Emergency Generator Formula(s)

- Emergency Generator Emissions per Year
AE_{POL}= (NGEN * HP * OT * EF_{POL}) / 2000

AE_{POL}: Activity Emissions (TONs per Year)
NGEN: Number of Emergency Generators
HP: Emergency Generator's Horsepower (hp)
OT: Average Operating Hours Per Year (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hp-hr)

33. Construction / Demolition

33.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project DO1: Demolition of vacant Library.

- Activity Start Date
Start Month: 4
Start Month: 2018

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2018

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.023913
SO_x	0.000371
NO_x	0.181655
CO	0.129045
PM 10	0.109887

Pollutant	Total Emissions (TONs)
PM 2.5	0.008391
Pb	0.000000
NH_3	0.000367
CO_2e	38.5

33.1 Demolition Phase

33.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 21

33.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 15372
Height of Building to be demolished (ft): 20

- Default Settings Used: No

- Average Day(s) worked per week: 5

- Construction Exhaust

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

33.1.3 Demolition Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0604	0.0006	0.3958	0.3850	0.0260	0.0260	0.0054	58.600
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

33.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (0.00042 * BA * BH) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/ft^3)
BA: Area of Building to be demolished (ft^2)
BH: Height of Building to be demolished (ft)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase
$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase
$VMT_{VE} = BA * BH * (1 / 27) * 0.25 * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building being demolish (ft^2)
BH: Height of Building being demolish (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
0.25: Volume reduction factor (material reduced by 75% to account for air space)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

33.2 Site Grading Phase

33.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2018

- Phase Duration
Number of Month: 0
Number of Days: 7

33.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 16000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1184

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

33.2.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1049	0.0014	0.7217	0.5812	0.0354	0.0354	0.0094	132.97
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0633	0.0012	0.4477	0.3542	0.0181	0.0181	0.0057	122.66
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2343	0.0024	1.8193	0.8818	0.0737	0.0737	0.0211	239.61
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0512	0.0007	0.3330	0.3646	0.0189	0.0189	0.0046	66.912

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.326	000.002	000.272	003.566	000.007	000.006		000.025	00344.527
LDGT	000.427	000.003	000.478	005.323	000.009	000.008		000.026	00446.488
HDGV	000.893	000.005	001.267	017.824	000.021	000.018		000.045	00788.510
LDDV	000.106	000.003	000.151	002.750	000.004	000.004		000.008	00338.771
LDDT	000.304	000.004	000.493	005.424	000.007	000.007		000.008	00493.509
HDDV	000.526	000.014	005.452	001.918	000.219	000.201		000.028	01538.403
MC	002.760	000.003	000.701	012.933	000.026	000.023		000.053	00395.615

33.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

34. Construction / Demolition

34.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project O01: Relocation of the Grenade Range.

- Activity Start Date
Start Month: 7
Start Month: 2019

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2019

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.010921
SO_x	0.000148
NO_x	0.072364
CO	0.056533
PM 10	0.024114

Pollutant	Total Emissions (TONs)
PM 2.5	0.003400
Pb	0.000000
NH_3	0.000128
CO_2e	15.4

34.1 Site Grading Phase

34.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 0
Number of Days: 3

34.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 15000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 1110

- Site Grading Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

34.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

34.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

VMT_{WT} = WD * WT * 1.25 * NE

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

34.2 Paving Phase

34.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 0
Number of Days: 5

34.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 15000

- Paving Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips
Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

34.2.3 Paving Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0982	0.0014	0.6490	0.5786	0.0316	0.0316	0.0088	132.96
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0595	0.0012	0.3971	0.3522	0.0158	0.0158	0.0053	122.63
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.2226	0.0024	1.6948	0.8387	0.0682	0.0682	0.0200	239.58
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0471	0.0007	0.3018	0.3630	0.0159	0.0159	0.0042	66.904

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.292	000.002	000.232	003.373	000.006	000.006		000.024	00335.434
LDGT	000.379	000.003	000.412	004.908	000.008	000.007		000.025	00433.594
HDGV	000.810	000.005	001.116	016.538	000.019	000.017		000.045	00785.640
LDDV	000.100	000.003	000.141	002.747	000.004	000.004		000.008	00328.227
LDDT	000.267	000.004	000.433	005.052	000.007	000.007		000.008	00471.807
HDDV	000.480	000.013	004.936	001.769	000.190	000.175		000.028	01524.947
MC	002.743	000.003	000.699	012.761	000.026	000.023		000.054	00395.722

34.2.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = PA * 0.25 * (1 / 27) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
PA: Paving Area (ft^2)
0.25: Thickness of Paving Area (ft)
(1 / 27): Conversion Factor cubic feet to cubic yards (1 yd^3 / 27 ft^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Off-Gassing Emissions per Phase
$VOC_P = (2.62 * PA) / 43560$

VOC_P: Paving VOC Emissions (TONs)
2.62: Emission Factor (lb/acre)
PA: Paving Area (ft^2)
43560: Conversion Factor square feet to acre (43560 ft2 / acre)^2 / acre)

35. Heating

35.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project CO7: Operation of a hot water heater in the Bowling Center.

- Activity Start Date
Start Month: 10
Start Year: 2019

- Activity End Date

Indefinite: Yes
End Month: N/A
End Year: N/A

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.000707
SO_x	0.000077
NO_x	0.012086
CO	0.005143
PM 10	0.000977

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.000977
Pb	0.000000
NH_3	0.000000
CO_2e	15.5

35.2 Heating Assumptions

- Heating

Heating Calculation Type: Rated Capacity Method

- Rated Capacity Method

Rated Capacity of boiler/furnance (MM Btu): 0.3
Type of fuel: Natural Gas
Type of boiler/furnace: Residential (<0.3 MMBtu/hr)
Heat Value (MMBtu/ft^3): 0.00105

- Default Settings Used: Yes

- Boiler/Furnace Usage

Operating Time Per Year (hours): 900 (default)

35.3 Heating Emission Factor(s)

- Heating Emission Factors (lb/1000000 scf)

VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
5.5	0.6	94	40	7.6	7.6			120390

35.4 Heating Formula(s)

- Heating Fuel Consumption ft^3 per Year

FC_{RC}= OT * RC / HV / 1000000

FC_{RC}: Fuel Consumption for Rated Capacity Method
OT: Operating Time Per Year (hours)
RC: Rated Capacity of boiler/furnance (MM Btu)
HV: Heat Value (MMBTU/ft^3)
1000000: Conversion Factor

- Heating Emissions per Year

HE_{POL}= FC * EF_{POL} / 2000

HE_{POL}: Heating Emission Emissions (TONs)
FC: Fuel Consumption
EF_{POL}: Emission Factor for Pollutant
2000: Conversion Factor pounds to tons

36. Construction / Demolition

36.1 General Information & Timeline Assumptions

- Activity Location
County: Taylor
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: Installation Development at Dyess AFB

- Activity Description:
Project IO2: Construct water pipeline.

- Activity Start Date
Start Month: 5
Start Month: 2019
- Activity End Date
Indefinite: False
End Month: 5
End Month: 2019

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.017820
SO_x	0.000273
NO_x	0.114214
CO	0.103832
PM 10	0.303450

Pollutant	Total Emissions (TONs)
PM 2.5	0.005010
Pb	0.000000
NH_3	0.000044
CO_2e	26.0

36.1 Trenching/Excavating Phase

36.1.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2019

- Phase Duration
Number of Month: 1
Number of Days: 0

36.1.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 30000
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: No
Average Day(s) worked per week: 5

- Construction Exhaust

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	1	6
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	6

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20
Average Hauling Truck Round Trip Commute (mile): 50

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

Average Worker Round Trip Commute (mile): 20

- Worker Trips Vehicle Mixture (%)

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

36.1.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour)

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.534	000.007	000.582	004.759	000.010	000.009		000.034	00373.409
LDGT	000.732	000.010	001.014	007.911	000.011	000.010		000.034	00500.251
HDGV	001.399	000.016	002.839	025.321	000.028	000.025		000.045	00783.622
LDDV	000.225	000.003	000.317	003.873	000.007	000.006		000.008	00382.861
LDDT	000.538	000.005	000.853	007.913	000.009	000.008		000.008	00597.264
HDDV	000.763	000.014	008.044	002.712	000.368	000.339		000.028	01587.983
MC	002.858	000.008	000.719	014.264	000.027	000.024		000.050	00395.027

36.1.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

APPENDIX C

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT
DYESS AIR FORCE BASE, TX
AIR QUALITY EMISSION ESTIMATES

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons