Draft
Environmental Assessment for Proposed Area Development Plan Projects Joint Base San Antonio, Camp Bullis, Bexar and Comal Counties, Texas

December 2022

Prepared for:
United States Air Force
502d Air Base Wing

PRIVACY ADVISORY

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

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

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 Personal home addresses and phone numbers will not be published in the EA.

COMPLIANCE

This document has been certified that it does not exceed 75 pages, not including appendices as defined in 40 CFR 1501.5(f). As defined in 40 CFR 1508.1(v), a "page" means 500 words and does not include maps, diagrams, graphs, tables, and other means of graphically displaying quantitative or geospatial information

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COVER SHEET
Draft Environmental Assessment for
Proposed Area Development Plan Projects at Joint Base San Antonio, Texas

a. Responsible Agency: United States Air Force

b. Location: Joint Base San Antonio, Camp Bullis, Texas

c. Designation: Draft Environmental Assessment

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Abstract: This Environmental Assessment (EA) has been prepared pursuant to provisions of the National Environmental Policy Act, Title 42 *United States Code*, Section 4321 et seq., implemented by Council on Environmental Quality regulations at Title 40, *Code of Federal Regulations* (CFR) Parts 1500–1508, and 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Potentially affected environmental resources were identified in coordination with local, state, and federal agencies. Specific environmental resources with the potential for environmental consequences include land use; air quality; earth, water, biological, and cultural resources; environmental justice and protection of children; infrastructure, transportation, and utilities; and hazardous materials and wastes.

The purpose of the Proposed Action is to maintain current mission and mission support functions at Joint Base San Antonio, Camp Bullis (JBSA-BUL) through selected development actions and real property improvements. The Proposed Action is needed to address the condition and capability of facilities and infrastructure. Many buildings and infrastructure systems are outdated and in poor condition; others lack the functionality required to accomplish the mission. These real property assets require maintenance, renovation, expansion, or replacement to remain operable and support future mission expansion. The Proposed Action would begin to address these deficiencies by implementing the selected projects in the short term (i.e., 2023–2027).

The analysis of the affected environmental and environmental consequences concluded that there would be no significant adverse impacts to environmental resources at JBSA-BUL under implementation of the Proposed Action with standing environmental protection measures and best management practices in place. JBSA-BUL is an active installation with demolition and construction actions currently underway as well as future development currently in the planning phase. Impacts associated with construction, demolition, and renovation would be minor; therefore, significant cumulative impacts are not anticipated with implementation of the Proposed Action when considered in conjunction with other past, present, or reasonably foreseeable environmental trends or future actions at JBSA-BUL.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABW	Air Base Wing
ACAM	Air Conformity Applicability Model
ACM	asbestos-containing materials
ADP	Area Development Plan
AETC	Air Education and Training Command
AFCEC	Air Force Civil Engineer Center
AFFF	Aqueous Film Forming Foam
AFI	Air Force Instruction
AFMAN	Air Force Manual
Air Force	United States Air Force
AMP	JBSA *Asbestos Management Plan*
AMPV	armored multi-purpose vehicle
APE	Area of Potential Effect
ARMAG	Arms Vault (portable storage)
AST	aboveground storage tank
BMP	best management practice
BO	Biological Opinion
BOLC	Basic Officer Leader Course
BUL	Camp Bullis
CAA	Clean Air Act
CATEX	Categorical Exclusion
CCD	Census County Division
CEQ	Council on Environmental Quality
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CFR	Code of Federal Regulations
CGP	construction general permit
CHD	Cantonment Historic District
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	*Clean Water Act*
CZP	contributing zone plan
dB	decibel
dBA	A-weighted decibel
DFAC	Dining Facility
DMSET	Deployable Medical Systems Equipment for Training
DNL	Day-Night Average Sound Level
DOD	United States Department of Defense
DODI	Department of Defense Instruction
EA	Environmental Assessment
EAA	Edwards Aquifer Authority
EAPP	Edwards Aquifer Protection Plan
ECP	entry control point
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EISA	*Energy Independence and Security Act*
ELPA	Eligible for the purposes of a Program Comment
EO	Executive Order
ERP	Environmental Restoration Program
ESA	*Endangered Species Act*
ETJ	Extraterritorial Jurisdiction
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FOB	Forward Operating Base
FONPA	Finding of No Practicable Alternative

FONSI	Finding of No Significant Impact
GCWA	golden-cheeked warbler
GHG	greenhouse gas
HAZMAT	hazardous material(s)
HWMP	JBSA-BUL *Hazardous Waste Management Plan*
I-10	Interstate 10
IDP	Installation Development Plan
IICEP	Interagency/Intergovernmental Coordination for Environmental Planning
INRMP	Integrated Natural Resources Management Plan
JBSA	Joint Base San Antonio
KPA	karst preserve area
LBP	lead-based paint
lf	linear foot/feet
LID	low-impact development
MBTA	*Migratory Bird Treaty Act*
MD	munitions debris
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
MRTC	Medical Readiness Training Center
MS4	municipal separate storm sewer system
MSA	metropolitan statistical area
NAAQS	National Ambient Air Quality Standards
NAGPRA	*Native American Graves Protection and Repatriation Act*
NEPA	*National Environmental Policy Act*
NHPA	*National Historic Preservation Act*
NOI	Notice of Intent
NREC	Contributing element to an eligible National Register district (Cantonment Historic District)
NREI	Individually eligible for the National Register
NRHP	National Register of Historic Places
NRO	Natural Resources Office
NSR	New Source Review
PA	Programmatic Agreement
PCBs	polychlorinated biphenyls
PFAS	per- and polyfluoroalkyl substances
PFOA	perfluorooctanoic acid
PFOS	perfluorooctane sulfonate
PSD	Prevention of Significant Deterioration
PTE	potential to emit
RCRA	*Resource Conservation and Recovery Act*
RIFA	red imported fire ants
ROI	Region of Influence
SARA	San Antonio Water Authority
SAWS	San Antonio Water System
sf	square foot/feet
SHPO	State Historic Preservation Office
SIP	state implementation plan
SMTS	Soldier Medic Training Site
SPCC	Spill Prevention, Control and Countermeasures
SWP3	Stormwater Pollution Prevention Plan
TAC	*Texas Administrative Code*
TCEQ	Texas Commission on Environmental Quality
TCP	Traditional Cultural Property
TEMF	Tactical Equipment Maintenance Facility
THC	Texas Historical Commission
TMDL	total maximum daily load

TPDES	Texas Pollutant Discharge Elimination System
tpy	ton(s) per year
TWDB	Texas Water Development Board
UFC	Unified Facilities Criteria
US	United States
USC	United States Code
USCB	US Census Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UST	underground storage tank

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CHAPTER 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The United States (US) Air Force (Air Force) 502d Air Base Wing (502 ABW) at Joint Base San Antonio (JBSA) proposes to implement development projects in accordance with the *Camp Bullis District Area Development Plan* (ADP) (Air Force, 2018a). The ADP establishes a framework and timeline for the future development of JBSA, Camp Bullis (JBSA-BUL), a large military installation located just north of the city of San Antonio, Texas (**Figure 1-1**). The proposed development projects were selected from the short-term phase of the ADP for implementation within the next 5 years, from approximately 2023 to 2027. This Environmental Assessment (EA) evaluates the potential environmental, cultural, and socioeconomic effects of the proposed ADP projects at JBSA-BUL. These projects are described and referenced throughout this EA and collectively referred to as the "Proposed Action."

This EA is prepared in accordance with the *National Environmental Policy Act of 1969*, as amended (42 *United States Code* [USC] § 4321 et seq.) (NEPA); the Council on Environmental Quality (CEQ) NEPA regulations (40 *Code of Federal Regulations* [CFR] Parts 1500–1508); and the Air Force NEPA regulations at 32 CFR Part 989, *Environmental Impact Analysis Process (EIAP)*. Per the updated CEQ NEPA regulations, this EIAP complies with the prescriptive timeline and page limits for an EA. Other applicable provisions of 40 CFR Parts 1500–1508 are cited below. EIAP informs decision-makers, regulatory agencies, and the public about an Air Force proposed action before any decision is made on whether to implement the action. During the EIAP, if analyses in the EA determine that potential significant adverse effects would be likely to occur, the Air Force would publish a Notice of Intent (NOI) in the *Federal Register* to prepare an Environmental Impact Statement (EIS).

The CEQ NEPA regulations at 40 CFR § 1500.1(b), 40 CFR § 1506.6(b) and (c), and 40 CFR § 1507.4 provide purpose and direction for streamlining the NEPA process. CEQ memoranda (e.g., March 6, 2012) and guidance on modernizing the NEPA process (CEQ, 2003) identify opportunities to streamline the NEPA process, including the use of technology for communications and information dissemination. This EA satisfies the requirements of NEPA in accordance with the CEQ regulations and promotes NEPA streamlining through the implementation of the Air Force EIAP. To render this document more concise, links are provided to online data sources to which the reader can refer for more information. Should the reader not have internet access, please contact the Air Force point of contact listed on the **Cover Sheet** of this EA, and accommodations will be made to provide print copies of relevant information requested.

1.2 JOINT BASE SAN ANTONIO

A main objective of the Department of Defense (DOD) joint basing program is to combine the support functions of two or more DOD installations that are in close proximity to one another. JBSA was formed in 2010, merging the support functions of three geographically separate installations in and around the city of San Antonio, Texas (see **Figure 1-1**). This joint basing action brought Lackland Air Force Base (AFB), Randolph AFB, and Fort Sam Houston (formerly an Army Base) under the management of the 502 ABW. Camp Bullis, an Army training camp under Fort Sam Houston, also became part of the Joint Base. JBSA is currently the single largest entity in the DOD, accomplishing diverse missions that include training, flying, medical, cyber, and intelligence.

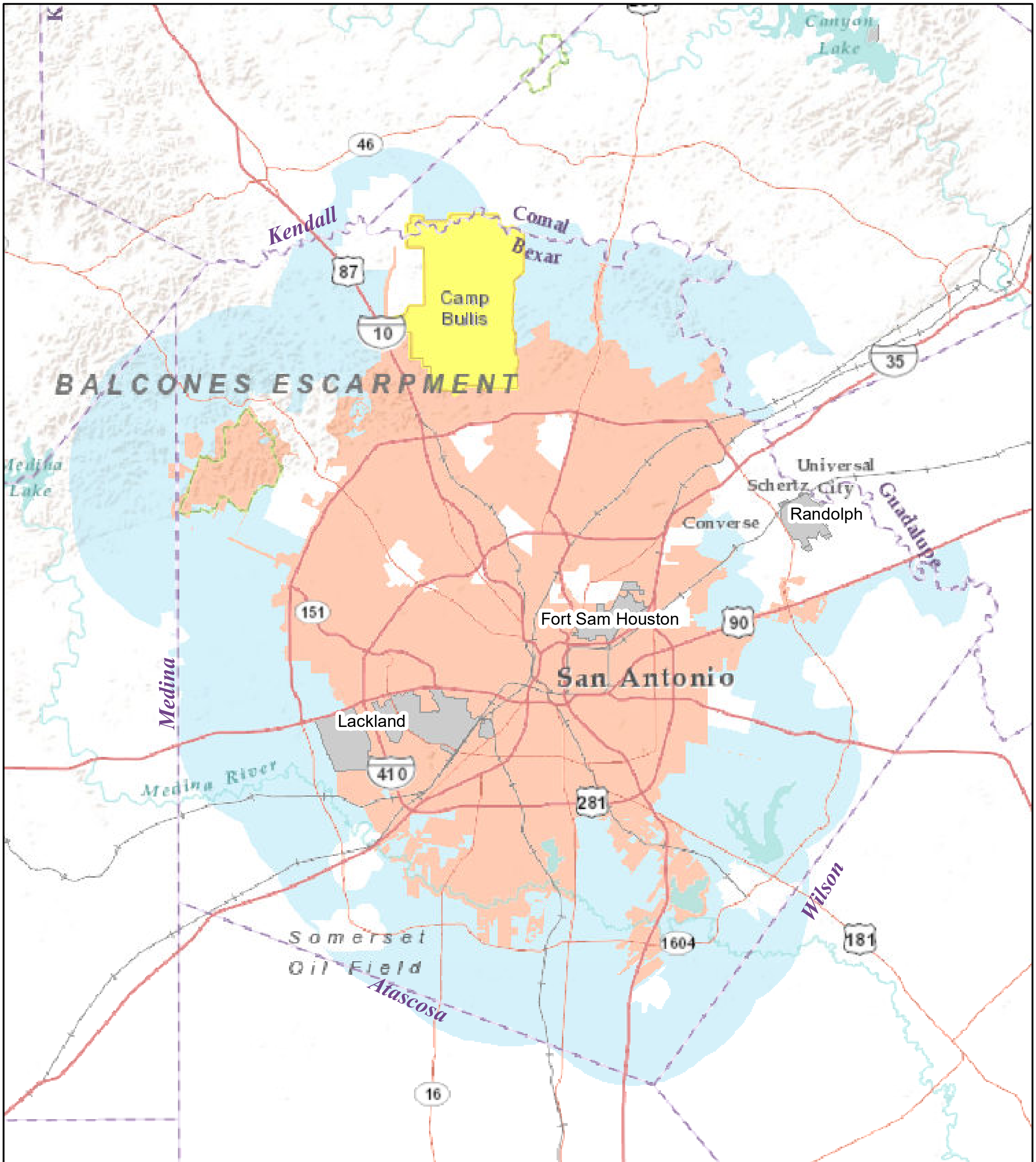


FIGURE 1-1
REGIONAL LOCATION

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

Miles
0 3.5 7

JBSA-BUL
Other JBSA Installation
City of San Antonio (COSA)
COSA Extraterritorial Jurisdiction

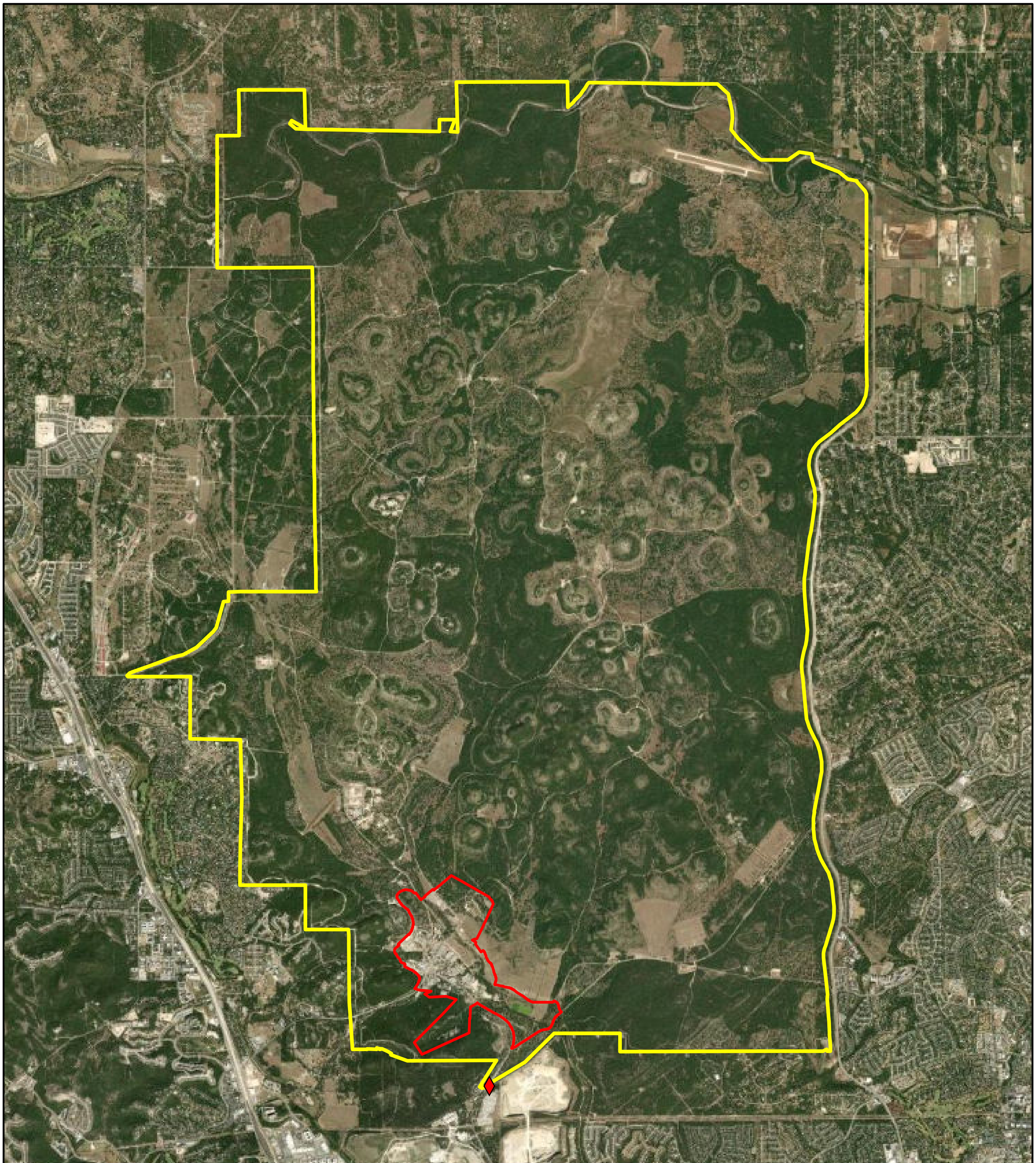


FIGURE 1-2
JOINT BASE SAN ANTONIO, CAMP BULLIS

N

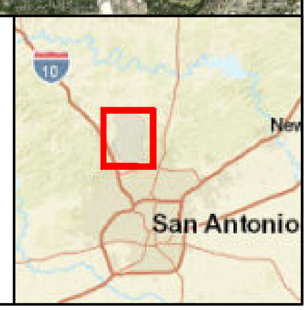
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

Miles
0 0.625 1.25

JBSA-BUL

Cantonment Area

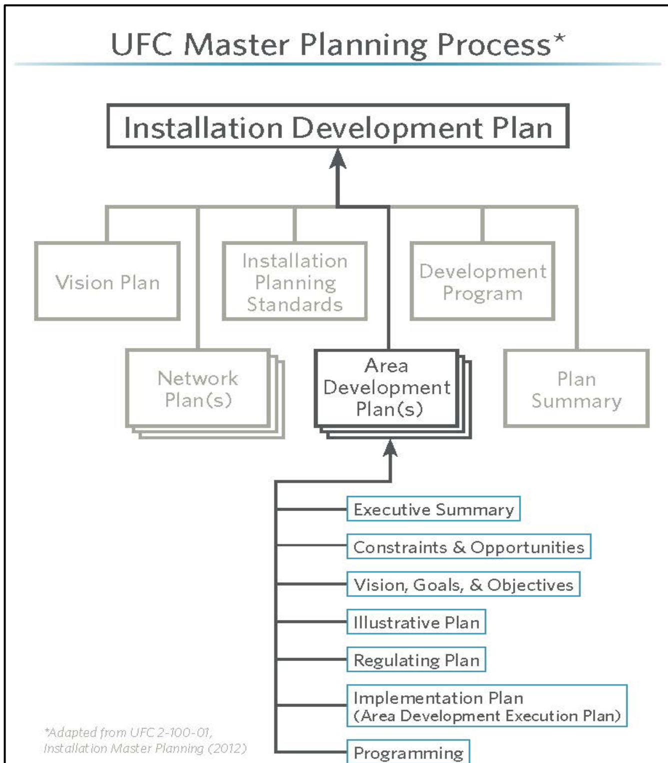
Entry Control Point



1.2.1 AIR FORCE INTEGRATED INSTALLATION PLANNING

In accordance with Department of Defense Instruction (DODI) 4165.70, *Real Property Management* (2018), Unified Facilities Criteria (UFC) 2-100-01, *Installation Master Planning* (2020), prescribes the minimum requirements for development planning on military installations. Air Force Instruction (AFI) 32-1015*, Integrated Installation Planning* (2021), describes and implements the development planning process for Air Force installations.

The *Joint Base San Antonio Installation Development Plan* (IDP), or "Master Plan" as defined in DODI 4165.70, outlines a future vision for JBSA activities over the next 25 years. The IDP also sets forth a "blueprint" for the future development of JBSA to better integrate these activities across the joint region. While development must conform to the IDP, ADPs require more detailed planning on a smaller scale. **Figure 1-3** depicts the planning elements combined and consolidated by the IDP, including the ADP.



Source: Air Force, 2018a

Figure 1-3 UFC Master Planning Process

1.3 JOINT BASE SAN ANTONIO, BULLIS

The 27,994-acre JBSA-BUL is the largest property under the management of the 502 ABW. It is primarily used as a training base and maneuvering grounds for Army, Air Force, and Marine Corps combat units. JBSA-BUL is also a key asset for expeditionary medical training at JBSA. Approximately 1,500 personnel are stationed at JBSA-BUL not including the visitor population on temporary training assignments.

Most of the approximately 300 buildings on JBSA-BUL are concentrated in a small cantonment area in the southern half of the Base (see **Figure 1-2**). These facilities support the training mission and include various administrative, industrial, and community land uses. Training lands generally surround the cantonment and occupy all other portions of the Base. These include many different training assets such as field training areas, live-fire ranges, navigation lands, physical fitness courses, and helicopter landing and drop zones.

1.4 PURPOSE OF THE ACTION

The **purpose** of the Proposed Action is to maintain the joint training mission of JBSA-BUL through selected development actions and real property improvements. As the Proposed Action includes the current, short-term component of the ADP's phasing plan, it aligns with current DOD and Air Force policy and strategy doctrine[1] applicable to JBSA-BUL. A secondary objective of the Proposed Action is to develop JBSA-BUL in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

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[1] Current DOD and Air Force policy and strategy doctrine applicable to the Proposed Action include the National Defense Strategy (DOD, 2018); Air Force Posture Statement (Air Force, 2020a); and Air Force Infrastructure Investment Strategy (Air Force, 2019), among others.

The Proposed Action, if implemented, would support these objectives by maintaining and modernizing JBSA-BUL from approximately 2023 to 2027, consistent with the ADP.

1.5 Need for the Action

The Proposed Action is **needed** to address the condition, capability, and configuration of JBSA's real property assets in the short and long term. The facilities and infrastructure on JBSA-BUL are in poor condition and require maintenance or replacement. Many real property assets are also outdated and functionally inadequate to meet current training requirements. As a result, numerous facilities on JBSA-BUL are underutilized.

In the long term, the Proposed Action is needed to chart a more flexible, phased approach for the future development of JBSA-BUL. Developable land at JBSA-BUL is limited due to numerous constraints, and the existing built environment lacks cohesion among land uses (e.g., community support functions are segregated by administrative and industrial functions). JBSA-BUL needs to address incompatible land use and improve the physical layout of the Base to operate more efficiently.

The Proposed Action would implement selected ADP projects in a strategic, orderly, efficient, and sustainable manner, thereby allowing JBSA-BUL to maintain and improve its mission-support capabilities. JBSA-BUL would continue to meet the mission-specific standards and objectives of the DOD and Air Force personnel that utilize the Base as their primary training venue, ensuring combat readiness. The Proposed Action would also result in more compatible and efficient land use in support of JBSA-BUL's longer-term plans to modernize the Base.

1.6 Scope of the Environmental Assessment

The Air Force NEPA regulations at 32 CFR § 989.11 require an assessment of potential environmental impacts for Air Force projects recommended in a comprehensive plan such as an ADP. In accordance with 40 CFR § 1501.3, the Air Force determined the appropriate level for this analysis is an EA. An EA is a concise public document that briefly discusses the purpose and need, alternatives, and potential environmental impacts of a proposed federal action. It aids in agency planning and decision-making, or facilitates the preparation of an EIS, as necessary (40 CFR § 1501.5).

This EA evaluates the potential environmental consequences of implementing the Proposed Action and Alternatives for short-term (i.e., from 2023 to 2027) ADP projects at JBSA-BUL. This EA serves as a basis for the Air Force to determine whether the selected ADP projects—individually or cumulatively—would result in a significant impact on the human environment.

If the EA determines that potential impacts would be less than significant, the Air Force would select an alternative to implement and document its decision by issuance of a Finding of No Significant Impact (FONSI). If the EA determines that potential impacts would or likely would be significant, the Air Force would announce its intent to prepare an EIS or choose to take no action. In lieu of preparing an EIS, the Air Force may also "mitigate" potentially significant environmental impacts found during preparation of an EA to less-than-significant levels. Any required, agreed upon mitigation for this purpose would be documented in the FONSI. Should the Proposed Action and Alternatives affect floodplains or wetlands subject to EO 11988, *Floodplain Management*; EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, as reinstated by EO 14030; or EO 11990, *Protection of Wetlands* (see **Section 1.9.1**), the Air Force would also prepare a Finding of No Practicable Alternative (FONPA).

AFI 32-1015 requires a flexible approach to planning the future development of Air Force installations. Accordingly, the scope of this EA is designed for that purpose. The Air Force may decide to implement the full scope of the Proposed Action or implement a reduced scope of the Proposed Action. The ability to evolve and adapt the scope of the Proposed Action during the EIAP is necessary to address planning, design, and funding uncertainty associated with the Proposed Action. This decision-making flexibility is also needed to implement the Proposed Action in compliance with applicable environmental laws and regulations. For example, should one or more individual ADP project(s) require further environmental review, other ADP projects included in the Proposed Action could move forward to comply with NEPA.

This EA addresses the potential effects of the Proposed Action and Alternatives on resource areas subject to potential impacts. **Chapter 3** presents information on the existing condition of each resource area, includes the environmental impact analysis, and, when appropriate, recommends mitigation measures. In accordance with 40 CFR § 1502.15, the existing conditions presented in **Chapter 3** also describe reasonably foreseeable environmental trends and planned actions in the area(s) that could be affected by the Proposed Action and Alternatives, now or in the future. Accordingly, the impact analyses in **Chapter 3** evaluates future actions that support the Air Force's decision-making process or have a reasonably close causal connection to the Proposed Action and Alternatives. To document and account for such potential effects, a Region of Influence (ROI) is defined for each resource or resource area subject to analysis in this EA. Resource areas eliminated from further, more detailed analysis, as well as the rationale for eliminating those resource areas, are presented in **Section 3.1**.

1.7 DECISIONS TO BE MADE

The decision to be made is whether to implement the Proposed Action. Should the Air Force choose to implement the Proposed Action, this EA will assist in determining an appropriate scope of action to minimize potential adverse environmental impacts and allow for additional, project-specific environmental review in compliance with NEPA. The decision-making framework for this EA (see also **Section 3.1**) is described as follows:

- Do not implement the Proposed Action.
- Implement the Proposed Action as documented in a FONSI for this EA and, when appropriate, via categorical exclusion (CATEX) [2] as defined in 32 CFR Part 989, Appendix B.
- Implement a reduced scope of the Proposed Action as documented in a FONSI for this EA and, when appropriate, via CATEX as defined in 32 CFR Part 989, Appendix B.
- Publish a NOI in the *Federal Register* to prepare an EIS for the Proposed Action or one or more ADP project(s).

Should the Air Force decide to implement the Proposed Action as noted above, this EA will identify any actions the Air Force will commit to undertake to minimize environmental effects and comply with NEPA.

1.8 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

NEPA requires federal agencies to consider the potential environmental impacts of their proposed actions on the human and natural environment. The EIAP implements Air Force compliance with NEPA in accordance with the CEQ NEPA regulations and guidance.

1.8.1 INTERAGENCY AND INTERGOVERNMENTAL COORDINATION AND CONSULTATION

Interagency and intergovernmental coordination for environmental planning (IICEP) is a federally mandated process for informing and coordinating with other governmental agencies regarding a federal proposed

[2] A CATEX refers to a category of actions that do not individually or cumulatively have potential for significant effects on the environment and, therefore, do not require further environmental analysis (32 CFR § 989.13).

action. The Air Force complies with the IICEP mandate through the scoping[3] process (10 CFR § 1501.9) and by inviting public participation (see 40 CFR § 1506.6 and **Section 1.8.2** of this EA).

On 21 March 2022, the Air Force sent scoping letters concerning the Proposed Action and Alternatives to 12 government agencies. Responses to the scoping letters were received from the following agencies:

- San Antonio River Authority (SARA) – 24 March 2022
- USACE Fort Worth District Regulatory Division – 31 March 2022
- Texas Commission on Environmental Quality (TCEQ) – 11 April 2022
- Texas Parks & Wildlife Department – 14 April 2022

A list of agencies that received scoping letters and a sample of the correspondence are provided in **Appendix A**.

1.8.2 PUBLIC AND AGENCY REVIEW

The intent of this EA is to inform decision-makers and the public of the potential environmental effects of the Proposed Action and Alternatives prior to making a federal decision to move forward with any alternative. This allows the Air Force to make a fully informed decision, aware of any potential environmental effects. Overall, this EA:

- documents the NEPA process or EIAP;
- provides an opportunity for the public, regulatory agencies, and federally recognized Native American tribes to participate in the Air Force's decision-making process; and
- considers input on the possible environmental effects of the Proposed Action and Alternatives, including methods to reduce such effects.

The Air Force invites the public and other interested stakeholders to review and comment on this EA. Accordingly, a Notice of Availability of the Draft EA and Draft FONSI was published in the following local newspapers to commence a 30-day public comment period:

- *The San Antonio Express News*
- *San Antonio Business Journal*

The public comment period of the Draft EA and FONSI concludes on [XX MONTH] 2022. During the public comment period, the Draft EA and FONSI are available for view or download online. Additionally, printed copies of the Draft EA and FONSI are available by request and placed at the following local libraries for review:

- San Antonio Public Library, 600 Soledad Street, San Antonio
- Tobin Library at Oakwell, 4134 Harry Wurzbach Road, San Antonio
- Keith A. Campbell Library, 3011 Harney Path, JBSA Sam Houston
- Universal City Public Library, 100 Northview Drive, Universal City

The Final EA will address all substantive comments received on the Draft EA and FONSI; written comments will be included as an appendix to the Final EA. Upon issuance of the Final EA and Final Draft FONSI, the

[3] Scoping is a process for determining the scope of issues to be addressed and analyzed in a NEPA document (40 CFR § 1501.9).

Air Force will determine a timeframe for a second public comment period (32 CFR § 989.15). If appropriate, the Air Force would then issue a Final (signed) FONSI to comply with NEPA.

1.9 Integration of Other Environmental Statutes and Regulations

This EA organizes separate, but related, environmental compliance requirements associated with the Proposed Action and Alternatives in a single compliance document. In accordance with NEPA and CEQ regulations, the Air Force addresses these requirements concurrently with the EIAP to the extent possible.

The Air Force is working closely with relevant federal, state, and local agencies, as well as federally recognized Native American Tribes, with purview over the Proposed Action. **Sections 1.9.1–1.9.4** summarize relevant environmental compliance requirements and their concurrency with this EA. Copies of relevant correspondence concerning these requirements are provided in **Appendix A**. These and other applicable environmental statutes and regulations are further described in **Chapter 3**.

1.9.1 FLOODPLAIN MANAGEMENT AND PROTECTION OF WETLANDS

EO 11988 directs federal agencies to determine whether a proposed action would occur within a floodplain and to avoid or minimize adverse impacts on floodplains. If an agency considers avoiding adverse impacts on a floodplain and determines that no practicable alternative to undertaking the action is feasible, EO 11988 requires minimizing impacts by design or modification. In such cases, agencies must also prepare and circulate a notice to explain how avoidance was not practicable and describe minimization measures. The planning and evaluation steps required by EO 11988 also apply to EO 11990 a similar directive requiring federal agencies to avoid or minimize adverse impacts on wetlands.

To implement EO 11988, processes for evaluating the impacts of federal actions in or affecting floodplains (and wetlands) are in place. EO 13690 creates a new flood risk reduction standard for federally funded projects, the Federal Flood Risk Management Standard (FFRMP). The FFRMP is a flexible framework for increasing resilience against flooding and preserving the natural function benefits of floodplains. The incorporation of the FFRMP will expand federal management of actions that affect floodplains from the current base flood level to a higher vertical elevation and corresponding horizontal extent. EO 13690 also sets forth a process for further solicitation and consideration of public input. As applicable, this EA documents Air Force compliance with EOs 11988, 11990, and 13690.

To comply with the EOs noted above, the Air Force placed an early public notice (EPN) in the *San Antonio Express News* (11 and 12 March 2022) and *San Antonio Business Journal* (25 March 2022) regarding the Proposed Action and its potential to affect floodplain and wetland resources on and in the vicinity of JBSA-BUL (**Appendix B**). No public comments in response to the EPN were received by the Air Force.

1.9.2 STATE HISTORIC PRESERVATION OFFICE

Section 106 of the *National Historic Preservation Act* (54 USC § 300101 et seq.) (NHPA) requires that federal agencies consider the potential effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. This EA assists the Air Force in identifying relevant or interested consulting parties and initiates the Section 106 process for the proposed undertaking concurrent with the NEPA process.

In accordance with 36 CFR Part 800, the Air Force maintains a Programmatic Agreement (PA) with the Texas State Historic Preservation Office (SHPO) under Section 106 for the operation, maintenance, and development of JBSA. Under the Proposed Action, the Air Force would adhere to the project review process as stipulated in the PA. This process outlines the agreed upon procedures for monitoring, recording, qualifying, and mitigating for potential adverse effects on cultural resources under JBSA's management, including those associated with JBSA-BUL. The PA also identifies development program activities that are "exempted" from Section 106 requirements.

The Air Force uses scoping to determine an appropriate level of analysis for potential effects on cultural resources, including historic properties. This EA is also used to document the Air Force's compliance with Section 106, as follows:

1. Determine if the Proposed Action, or elements of the Proposed Action, would potentially affect historic properties or sites;
2. Determine the Area of Potential Effect (APE) for any affected historic properties or sites, as appropriate; and
3. Consult with the State Historic Preservation Office and other relevant or interested parties to establish an appropriate level of effort for gathering additional information by inventory or investigation within the APE.

If no historic properties or sites are identified or are present but would not be affected, this EA would be used to provide a "no historic properties affected" finding to the SHPO and other consulting parties for review. Historic properties or sites potentially affected by the Proposed Action would be subject to further consultation under Section 106.

1.9.3 FEDERALLY RECOGNIZED TRIBAL GOVERNMENTS

Numerous federal laws, regulations, policies, and directives protect the rights of indigenous communities and resources that preserve their heritage, culture, or religious beliefs. These include the NHPA, NEPA, *Native American Graves Protection and Repatriation Act* (25 USC § 3001 et seq.) (NAGPRA), and more recent federal policy directives.[4] DODI 4710.02, *DOD Interactions with Federally Recognized Tribes*, describes and implements the DOD policy for engaging with tribal governments.

In accordance with Department of Air Force Instruction (DAFI) 90-2002, *Interactions with Federally Recognized Tribes*, the Air Force engages with federally recognized Native American Tribes that have potential historic or cultural affiliations to installation lands or lands under managed airspace. As part of the scoping process for this EA, the Air Force identified federally recognized Native American Tribes with a potential interest in the Proposed Action and Alternatives. Those tribes that expressed an interest in the Proposed Action were invited to participate in this EIAP and as consulting parties under Section 106 of the NHPA.

The Air Force sent scoping letters concerning the Proposed Action and Alternatives to three federally recognized Native American Tribes. To date, none of the tribes has commented on the Proposed Action.

A list of tribes that received scoping letters and a sample of the correspondence is provided in **Appendix A**.

1.9.4 ENDANGERED SPECIES ACT

Section 7 of the *Endangered Species Act* (16 USC § 1531 et seq.) (ESA) requires federal agencies to consider the potential impacts of their proposed actions on ESA-listed threatened and endangered species or habitat considered essential to their recovery, defined and designated as "critical habitat" under the ESA.

As all formal consultations under ESA, Section 7, must be completed prior to the issuance of a NEPA decision document, federal agencies must consult with the US Fish and Wildlife Service (USFWS) or National Oceanic and Atmospheric Administration, as applicable, for actions that may affect federally listed threatened and endangered species or their critical habitat. This EA constitutes an informal consultation under ESA, Section 7, for the potential for the Proposed Action or Alternatives to affect threatened or

[4] For example, Presidential Memorandums on *Tribal Consultation and Strengthening Nation-to-Nation Relationships* (26 January 2021) and *Indigenous Traditional Ecological Knowledge and Federal Decision Making* (15 November 2021).

endangered species known or with the potential to occur on JBSA-BUL. No ESA-designated critical habitat is present on the Base.

By letter dated 21 March 2022, the Air Force informed the USFWS about the Proposed Action and Alternatives (**Appendix A**). On 6 July 2022, the Air Force initiated Section 7 consultation under the ESA for the Proposed Action using the USFWS' Information for Planning and Consultation tool. Basic information concerning the location and nature of the projects included in the Proposed Action was input into the tool to obtain an official species list from the USFWS. The list identifies threatened and endangered species and other protected species (e.g., migratory birds) with potential to be affected by the Proposed Action. The list is provided in **Appendix A** and the information was incorporated into this EA where applicable.

1.10 Applicable Laws And Environmental Regulations

Other laws and regulations applicable to the Proposed Action include, but are not limited to:

- *Endangered Species Act* (16 USC § 1531 et seq.)
- *Edwards Aquifer Rules* (Texas Administrative Code, Title 30,Chapter 213-A et seq.)
- Clean Water Act (CWA; 33 USC § 1251 et seq.)
- Resource Conservation and Recovery Act (RCRA; 42 USC § 6901 et seq.)
- Section 438 of the Energy Independence and Security Act (EISA, Public Law 110-140)
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA;42 USC § 9601 et seq.)
- Federal Clean Air Act (CAA; 42 USC § 7401 et seq., as amended)
- Migratory Bird Treaty Act (16 USC § 703 et seq.)
- Toxic Substances Control Act (15 USC § 2601 et seq.)
- EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994)
- EO 13045, Protection of Children from Environmental Health Risks and Safety Risks (1997), as amended by EO 13296 (2003)

CHAPTER 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The following sections describe the Proposed Action, alternatives screening process, and alternatives dismissed and retained for analysis in this EA.

2.1 INTRODUCTION

The ADP projects defined as the Proposed Action were selected based on a reasonable likelihood that each would receive funding and could be implemented within approximately 5 years. Most of these projects were conceived prior to the ADP planning phases that concluded in 2019; however, in accordance with AFI 32-1015, the planning process continued thereafter. More recently, the Air Force determined these projects to be of a higher priority and ready for environmental review (40 CFR § 1502.5). These development actions and real-property improvements are therefore incorporated into the Proposed Action to support JBSA-BUL's military mission in the short term.

The ADP projects encompassed by the Proposed Action vary in *context* and *intensity* from new construction, expansion, and demolition actions to repairs, renovations, and upgrades. The order, timing, and duration of the individual ADP projects would be determined, in part, by this EA. To provide a more comprehensive accounting of potential environmental effects for the multiple types of actions under the Proposed Action, this EA classifies the ADP projects into three general categories:

- **Construction** projects include new development and redevelopment for expansion of the existing built environment, including new buildings, building additions, and new or expanded infrastructure for operational support (e.g., parking and utilities).
- **Demolition** projects include the temporary or permanent removal of existing buildings and structures in support of new development or redevelopment, or to provide future land use flexibility.
- **Infrastructure** projects address deficient components of the existing built environment through repair, renovation, maintenance, or improvement actions. Infrastructure projects range from routine management actions (e.g., road, sidewalk, or utility system repairs or maintenance activities) to renovation or modernization of buildings for continued mission support.

As defined, the project categories provide a framework for analysis in the EA.

2.2 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action would implement a total of 25 short-term development actions and real property improvements on JBSA-BUL from approximately 2023 to 2027. Of these projects, 12 would occur in the cantonment area; 13 are associated with training areas. **Figure 2-** shows the location of the ADP projects included in the Proposed Action as categorized for analysis in this EA (see **Section 2.1** above). Additional details regarding the nature and extent of **Project C14** are shown on **Figure 2-**.

As part of the ADP's phasing plan, the Proposed Action would incorporate the planning considerations addressed in other elements of the ADP, as required by AFI 32-1015. For example, the Proposed Action would adhere to development standards for siting the new facilities and regulate design parameters such as height, scale, and orientation. Because the ADP conforms to the IDP, the Proposed Action would also incorporate elements of the IDP. When appropriate, the standards and component plans of the ADP and IDP are discussed and referenced throughout this EA.

Demolition and renovation projects under the Proposed Action would be subject to the PA the Air Force maintains with the Texas SHPO. The Proposed Action also would implement these projects in accordance with a recently completed Section 106 consultation for a proposed new dining facility (DFAC) within JBSA-BUL's cantonment area. Specifically, the Texas SHPO concurred with the Air Force's proposal to formally establish an area immediately south of Military Highway as a historic district. This area, referred to as the

"Upper Military" portion of the cantonment, is currently being nominated for listing in the National Register of Historic Places (NRHP) pursuant to the NHPA. The Air Force also committed to rehabilitating the Officer's Mess (Building 5903) into an administrative headquarters as part of this consultation. In turn, remaining buildings that are part of the JBSA-BUL cantonment (once considered eligible or potentially eligible for listing on the NRHP) would be determined by the Texas SHPO as not eligible for listing on the NRHP.

Tables 2-1 and **2-2** list the projects included in the Proposed Action at JBSA-BUL. These projects are shown on **Figure 2-1**. **Project C14** is depicted on **Figure 2-2**.

Table 2-1
List of Proposed Construction and Demolition Projects at JBSA-BUL

Map ID[a]	Project	Approximate Size or Footprint
Cantonment Area		
C1/D1	Demolish B-5112 and construct a general instruction building.	+ 2,250 sf
C2	Construct a hazardous waste storage facility.	+ 3,067 sf
C3	Install two cell towers.	+ 2,500 sf
C4	Construct K-span/trailers to support B-5115, B-5116, and B-5117 functions; install a shade structure.	+ 10,000 sf
C5	Construct or extend a tactical road/route.	+ 19,998 sf
D6	Demolish B-6104 and B-6106.	- 24,487 sf
D7	Demolish B-6222 and B-6224.	- 5,152 sf
Training Area		
C8/D8	Remove tents, demolish/remove 12 asphalt pads, and replace with 24 BOLC tent concrete pads; construct a storm shelter.	+ 10,000 sf
C9	Expand the MRTC administrative facility (B-6350) and its associated parking area.	+ 4,560 sf
C10	Expand the ARMAG concrete pad at SMTS.	+ 720 sf
C11	Construct training/storage space, parking, and storm shelters at the Center for Pre-Deployment, including installation of utilities for water, electric, and sanitary sewer.	+ 40,000 sf + 1,000 lf
C12	Construct Live Model Tissue Site facilities, including installation of utilities for water, electric, and sanitary sewer.	+ 5,000 sf + 1,000 lf
C13	Construct storage facility adjacent to B-6274.	+ 5,000 sf
C14	Establish approximately 3.4 miles of 12 feet wide, reinforced, hardscape trails to support future AMPV training; interconnect AMPV training and operational support facilities.	+ 17,961 lf
C14a	Partially clear vegetation adjacent to existing trails or dirt roads; construct 2.2 miles of reinforced, hardscape trails to support future AMPV training.	+11,835 lf
C14b	Fully clear vegetation to construct 1.2 miles of new reinforced, hardscape trails to support future AMPV training.	+ 6,126 lf

Note:
a Numeral Map IDs correspond with **Figure 2-1** and, for **Project C14**, **Figure 2-2.**
AMPV = armored multi-purpose vehicle ARMAG = Arms Vault (portable storage); ATMC = Army Training Medical Command; BOLC = Basic Officer Leader Course; lf = linear feet; MRTC = Medical Readiness Training Center; SMTS = Soldier Medic Training Site; sq = square feet

Table 2-2
List of Proposed Infrastructure Improvement Projects at JBSA-BUL

Map ID[a]	Project	Approximate Size or Footprint
Cantonment Area		
I1	Repair, replace, and resurface an existing running track.	2,200 sf
I2	Renovate B-5050.	6,532 sf
I3	Improve and delineate existing running trails.	6,056 sf
I4	Renovate B-5903, Environmental Headquarters.	5,200 sf
Training Area		
I5	Install metal Quonset hut structures (on existing concrete slabs).	1,365 sf
I6	Replace overhead power distribution wiring at the DMSET FOB.	10,000 lf
I7	Repair Lewis Valley Road.	10,000 lf
I8	Improve Blackjack Village structures.	2,000 sf
I9	Repair Lewis Valley Trail.	24,000 lf
I10	Repair Houston Cutoff Road.	10,764 sf

Note:
a Alphabetical Map IDs correspond with **Figure 2-1.**
DMSET = Deployable Medical Systems Equipment for Training; FOB = Forward Operating Base; lf = linear feet; sf = square feet

The planning principles set forth in AFI 32-1015, and included in the IDP and ADP, are also incorporated into the Proposed Action by design. These principles set objectives for sustainable development, including guidelines and requirements for land, water, and energy conservation. Standards and requirements common to the "planning, design, construction, sustainment, restoration, and modernization of DOD-owned facilities" are included in the Proposed Action, as applicable (National Institute of Building Sciences, 2021). These include:

- UFC 1-200-02, High Performance and Sustainable Building Requirements (2016, as updated)
- UFC 3-210-10, Low Impact Development (2015, as updated), in accordance with Guiding Principles for Sustainable Federal Buildings and Associated Instructions (CEQ, 2016) and implemented by AFI 32-1023, Designing and Constructing Military Construction Projects, and the Air Force Corporate Facilities Standards.

US Green Building Council or Green Building Initiative certification for applicable projects as required by the *Air Force Sustainable Design and Development Implementing Guidance Memorandum* (June 2011). Applicable projects include:

- New buildings larger than 5,000 square feet (sf) with construction costs greater than $3 million; and
- Building renovations of more than 5,000 sf with construction costs greater than $3 million and an estimated 50 percent replacement cost.

Under the Proposed Action, projects certified by the US Green Building Council or Green Building Initiative would meet the federal sustainability requirements as detailed in UFC 1-200-2. Green building designs and practices would also be incorporated into all other ADP projects (i.e., below the thresholds noted above) to the extent practicable.

As components of the IDP, installation facility standards and installation-wide plans (e.g., for transportation, energy, and natural and cultural resources) implement design and development standards and requirements at the Base level. Those measures that serve to prevent or reduce adverse environmental impacts are incorporated into the Proposed Action by design and described in this EA, where appropriate.

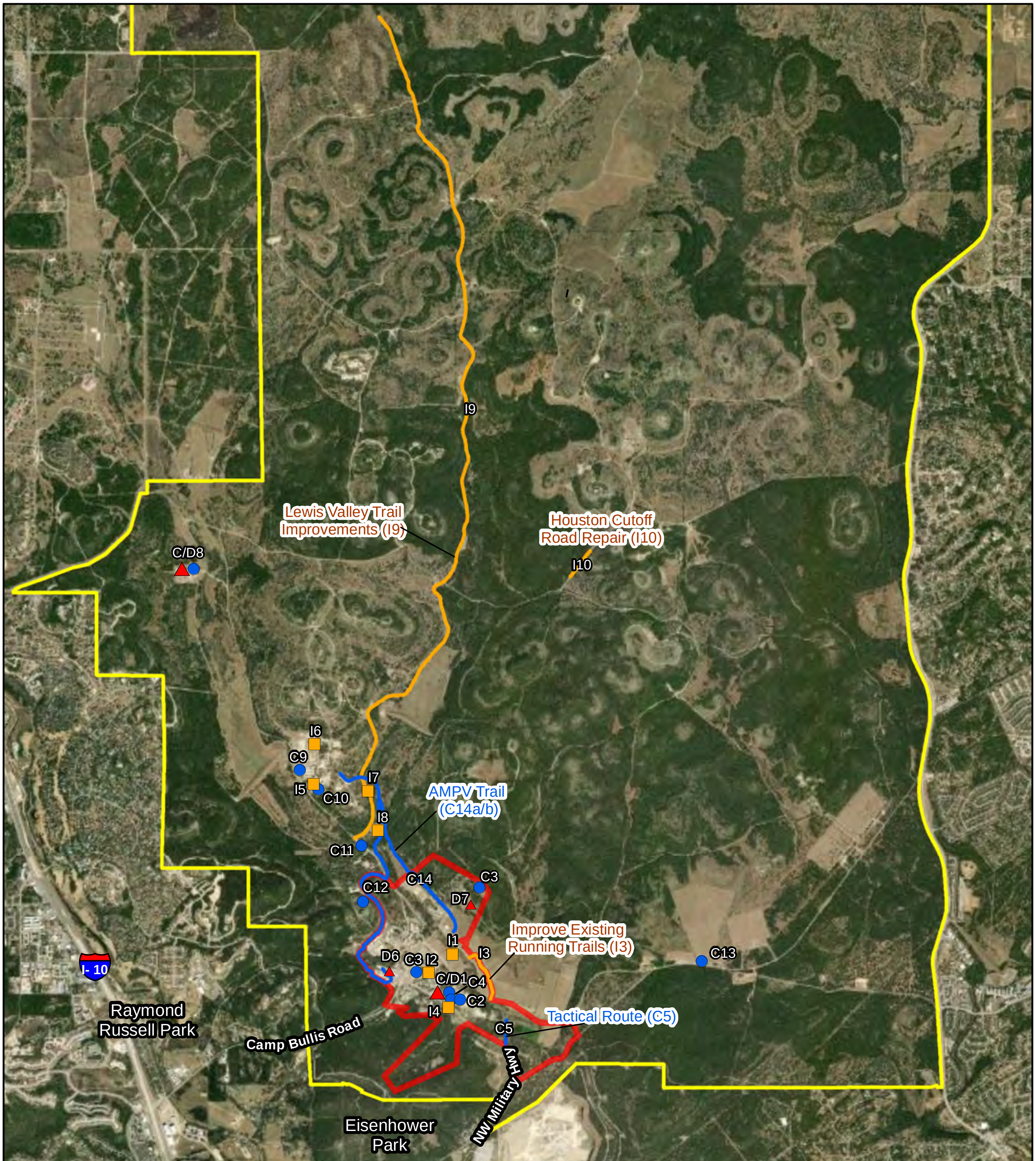


FIGURE 2-1

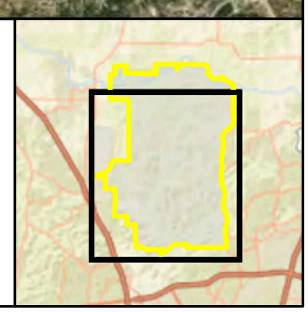
ADP PROJECTS

N

Imagery: ESRI 2021
Projection: WGS 1984 Zone 14N

0 0.4 0.8 Miles

- Construction
- Demolition
- Infrastructure
- Linear Construction
- Linear Infrastructure
- Installation Boundary
- Cantonment Area



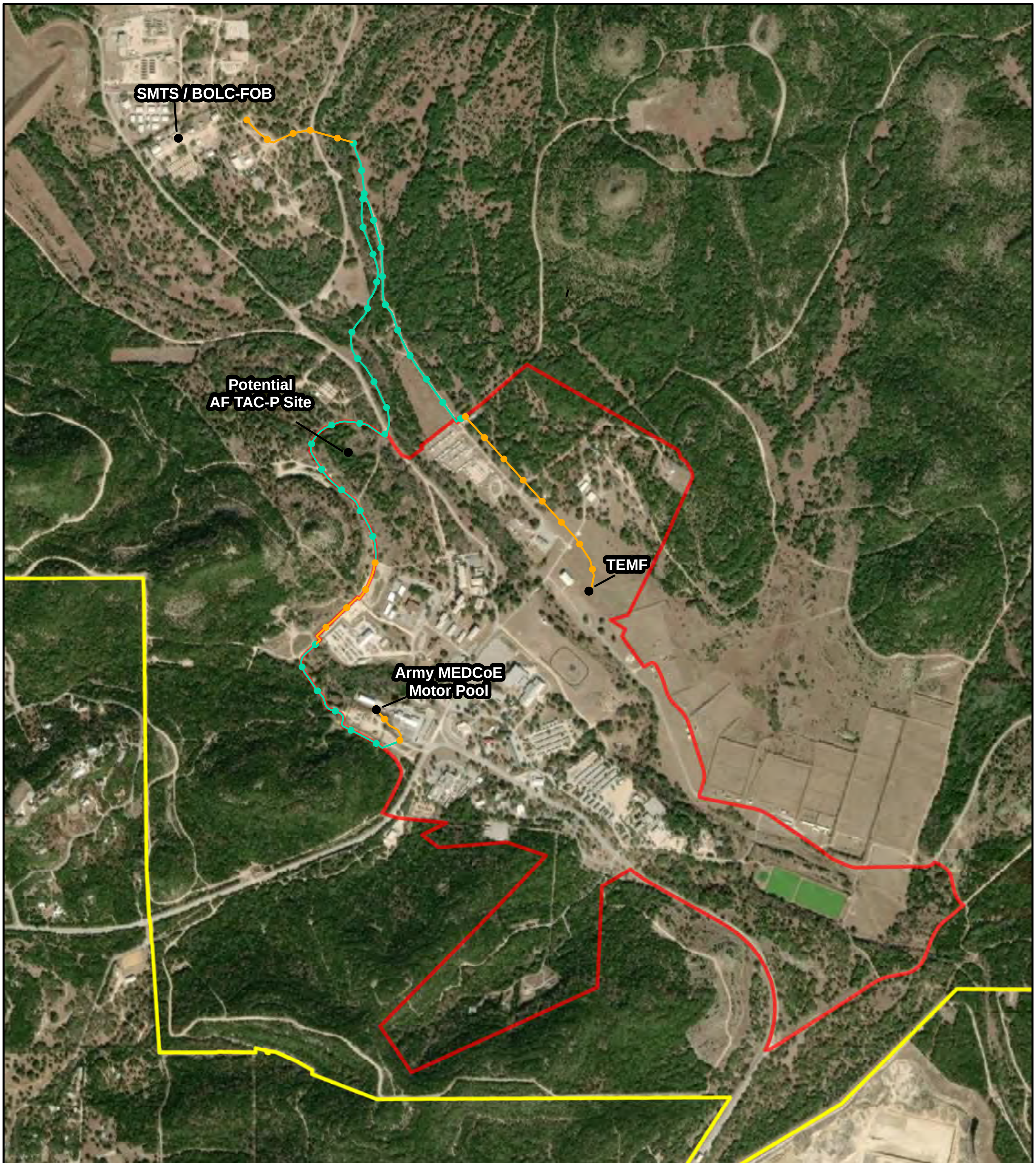


FIGURE 2-2
PROJECT C14 -
PROPOSED AMPV
TRAILS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 900 1,800 Feet

JBSA-BUL

Cantonment Area

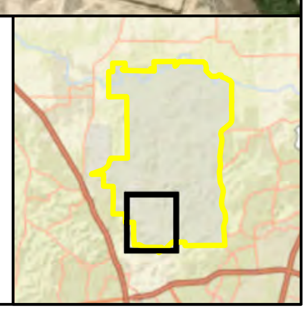
AMPV Trail - Road Unsurfaced

AMPV Trail - Undeveloped

Acronyms

SMTS / BOLC-FOB - Soldier Medic Training Site / Basic Officer Leadership Course Forward Operating Base
MEDCoE - Medical Center of Excellence
AF TAC-P - Air Force Tactical Air Control Party
TEMF - Tactical Equipment Maintenance Facility

NOTE: EXISTING TRAIL CONDITIONS DERIVED FROM AERIAL IMAGERY (ESRI, 2016-2021) AND AIR FORCE DATA (NO DATE)



2.3 ALTERNATIVES SCREENING PROCESS

NEPA requires federal agencies to objectively explore and evaluate reasonable alternatives to a proposed action. Alternatives not found to be reasonable can be eliminated from evaluation provided the EA or EIS includes a brief rationale for their elimination (40 CFR § 1502.14[a]).

2.3.1 SELECTION STANDARDS FOR ALTERNATIVE SCREENING

Consistent with 32 CFR § 989.8(c), the following selection standards meet the purpose of and need for the Proposed Action (see **Sections 1.4** and **1.5**) and were used to identify reasonable alternatives for analysis in the EA. The supporting alternatives must:

- continue, maintain, and enhance **mission support** capabilities, now or in the future.
- be consistent and compatible with current **land use**.
- have available space to comply with **security/setback requirements** and existing conditions **suitable for development** within the required timeframe.
- avoid adverse effects on **historic** properties or sites and sensitive or beneficial **environmental** resources, to the extent practicable.
- comply with federal and Air Force mandates for **sustainable** design and development.

As a product of the Air Force's installation planning process, the Proposed Action was developed consistent with AFI 32-1015 and the screening criteria above. Therefore, the Air Force determined that only the Proposed Action would meet the purpose and need.

Section 2.3.2 describes the alternatives considered but eliminated from detailed analysis, including a brief rationale for their elimination. **Section 2.3.3** describes the alternatives retained for more detailed analysis, including the No Action Alternative.

2.3.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

In 2017, as part of the ADP planning process, the Air Force evaluated alternatives to guide the future development of JBSA-BUL. Multiple development scenarios (i.e., alternatives) were considered and dismissed as being unable to support the JBSA-BUL mission. However, three alternatives were subject to further evaluation by personnel and users of JBSA-BUL through their participation in a multi-day ADP planning workshop. These participants developed screening criteria to assess whether the alternatives could be considered reasonable to support JBSA-BUL's training mission. Each evaluated scenario or alternative, described below, presented a unique strategy and framework for the future development of the post.

- **Alternative 1** – Implement sustainment, restoration, and modernization projects to renovate and redevelop existing facilities and improve the built environment with respect to mobility (i.e., vehicular and pedestrian), safety, and quality of life (i.e., minimal growth).
- **Alternative 2** – Implement new construction projects to replace existing facilities, focusing on modernization and efficiency (i.e., moderate growth).
- **Alternative 3** – Implement the above alternatives and a program of building demolitions to establish a centralized cantonment campus that supports development, now and in the future (i.e., maximum growth).

It was concluded that only **Alternative 3** would allow JBSA-BUL to sustain its mission in the long term.

Because the ADP projects under the Proposed Action are products of the ADP planning process, the alternatives screening and evaluation process described above is applicable to this EA.

2.3.3 OTHER ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Since publication of the ADP in 2018, in consultation with individual project proponents, the Air Force has continued to evaluate and consider alternatives for the ADP projects under the Proposed Action. For example, the findings of this EA will support Air Force decisions regarding the final siting and design of the ADP projects. Because development planning on military installations is a fluid process, **Appendix C** provides additional, project-specific examples of planning considerations made following completion of the ADP. For analysis purposes in this EA, this information is supplementary to that generated by the ADP planning process. **Chapter 3** of this EA also includes further details about project-level considerations for potential resource effects associated with the Proposed Action, as appropriate.

2.3.4 ALTERNATIVES RETAINED FOR DETAILED ANALYSIS

As described above, the Proposed Action is the only reasonable alternative that would meet the Air Force's purpose and need. Therefore, the Proposed Action is retained for more detailed analysis in this EA, along with the No Action Alternative.

2.3.4.1 No Action Alternative

Under the No Action Alternative, the Air Force would not implement the ADP projects, and JBSA-BUL would continue to operate under current conditions. The facility and infrastructure assets of JBSA-BUL would continue to degrade. The current level of mission support on Base would not be maintained or able to accommodate evolving mission requirements in the short or long term. Training and operations conducted at JBSA-BUL would continue to be affected by a less efficient, functional, and sustainable built environment. Overall, the combat readiness of the DOD and Air Force personnel that rely on JBSA-BUL to meet training requirements would be diminished or reduced without another readily available, comparable training venue.

While the No Action Alternative would not satisfy the purpose of and need for the Proposed Action, this alternative is retained to provide a comparative baseline against which to analyze the effects of the Proposed Action, as required under the CEQ regulations (40 CFR § 1502.14[d]). The No Action Alternative reflects the status quo and serves as a benchmark against which the effects of the Proposed Action can be evaluated.

2.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The potential impacts associated with Proposed Action and No Action Alternative are summarized in **Table 2-3**. The summary is based on information discussed in detail in **Chapter 3** of this EA and includes a concise definition of the issues addressed and the potential environmental impacts associated with each alternative.

Table 2-3
Summary of Environmental Consequences

Resource Area	Proposed Action	No Action Alternative
Land Use	No significant adverse effects on land use on- or off-Base.	No effects on land use.
Air Quality	No significant adverse effects on air quality within San Antonio-New Braunfels MSA or Bexar County, Texas.	No effects on air quality.
Earth Resources	No significant adverse effects on or from earth resources on JBSA-BUL.	No effects on or from earth resources.
Water Resources	No significant adverse effects on water resources on or adjacent to JBSA-BUL.	No effects on water resources.

Resource Area	Proposed Action	No Action Alternative
Biological Resources	No significant adverse effects on biological resources on or around JBSA-BUL.	No effects on biological resources.
Cultural Resources	Significant adverse effects on historic architectural resources are in the process of being mitigated via agreement with the Texas SHPO for work associated with the JBSA-BUL DFAC project. No significant adverse effects on historic architectural resources outside the boundary of JBSA-BUL. No significant adverse effects on archaeological resources, including Native American traditional cultural properties on or around JBSA-BUL.	Renovation of Building 5903 (Project I4), agreed upon mitigation for the JBSA-BUL DFAC project would not occur, leading to an adverse effect to historic properties under Section 106 of the NHPA. No other effects on cultural resources.
Environmental Justice and Protection of Children	No significant adverse effects on disadvantaged minority or low-income populations of the San Antonio North CCD. No significant adverse effects on children in the San Antonio North CCD.	No effects on environmental justice, including children.
Infrastructure, Transportation, and Utilities	No significant adverse effects on utility or transportation infrastructure associated with JBSA-BUL.	No effects on infrastructure, transportation, or utilities.
Hazardous Materials and Wastes	No significant adverse effects on or from hazardous materials and waste on JBSA-BUL.	Minor to moderate adverse impacts from not removing and properly disposing of known contaminants. No other effects on hazardous materials and wastes.

CCD = Census County Division; DFAC = Dining Facility; MSA = metropolitan statistical area; NHPA = National Historic Preservation Act; SHPO = State Historic Preservation Office

CHAPTER 3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the baseline resource conditions and environmental consequences of the Proposed Action and No Action Alternative.

The methodology used to analyze potential adverse effects that could result from the Proposed Action or No Action Alternative is briefly described in **Section 3.1**. Resources considered but dismissed from detailed analysis in this EA, including a brief justification for their dismissal, are discussed in **Section 3.2**. Resources carried forward for analysis are identified in **Section 3.3**. These resources are further described and analyzed in **Sections 3.4** through **3.12**.

3.1 FRAMEWORK FOR ANALYSIS

To provide a framework for the analyses in this EA, the Air Force defined a study area specific to each resource or sub-resource area. Referred to as a Region of Influence (ROI), these areas delineate a boundary where possible effects from the considered alternatives would have a reasonable likelihood to occur. Beyond these ROIs, potential adverse effects on resources would not be anticipated. For the purposes of analysis, potential effects are described as follows:

- **Beneficial –** positive effects that improve or enhance resource conditions.
- **Negligible –** adverse effects likely to occur but at levels not readily observable by evaluation.
- **Minor –** observable, measurable, tangible adverse effects qualified as below one or more significance threshold(s).
- **Significant –** obvious, observable, verifiable adverse effects qualified as above one or more significance threshold(s); not mitigable to below significance.

When relevant to the analyses in this EA, potential effects are further defined as direct or indirect, short- or long-term, and temporary, intermittent, or permanent.

To determine the potential for "significant" effects under the Proposed Action, the Air Force defined impact thresholds to support the analyses in this EA. Based upon the nature of the Proposed Action and the affected environment, both qualitative and quantitative thresholds were used as benchmarks to qualify effects that may require further Air Force management or mitigation.

Cumulative effects result from individually minor but collectively significant actions taking place over a period of time (40 CFR § 1508.1(g)(3)). For example, the Proposed Action could combine with other actions and contribute to potentially significant cumulative effects. Accordingly, the Air Force identified past, present, and reasonably foreseeable planned actions that could overlap with the Proposed Action on a regional and time scale. **Table 3-1** lists the relevant projects for the cumulative effects analyses in **Sections 3.5–3.13**.

Table 3-1
Past, Present, and Reasonably Foreseeable Planned Actions

Name	Description	Timeframe/ Duration	Location
US 281 Expansion	Reconstruct and widen from 4 to 6 lanes a divided expressway with two high-occupancy vehicle lanes.	2017–2023	From Loop 1604 to Bexar/Comal County line
New Entry Control Point (ECP)	Construct ECP to accommodate future traffic demand for access to JBSA-BUL.	2019	Southern boundary of JBSA-BUL along Military Highway
Panther Springs Creek Restoration	Make improvements to natural channel for increased water flow.	2021–2022	Southeast corner of JBSA-BUL (off Base)

Name	Description	Timeframe/ Duration	Location
North Rim Corporate Campus	Construct 550,000-square-foot campus with four office buildings, two multi-level parking garages, and retail space.	Phase 1 (2022) Phase 2 (2023)	Immediately south of the I-10 intersection with Camp Bullis Road
Classen-Steubing Ranch Park	Make improvements to the park.	2022	Approximately 2.5 miles east of the southeast boundary of JBSA-BUL along Huebner Road
Natural Gas Line Installation	Construct natural gas pipeline from a central location within JBSA-BUL to a main line connection point.	2025–2029	Within JBSA-BUL along Camp Bullis Road or Military Highway to connection points outside the Installation
Wastewater Line Connection	Install proposed wastewater line connection to the San Antonio Water System (SAWS).	2025–2027	Alternatives within JBSA-BUL along Camp Bullis Road or to the southeast boundary of the Installation to a SAWS connection point
Blanco Road Phase III	Expand roadway from 2 to 4 lanes (Borgfeld Drive to County Line).	Planning Stage TBD	Near the eastern boundary of JBSA-BUL
Replace Tactical Equipment Maintenance Facility (TEMF)	Demolish existing facility and construct a new TEMF with vehicle wash facility, parking, storage, and infrastructure improvements.	TBD	JBSA-BUL (cantonment)
Shavano Highlands Subdivision	Construct planned residential subdivision with access Salado Creek Greenway.	TBD	East of Eisenhower Park and south of JBSA-BUL

Source: Air Force, 2018a, 2017; County of Bexar 2022; City of San Antonio, 2016; Texas Department of Transportation 2022; Pape-Dawson, 2021.
ECP = entry control point; JBSA-BUL = Joint Base San Antonio, Camp Bullis; SAWS = San Antonio Water System; TBD = to be determined; TEMF = Tactical Equipment Maintenance Facility

3.2 Resources Eliminated from Detailed Analysis

The CEQ regulations state that federal agencies should “identify and eliminate from detailed study the issues which are not significant, or which have been covered by prior environmental review” (40 CFR § 1506.3). Accordingly, the Air Force considered but eliminated from further analysis the following resources:

- **Airspace Management –** The Proposed Action would not alter the current airspace configurations associated with JBSA-BUL; the frequency, tempo, and volume of current aircraft training and operations would not change.
- **Socioeconomics –** The Proposed Action would not increase the number of military personnel or training activities at JBSA-BUL from current state. During construction, minor, beneficial effects on local economic conditions would likely result from the form of increased expenditures (e.g., procurement of construction materials and temporary jobs) and incidental spending. No adverse socioeconomic effects would be anticipated.
- **Noise –** Construction noise associated with the Proposed Action would be negligible in the context of noise from military training and operations at JBSA-BUL. No noise effects would be anticipated beyond 1 mile of the involved project sites. At this distance, noise would not be perceptible outside

the Noise Military Influence Area (MIA)[5] of the Military Influence Overlay District (MIOD)[6] adopted into the City of San Antonio's Comprehensive Plan; noise from the Proposed Action would be barely perceptible within the Noise MIA. Further, potential noise effects from the Proposed Action would be managed in accordance with the *Environmental Noise Management Plan for JBSA-BUL* (City of San Antonio, 2009, 2016).

- **Coastal Zone Management –** JBSA-BUL lies outside the jurisdiction of the federally approved Texas Coastal Zone Management Program.
- **Operational Safety –** The Proposed Action would not pose an operational safety risk to the military mission of JBSA-BUL. None of the involved project sites would be located on or near the Combat Assault Landing Strip in the northeast corner of the Base. As necessary, construction activities would be de-conflicted with the safety zones in place for weapons firing ranges or areas where explosives are detonated. Construction of the Proposed Action would occur during normal daylight working hours (i.e., no light or glare would affect nighttime training and operations). Safety risks to or from military activities taking place concurrently with the Proposed Action would be manageable under established protocols and procedures.

3.3 Resources Carried Forward for Detailed Analysis

Based on the results of internal and external scoping (see **Section 1.8**), the following resources are carried forward for analysis in **Sections 3.5–3.13** of this EA: land use; air quality; earth resources; water resources; biological resources; cultural resources; environmental justice and protection of children; infrastructure, transportation, and utilities; and hazardous materials and wastes. To provide context for the resource analysis sections, **Section 3.4** briefly describes the environmental setting on and around JBSA-BUL.

3.4 Environmental Setting

Part of the larger San Antonio-New Braunfels metropolitan statistical area (MSA), the city of San Antonio is centrally located in Bexar County, Texas. JBSA-BUL is situated north of downtown San Antonio in northern Bexar County. A small portion of the Base overlaps with Comal County to the north. As one of the most urbanized counties in Texas, the population of Bexar County is projected to surpass 2 million in the next several decades. Land use in the vicinity of JBSA-BUL generally consists of low-density residential and commercial development interspersed with public lands and agricultural areas. The Base is bound by Farm Road and Market Road to the east, Amman Road to the north, Interstate 10 to the west, and the northern part of San Antonio to the south. The incorporated city of Fair Oaks Ranch and Camp Stanley, a National Guard-owned and -operated Base, abut JBSA-BUL to the west-northwest.

The regional climate is typified by warm, temperate weather conditions. On average, temperatures range from 62 to 95 degrees Fahrenheit in the summer, and 39 to 74 degrees Fahrenheit in the winter. Average annual precipitation is approximately 33 inches per year. Throughout the year, common weather conditions for San Antonio and the surrounding region include clear, sunny skies, and low wind speeds.

3.5 Land Use

The term "land use" refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in local zoning laws; however, no nationally recognized convention or uniform terminology has been adopted to describe land use.

[5] The Noise MIA is defined by the composite noise levels for training and operations conducted at JBSA-BUL, encompassing land areas 1 mile or more beyond the Base boundary.

[6] The MIOD is a zoning tool used to implement policies and regulations to sustain the mission capabilities of JBSA-BUL regionally. Four MIAs were defined for that purpose: Light, Noise, Vertical Obstruction, and Safety MIAs.

Therefore, the ROI for land use is JBSA-BUL and its immediately adjacent land areas.

3.5.1 EXISTING CONDITIONS

The City of San Antonio's Comprehensive Plan includes land within its municipal boundary and extraterritorial jurisdiction (ETJ) in unincorporated Bexar County. The plan establishes an overarching planning framework for the San Antonio metropolitan area and includes three main components: the Comprehensive Plan, Sustainability Plan, and Multimodal Transportation Plan. The Comprehensive Plan regulates and guides land use across the city through regional, functional, and more detailed sub-area plans applicable to specific geographies and functions. However, as a framework plan, it does not alter or negate land use plans for other jurisdictions within the city. With respect to development, Chapter 35 of the Municipal Code collates all associated ordinances to include zoning maps, subdivision regulations, and policies and plans.

JBSA-BUL is largely surrounded by urban development. The northern and eastern boundaries of the Installation are bound by the City of San Antonio ETJ, which encompasses the unincorporated land within 5 miles of the municipal boundary excluding smaller incorporated areas found therein. The City of San Antonio has authority to annex land within its ETJ and can also expand its jurisdiction to adjacent lands in cases where development has a demonstrable effect on the quality of life within the city (City of San Antonio, 2021). In Bexar County, the ETJ extends outward from the city center and into portions of neighboring counties (see **Figure 1-1**).

According to the JBSA IDP, JBSA-BUL contains seven land use categories within one main planning district. These seven land use categories are largely separated into two overarching categories: the cantonment area, in which the majority of buildings on the Installation are located, and the training area (area outside of the cantonment area). Within the cantonment area, land use is broken out by Administrative, Community Service, Housing Unaccompanied, Medical/Dental, Open Space/Buffer, Outdoor Recreation, and Industrial. All areas outside of the cantonment area are classified as Industrial but further designated based on their training support function. Live-fire ranges are generally concentrated in the central portion of the Installation or northeast of the cantonment area. Referred to as the Impact Area, development is limited to range facilities and infrastructure and their associated safety zones (Air Force, 2018b). In other areas outside the cantonment area (e.g., the southeast portion of JBSA-BUL), development is limited by natural constraints.

Overall, approximately 1,750 acres of land on JBSA-BUL are characterized as semi-improved (partially impermeable) and 1,239 acres as improved (i.e., areas of limited permeability) (Air Force, 2020b). However, most of JBSA-BUL consists of undeveloped lands. To preserve its joint training mission, JBSA-BUL partners with private and public interests to minimize urban development encroachment around the Base's periphery. For example, conservation easements are purchased by the Air Force to ensure land use in proximity to JBSA-BUL remains compatible with military operations.

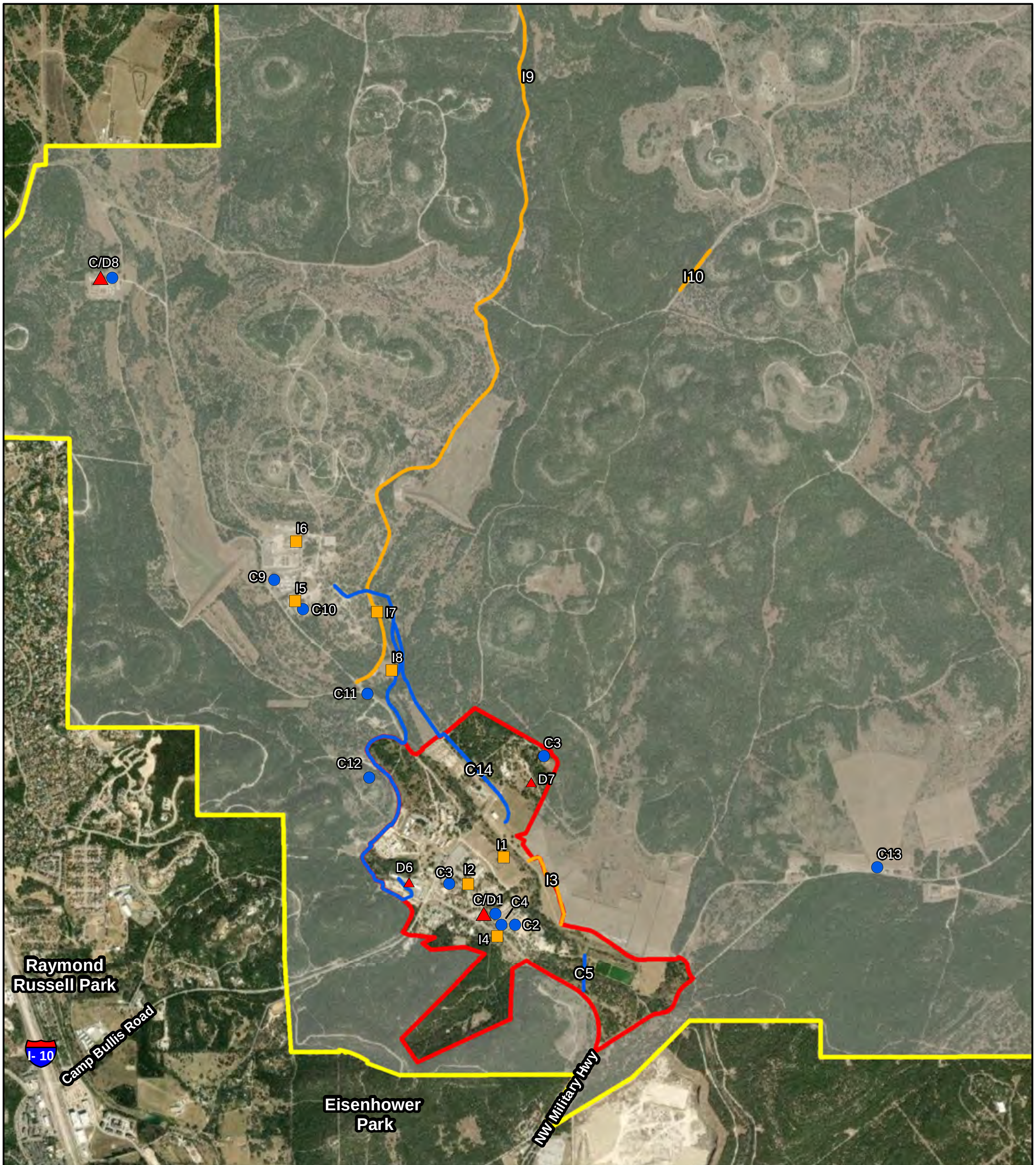


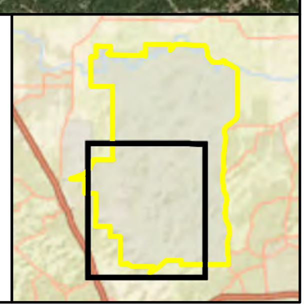
FIGURE 3-1
LAND USE

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Construction
- Demolition
- Infrastructure
- Linear Construction
- Linear Infrastructure
- Cantonment Area
- Installation Boundary
- Administration
- Community Service
- Housing Unaccompanied
- Industrial
- Medical/Dental
- Open Space
- Outdoor Recreation



3.5.2 ENVIRONMENTAL CONSEQUENCES

Potential impacts on land use are based on the level of land use sensitivity in areas potentially affected by a proposed action as well as compatibility of the action with existing conditions. In general, a land use impact is adverse if it is inconsistent or noncompliant with existing land use plans, regulations, or policies; reduces the viability of existing land use; prohibits continued use or occupation of an area; reduces compatibility with adjacent land use to the extent that public health or safety is threatened; or conflicts with planning criteria established to ensure the safety and protection of human life and property.

3.5.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. Demolition and construction of buildings would not occur, resulting in infrastructure remaining as is. The overall footprint at JBSA-BUL would not change and there would be no changes to current land use.

3.5.2.2 Proposed Action

Under the Proposed Action, 11 projects would occur within the cantonment area, and the remaining 3 projects would occur within the training area of JBSA-BUL. Land use within the cantonment area would remain generally unchanged, as this area is already highly developed and has many uses. The training areas (outside of the cantonment area) would also experience a minor increase in development compared to the status quo. However, the Proposed Action would not change existing land use classifications of JBSA-BUL. The Proposed Action generally would be consistent with the current land use of JBSA-BUL. No impacts to land use outside the boundary of JBSA-BUL would be anticipated.

Existing land use and land use compatibility under implementation of the Proposed Action would remain generally unchanged. No impacts to land use outside of the boundary of JBSA-BUL would be anticipated. The Proposed Action would be consistent with applicable land use plans and policies on and around JBSA-BUL. Therefore, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to land use would be anticipated to occur with implementation of the Proposed Action.

3.5.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

No best management practices (BMPs) are recommended (beyond those for related resources) to reduce potential land use impacts.

No project-specific mitigation measures are recommended.

3.6 AIR QUALITY

Air pollution is harmful to human health and the environment. Air pollutants are emitted from both stationary, such as chemical and power plants, and mobile sources, such as vehicles and aircraft. To protect against these harms, the United States Environmental Protection Agency (USEPA) implements various programs under the CAA to control and minimize different types of air pollution.

The most common and widespread air pollutants are regulated by the National Ambient Air Quality Standards (NAAQS), science-based criteria for setting permissible levels for six such pollutants within a defined "airshed." Also known as "criteria pollutants," these include particle matter, ground-level ozone,[7]

[7] Ozone is formed by the mixing of two types of chemicals in the atmosphere, volatile organic compounds, and nitrogen oxides. Volatile organic compounds are released by cars burning gasoline, petroleum refineries, chemical manufacturing plants, and other industrial facilities. The solvents used in paints and other consumer and business

carbon monoxide, sulfur oxides, nitrogen oxides, and lead. The limits set based on human health are called primary standards; the limits intended to prevent environmental damage are called secondary standards. States must adopt the federal standards but have authority to adopt stricter criteria pollutant standards. A geographic area with air quality that is below the primary standard threshold is called an "attainment" area; areas that do not meet the primary standard are called "nonattainment" areas.

The CAA also contains specific provisions to address hazardous and toxic air pollutants that pose health or environmental risks; acid rain that causes damage to aquatic life, forests, and property; chemical emissions that deplete the stratospheric ozone layer; and regional haze that impairs visibility in national parks and other recreational areas. In addition to these programs, the CAA provides the authority to regulate new or emerging pollutants such as greenhouse gases that cause global climate change.

This section describes regional air quality conditions and analyzes potential effects on air quality under the Proposed Action and No Action Alternative. The ROI for air quality is defined as the San Antonio-New Braunfels MSA which includes Bexar County, designated by the USEPA as being in "marginal nonattainment" for ozone, a NAAQS criteria pollutant. This section also discusses greenhouse gas emissions.

3.6.1 EXISTING CONDITIONS

Under the CAA, the USEPA periodically reviews the NAAQS and, if scientific evidence warrants, revises the standards to ensure the continued protection of human health and environment. Accordingly, in October 2015, the USEPA promulgated revisions to the primary and secondary NAAQS for ozone to an 8-hour standard of 0.070 part per million. In such cases, the USEPA is also required to promulgate designations for areas of the US in accordance with the revised NAAQS.

In response to the revised ozone standard, the State of Texas recommended the USEPA designate the San Antonio-New Braunfels MSA as attainment or unclassifiable for the 2015 8-hour ozone NAAQS. However, in September 2018, a USEPA evaluation of ozone precursor conditions in each MSA county resulted in modification of Texas' recommendation of attainment or unclassifiable for Bexar County to nonattainment. Based on factors such as county-level nitrogen oxides and volatile organic compound emissions, population density, vehicle miles traveled, and environmental conditions (e.g., meteorology and topography), the USEPA further determined the other counties of the MSA were in attainment or unclassifiable for the 2015 8-hour ozone NAAQS.

The USEPA's reclassification of Bexar County to nonattainment with a marginal classification was conditioned on 2015–2017 data recorded at 0.073 part per million from two monitoring stations, one at JBSA-BUL and one in northwest Bexar County. The change from attainment to marginal nonattainment for Bexar County required a revision to Texas' *State Implementation Plan* (SIP) for attainment of the ozone NAAQS based on 2018–2020 monitoring data. In January 2020, pursuant to Section 179B of the CAA, the Texas Commission on Environmental Quality (TCEQ) adopted a SIP revision and requested USEPA's approval by demonstration that Bexar County would attain the 2015 8-hour ozone NAAQS by its statutory attainment deadline of September 21, 2021 "but for" anthropogenic emissions emanating from outside the US. As the USEPA has yet to approve Texas' SIP revision, the Air Force conducted an air quality analysis to determine General Conformity applicability for the Proposed Action (see **Section 3.6.1.1**).

3.6.1.1 General Conformity Rule

Under the CAA, the General Conformity Rule requires proposed federal agency activities in designated nonattainment or maintenance areas (i.e., attainment areas reclassified from a prior nonattainment designation) to demonstrate conformity with the SIP for attainment of NAAQS. In such cases, an

products also contain volatile organic compounds. Nitrogen oxides are produced when cars and other sources (e.g., power plants and industrial boilers) burn fuels such as gasoline, coal, or oil.

applicability determination is required to demonstrate that net emissions from a federal proposed action would be below the applicable *de minimis* threshold levels. If the net change of a criteria pollutant(s) in a nonattainment or maintenance area is above the applicable *de minimis* threshold(s), a more detailed General Conformity analysis is required.

Since Bexar County is a nonattainment area for ground-level ozone, the General Conformity Rule *de minimis* threshold of 100 tons per year (tpy) for ozone precursors is applicable to the Proposed Action. Because the Air Force uses the General Conformity Rule *de minimis* threshold of 25 tpy for lead, regardless of an area's attainment status under the NAAQS, this threshold also applies to the Proposed Action.

3.6.1.2 Operating Permits

The State of Texas has adopted the federal NAAQS. Pursuant to Title 30 of the Texas Administrative Code, Chapter 122 (30 TAC 122), the TCEQ administers a permit program for stationary source emissions generated at federal facilities. Permitting requirements for federal owners and operators are largely based on "potential to emit" (PTE), defined as the maximum capacity of a stationary source to emit any air pollutant under its physical and operational design or configuration. PTE calculations determine whether a federal facility is defined as a "major source" under the CAA requiring a Title V operating permit; however, some "non-major" or "minor source" federal owners or operators are subject to permit-by-rule (PBR) requirements (30 TAC 106). PBRs authorize stationary source emissions for individual or specific operations.

TCEQ's delegated authority under the CAA extends to mobile emissions generated in Texas. Pursuant to 30 TAC 111.145, fugitive dust generated by construction or demolition involving 1 acre or more of land requires, at a minimum, two dust-control measures, including the use of water (or other suitable oil or chemical application) for dust suppression and measures to prevent airborne particulate matter during sandblasting or similar operations.

3.6.1.3 New Source Review

Per the CAA, the USEPA's Prevention of Significant Deterioration (PSD) New Source Review (NSR) permit program regulates criteria, and certain non-criteria, air pollutants for air quality control regions designated as unclassified or in attainment status with respect to the federal standards. In such areas, a PSD review is required for new "major source" or "major modification of existing source" emissions that exceeds 100 or 250 tpy of a regulated CAA pollutant, dependent on the type of major stationary source.[8] For "minor source" emissions, a PSD review is required if a project increases a "major source" threshold by itself.

Since JBSA-BUL is classified as a "minor source" under Title V of the CAA and Bexar County is in attainment or unclassifiable for all criteria pollutants other than ground-level ozone, the PSD permitting threshold of 250 tpy is applicable to the Proposed Action.

3.6.1.4 Greenhouse Gases

Greenhouse gases (GHGs) include carbon dioxide (CO_2), nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. GHGs are both a natural phenomenon and the result of man-made activity. Natural concentrations of CO_2 are part of the global carbon cycle, an exchange between the atmosphere and land and water on the earth through processes such as plant photosynthesis. GHG emissions from human activity have risen over time through industrialization, including the burning of fossil fuels. Although natural processes can absorb some anthropogenic GHG emissions, those that are not absorbed accumulate in the atmosphere and contribute to climate change.

[8] There are two types of "major stationary source" emissions: named and un-named. A named stationary source is listed in 40 CFR § 51.166(b)(1) and has a PTE of 100 tpy (includes fugitive emissions). An un-named stationary source is one that is not listed in 40 CFR § 551.166(b)(1) and has a PTE of 250 tpy.

There is no NAAQS for GHGs. As such, aggregate GHG emissions are included in the statewide PSD program administered by the TCEQ, regardless of attainment status. GHGs are defined as a non-criteria pollutant under 30 TAC 101.1 and are subject to regulation when their PTE exceeds 75,000 tpy or more of carbon dioxide equivalent (CO_2e) (30 TAC 116.164i). However, there is no minor source program applicable to GHGs in Texas.

Global warming potential is a metric used to determine how much a particular GHG contributes to climate change. The calculation is premised on a global warming potential of 1 for CO_2, which is then used to calculate a CO_2e for other GHGs. These data can then be totaled as an aggregate in metric tons CO_2e. According to the USEPA's Greenhouse Gas Reporting Program, in 2020, GHG emissions for the Bexar County, Texas, area were predominately from the following industrial activities:

- J K Spruce Power Plant (CPS Energy), San Antonio, Texas: 5,785,736 metric tons CO_2e
- V H Braunig Power Plant (CPS Energy), Elmendorf, Texas: 1,734,441 metric tons CO_2e
- Alamo San Antonio Cement Plant, San Antonio, Texas: 785,478 metric tons CO_2e

Collectively, these activities generated 8,305,655 metric tons CO_2e in 2020. By comparison, JBSA-BUL generated a total of 614 metric tons CO_2e in 2019, the most recent year for which information is available.

3.6.1.5 Federal Class I Areas

National parks larger than 6,000 acres and national wilderness areas larger than 5,000 acres in existence when the CAA was amended in 1977 are provided air quality and visibility protection under the CAA. Referred to as "Class I" areas, there are no such designations in proximity to San Antonio or the San Antonio-New Braunfels MSA.

3.6.1.6 Joint Base San Antonio, Camp Bullis

JBSA-BUL is defined as a "minor source" for criteria and hazardous air pollutants and operates under PBR as specified in 30 TAC 106. Military operations at JBSA-BUL that generate stationary source emissions primarily include abrasive blasting, combustion equipment use, refueling, welding, solvent use, and small arms firing. Other stationary source emissions include those generated from storage tanks and wastewater treatment plant operations.

3.6.2 ENVIRONMENTAL CONSEQUENCES

Potential adverse impact(s) on air quality would include nitrogen oxide or volatile organic compound (ozone precursors) emissions above the General Conformity Rule *de minimis* threshold of 100 tpy; particulate matter, carbon monoxide, or sulfur oxide emissions above the PSD permitting threshold of 250 tpy; lead emissions above the General Conformity Rule *de minimis* threshold of 25 tpy; and GHG emissions with a PTE above 75,000 tpy or more of CO_2e.

Air Force Manual (AFMAN) 32-7002, *Environmental Compliance and Pollution Prevention* (4 February 2020) requires air quality analyses for CAA-regulated pollutants concurrent with and in support of the EIAP. AFMAN 32-7002 further requires Air Force action proponents to evaluate the net change in emissions using an approved emissions estimate technique or methodology. Accordingly, an Air Force screening tool known as the Air Conformity Applicability Model (ACAM) was employed to estimate emissions associated with the Proposed Action for comparison with the baseline air quality conditions within the ROI (i.e., the No Action Alternative).

ACAM requires various data inputs regarding the location, size, and nature of a proposed activity to model and estimate air emissions; however, assumptions may be established in lieu of certain data. Available data for the individual ADP projects (e.g., facility square footage, construction limits of disturbance, roadway linear feet, materials usage, and similar data) were used to populate ACAM. Where data gaps existed, specific assumptions were established for the analysis. For example, since the Proposed Action would not include increases in military personnel or changes in the frequency, tempo, or volume of training and operations at JBSA-BUL, this assumption was documented and applied to the ACAM emissions estimates. **Appendix D** provides additional details and summarizes the results of the ACAM analysis conducted for the Proposed Action. The ACAM emissions estimates for the Proposed Action are also incorporated into the air quality impact analysis below (**Section 3.6.2.2**).

3.6.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. Air quality conditions in the ROI would remain consistent with the status quo in the short term. In the longer term, air quality conditions would be determined by changes in population, land use, energy usage, and other relevant factors that affect the air quality of the San Antonio-New Braunfels MSA and Bexar County, Texas.

3.6.2.2 Proposed Action

The Proposed Action would involve construction, demolition, improvement, and maintenance projects. Construction activities associated with the projects would occur in phases from approximately 2023 to 2027. Under the Proposed Action, temporary construction workers would support the individual construction projects but no permanent, long-term increase to the population of JBSA-BUL would occur. The implementation of the Proposed Action would increase air emissions from the current status quo; however, minor, beneficial effects on air quality could result from the new, more energy efficient facilities and infrastructure improvements.

Table 3-2 summarizes the results of the ACAM analysis for the duration of construction, demolition, improvement, and maintenance projects under the Proposed Action. The table compares the cumulative emissions of regulated NSR pollutants under the Proposed Action (2023 to 2027) with their applicable (annual) PSD thresholds. Because the cumulative emissions of these pollutants would not exceed the applicable PSD thresholds for any one year under the Proposed Action, local and regional air quality impacts would be short term and negligible.

Table 3-2
Comparison of Cumulative Air Emissions and Annual PSD Thresholds for the Proposed Action (2023–2027)

Regulated NSR Pollutant	Emissions Estimate (tons/year)	Applicable PSD Threshold (tons/year)[a]
Volatile organic compounds	5.9	100
Nitrogen oxides	30.8	
Carbon dioxide	34.8	250
Sulfur oxides	0.1	
PM_{10}	155.0	
$PM_{2.5}$	1.4	
Lead	.00	25
Ammonia	.02	250
CO_2e	10,312.4	75,000

Under the Proposed Action, Bexar County and the City of San Antonio would continue to revise and implement the SIP for attainment of ozone and to maintain attainment status for all other criteria pollutants. Enforcement of the General Conformity Rule would also continue within Bexar County, Texas, and the Metropolitan San Antonio Intrastate AQCR. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to air quality would be anticipated to occur with implementation of the Proposed Action.

3.6.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would implement the following BMPs to reduce potential air quality effects under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Minimize vehicle idling by turning off equipment and vehicles when not in use.
- Cover dump truck beds while in transit or not in use to minimize fugitive dust emissions.
- Regularly water stockpiles or unpaved areas to minimize fugitive dust emissions.

No project-specific mitigation measures for air quality were identified by analysis.

3.7 EARTH RESOURCES

Earth resources include geology, topography, and soils, the characteristics of which help determine whether land is suitable for development. Geology refers to the structure and configuration of surface and subsurface features. Characteristics of geology include geomorphology, subsurface rock types, and structural elements. Over long periods of time, geological processes determine topography: the shape, height, and position of the land surface. Soil refers to the unconsolidated materials overlying bedrock or other parent material. Soils are defined by their composition, slope, and physical characteristics. Attributes of soil, such as elasticity, load-bearing capacity, shrink-swell potential, and erodibility, determine its suitability to support a particular land use, including development.

As defined by the *Farmland Protection Policy Act* (7 USC §§ 4201–4209), most projects included in the Proposed Action would not occur in "prime farmland" soils. Only one type of soil associated with the Proposed Action is considered "prime farmland," Krum clay (see **Table 3-3** below), but only if irrigated. Although some linear infrastructure projects (e.g., roadway improvements) under the Proposed Action may disturb limited amounts of "prime farmland" soils, most areas are previously developed. Further, given JBSA-BUL's historic use for military training, lands on the Base have no association with agriculture or precedence set to warrant their designation as "prime farmland" under the Farmland Protection Policy Act.

The ROI for earth resources is JBSA-BUL. No potential adverse impacts on earth resources would be anticipated beyond this ROI.

3.7.1 EXISTING CONDITIONS

3.7.1.1 Geology and Topography

The geology associated with JBSA-BUL is characterized by the Upper Glen Rose Formation, alternating layers of limestone, dolomite, and marl that resemble stairsteps when viewed from land. The Upper Glen Rose Formation contains the Trinity Aquifer system. The Lower Glen Rose Formation is associated with the Edwards Aquifer system. The latter formation is limited to the southeastern portion of JBSA-BUL, an area underlain by limestone rock ranging in thickness from 300 to 500 feet.

Another characteristic of geology underlying JBSA-BUL and the San Antonio area is its association with the Balcones Fault Zone Karst Region (Texas Speleological Survey, 2014). Karst topography is formed by the dissolution of carbonate rocks like limestone and dolomite that dissolve when exposed to acidic water. The resulting landscape is characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, mesocaverns (humanly impassable voids in karst limestone), and caves. Although all of the JBSA installations are impacted by karst geology, JBSA-BUL is characterized by karst landforms, including caves, throughout the entire Installation. Numerous surveys have been conducted at JBSA-BUL to identify karst features, resulting in the identification of 111 known caves and 1,474 karst features as of 2020 (Air Force, 2020b). Karst features provide habitat for endangered and endemic invertebrates (see **Section 3.9**) and also contribute to water availability from the Edwards Aquifer.

Elevations across JBSA-BUL range from approximately 700 to 1,500 feet above mean sea level. The steeper topography is found in the northernmost areas of the Base and grades downward toward the south thereafter. As a result, surface drainage is generally oriented south to southeast across the Base. (United States Department of Agriculture [USDA], 1966).

3.7.1.2 Soils

Table 3-3 describes the soils of JBSA-BUL associated with the Proposed Action, as shown in **Figure 3-2**. Compared to other installations within JBSA, JBSA-BUL has a wider variety of soil types as a result of the greater range in topography across the Installation. In general, soils at JBSA-BUL are classified as very shallow to shallow at higher points, while valleys and lower elevations have deeper soils. Soil erosion is most likely to occur among the shallow soils at higher elevations due in part to the slope of the landscape (Air Force, 2020b).

The most common soil types at JBSA-BUL, including Brackett gravelly clay loam, Krum clay, and Eckrant cobbly clay are also the most common soil types found within the ROI (Air Force, 2020b). Each of these soil types is considered well-drained and is associated with medium-to-high runoff potential, contributing to an increased risk of erosion in certain areas depending on the slope of the landscape.

Table 3-3
Soil Types Associated with the Proposed Action

Symbol	Name	Percent of ROI	Hydric (Y/N)	Drainage Class	Runoff Class	Depth to Water Table (inches)
BrD	Brackett gravelly clay loam, 3 to 12 percent slopes	23.7	N	well-drained	medium	> 80
BrE	Brackett gravelly clay loam, 12 to 20 percent slopes	13.1	N	well-drained	high	> 80
BtE	Brackett-Eckrant association, 20 to 60 percent slopes	3.2	N	well-drained	very high	> 80
Kr	Krum clay, 1 to 5 percent slopes	15.0	N	well-drained	high	> 80
TaB	Eckrant cobbly clay, 1 to 8 percent slopes	5.2	N	well-drained	medium	> 80
TaC	Eckrant very cobbly clay, 5 to 15 percent slopes	5.3	N	well-drained	high	> 80
TaD	Eckrant-Rock outcrop association, 8 to 30 percent slopes	1.2	N	well-drained	high	> 80
TbB	Tarpley clay, 1 to 3 percent slopes	4.0	N	well-drained	very high	> 80
Tc	Tinn clay, 0 to 1 percent slopes, occasionally flooded	2.7	N	well-drained	negligible	> 80

Source: USDA, Natural Resources Conservation Service's Web Soil Survey Tool

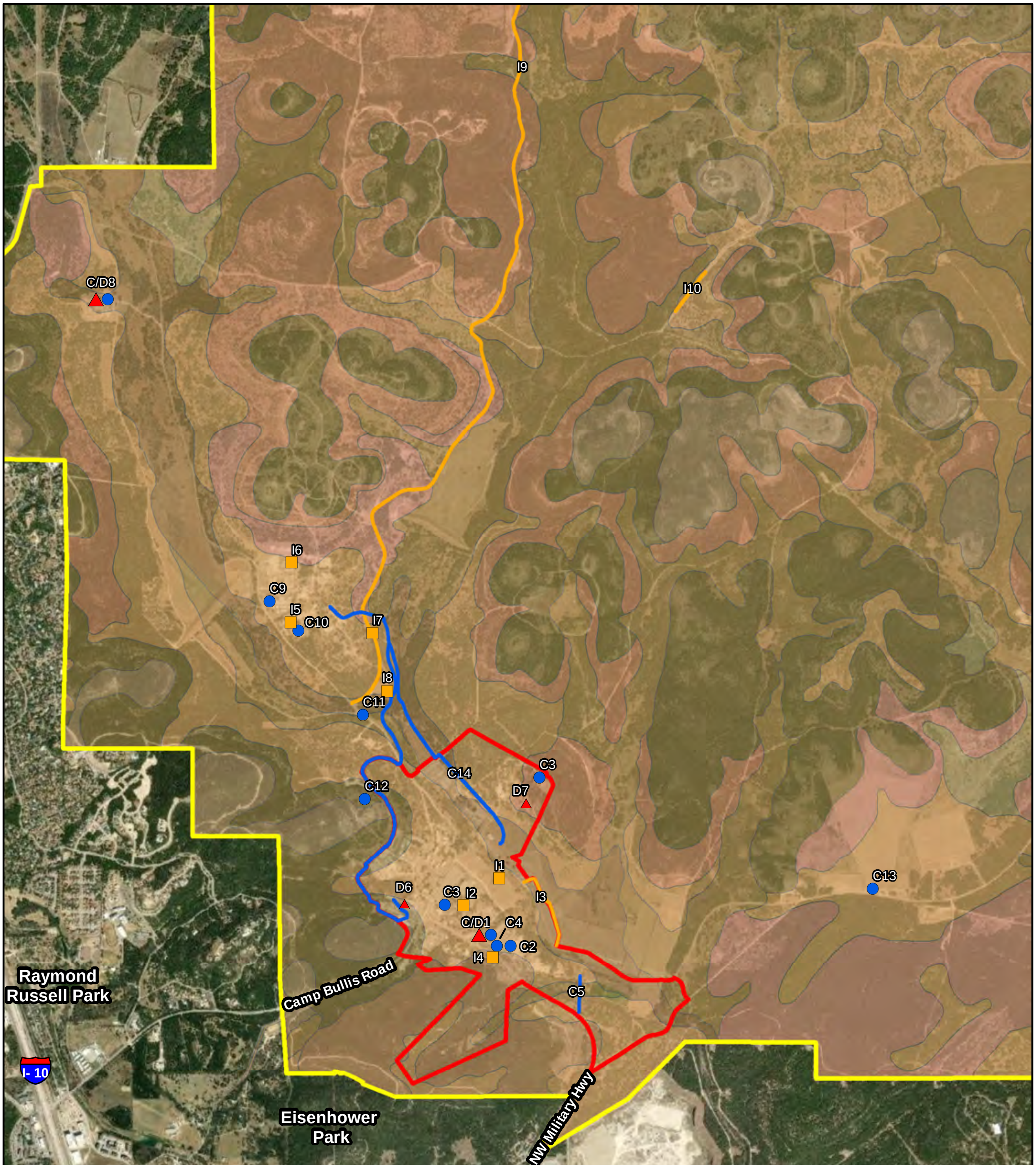


FIGURE 3-2
SOIL TYPES

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Construction
- Demolition
- Infrastructure
- Linear Construction
- Linear Infrastructure
- Cantonment Area
- Installation Boundary

BtE	Brackett-Eckrant association, 20 to 60 percent slopes
BrD	Brackett gravelly clay loam, 3 to 12 percent slopes
BrE	Brackett gravelly clay loam, 12 to 20 percent slopes
TaB	Eckrant cobbly clay, 1 to 8 percent slopes
TaC	Eckrant very cobbly clay, 5 to 15 percent slopes
TaD	Eckrant-rock outcrop complex, 8 to 30 percent slopes
Kr	Krum clay, 1 to 5 percent slopes
TbB	Tarpley Clay, 1 to 3 percent slopes
Tc	Tinn clay, 0 to 1 percent slopes, occasionally flooded

3.7.2 ENVIRONMENTAL CONSEQUENCES

Impacts on earth resources from a proposed action could include substantial alteration of unique or valued geologic or topographic conditions, substantial soil loss or contamination, measurable loss or degradation of a valued or beneficial soil function, and disturbance of soils with contaminant(s) above regulatory threshold(s).

3.7.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. The Air Force would not implement the Proposed Action. The geology, topography, and soils associated with JBSA-BUL would not change in the short term. However, over time, future development projects unassociated with the Proposed Action would continue to alter these resources in portions of the Base.

3.7.2.2 Proposed Action

The Proposed Action would involve earthwork, including excavation, backfilling, and compacting of soils or fill materials on and immediately adjacent to the project sites. These activities would expose soils and increase their susceptibility to water and wind erosion. Inclement weather (e.g., rain or wind) could increase the probability and severity of any potential impacts on soils. Where excavation and backfill are required, soil structure, composition, and function could be altered. Further, operating heavy vehicles and equipment to remove, place, or stabilize infrastructure could result in soil compaction. In a compacted state, normal soil function may be altered (e.g., water storage, infiltration, or filtration).

The Proposed Action could also result in the accidental release of contaminants or unintentional disturbance and movement of contaminated soils that already persist in the environment. For example, construction vehicle and equipment usage could result in accidental spills of petroleum-based constituents into soil media.

Under the Proposed Action, potential adverse effects on soils, including soil loss, contamination, and structural alteration, would be managed at an individual project level. When applicable, the construction contractor would obtain and comply with a construction general permit (CGP) under the TCEQ-administered Texas Pollutant Discharge Elimination System (TPDES) program (see **Section 3.8.1.2**) when projects would disturb 1 acre or more of land. The CGP would require the preparation, approval, and implementation of a site-specific Stormwater Pollution Prevention Plan (SWP3) prior to construction, including appropriate structural and non-structural erosion, sediment, and waste control BMPs. Additional measures may include planning and operational considerations such as staging construction equipment and materials on existing gravel or paved surfaces or minimizing or restricting vehicle movements to select areas on JBSA-BUL.

Once reuse or fill soils are placed and compacted, surficial soils would be graded to conform to local topography and achieve positive surface drainage. All construction activities under the Proposed Action would conclude with revegetation of the landscape using native plants and trees, as appropriate. The Air Force would also conduct post-construction site inspections to ensure any agreed upon management measures remain effective and pre-construction conditions remain the same or improve.

All soils associated with the Proposed Action are previously disturbed and classified as well drained; no soils are classified as hydric. Projects C1/D1, C3, C4, D6, D7, C9, C10, C13, and portions of Projects C14, I1, I2, I5, I7, and I10, would take place in soils with a medium potential for runoff. Projects C2, C11, C12, and portions of Projects C14, I4, I6, and I9, would take place in soils with a high potential for runoff. No projects would be slated to occur in areas of soil with very high runoff potential. Projects C5 and C8/D8, and portions of Projects C14, I3, and I8, would occur in areas with a low potential for runoff. All project sites under the Proposed Action are generally suitable for development; however, the Air Force would validate soil conditions at each site prior to construction to address any limiting factors by management or design. During construction, crews would adhere to BMPs for soil erosion, as determined by JBSA-BUL, to minimize runoff potential. Additionally, construction phasing under the Proposed Action would minimize the severity of potential adverse effects on soils.

Constraints to ground disturbance in areas likely to contain karst features are described in **Section 3.9.1.4.** In the event that karst/cave would be discovered during trenching, all work would stop immediately, the JBSA-BUL Natural Resources Office (NRO) would be contacted, and the area would be surveyed for protected species before work would be allowed to continue.

With these project-specific measures required and in place during implementation of the Proposed Action, potential effects on soils in the ROI would be negligible and temporary in duration; no permanent, long-term effects on soils would occur under the Proposed Action. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on earth resources, including soils, would be anticipated to occur with implementation of the Proposed Action.

3.7.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would require contractors to implement the following BMPs to reduce potential effects on or from earth resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction projects.
- Prior to construction, obtain an applicable TPDES permit to manage stormwater on a site-specific basis. Prepare a TCEQ-approved SWP3 and submit an NOI as appropriate. Adhere to the permit conditions during construction to minimize soil erosion, sedimentation, and compaction.
- When practicable or in compliance with applicable laws and regulations, incorporate low-impact development (LID)[9] features and techniques into the design of the Proposed Action to increase stormwater retention and infiltration on the project sites.
- When practicable, identify and implement BMPs for construction and post-construction stormwater management in accordance with the USEPA's National Menu of Best Management Practices (BMPs) for Stormwater or other technical guidance.

No project-specific mitigation measures are recommended.

3.8 WATER RESOURCES

This section describes the types and conditions of water resources associated with the Proposed Action and No Action Alternative. These include surface waters, stormwater management, floodplains, and groundwater.

The ROI for water resources includes the surface and subsurface environments at, adjacent to, and downstream of the Proposed Action. This area includes the portions of JBSA-BUL downgradient of the involved project sites and approximately 0.5 mile from its boundary thereafter. Beyond this ROI, potential adverse impacts on water resources would not be anticipated to occur under the Proposed Action.

[9] LID measures include filtration, infiltration, evaporation, plant transpiration, and rainwater reuse to retain and treat stormwater on site, in contrast to conventional management practices that temporarily store and ultimately discharge stormwater to receiving waterbodies.

3.8.1 EXISTING CONDITIONS

3.8.1.1 Watershed Management

Bexar County is part of the 4,180-square-mile San Antonio River Basin. The principal tributaries of the basin include the Medina River, Leon Creek, Cibolo Creek, and Salado Creek. The Texas Water Development Board (TWDB) administers a program for the long-term planning and development of state water resources. The TWDB divides Texas into 16 distinct regional water planning areas for this purpose. Each regional water planning area is tasked with developing a regional water plan to be incorporated into the state water plan prepared by the TWDB. Bexar County, Texas, is part of the Region L regional water planning area.

There are four sub-watersheds of the San Antonio River Basin associated with JBSA-BUL, two of which contain projects under the Proposed Action. As shown on **Figure 3-3**, these include:

- Lewis Creek-Salado Creek (Hydrologic Unit Code [HUC] 121003010101), and
- Panther Spring Creek-Salado Creek (HUC 121003010102)

These sub-watersheds collectively capture and drain stormwater for a 78,646-acre area.

3.8.1.2 Surface Waters and Water Quality

Pursuant to the CWA, the TCEQ sets and enforces water quality standards for surface waters in Texas. Discharges to state waters are permitted under the TPDES permit program. TPDES permits are required for different types of pollutant-generating activities such as construction, industrial operations, and public-owned and -operated storm sewers (TCEQ, 2020, 2021a).

Under Section 303(d) of the CWA, the State of Texas is required to identify and develop a list of waterbodies (or waterbody segments) that are impaired based on their intended use (e.g., swimming or fishing). Impaired waterbodies are those that are not in attainment with water quality standards promulgated by the TCEQ. To achieve attainment status, a total maximum daily load (TMDL) is developed for the impairment. TMDLs use science-based criteria to establish a regulatory ceiling for the impaired waterbody to achieve attainment of water quality standards; that is, the maximum pollutant loads a waterbody may receive from all or portions of a basin or sub-basin in attainment of water quality standards. TMDLs target specific pollutants and set enforceable limits to improve or maintain the current conditions of 303(d)-listed waterbodies. The TCEQ also implements a statewide water quality sampling program for this purpose and requires sampling through the issuance of TPDES permits (USEPA, 2021).

The water quality of the San Antonio River Basin has improved over historic levels, in large part due to more advanced wastewater treatment within the region. For example, dissolved oxygen concentrations in the surface waters of the basin have increased substantially in the last several decades. However, water quality in portions of the basin continues to be of management concern for low dissolved oxygen levels and contaminants such as fecal coliform and nutrients.

The surface waters of JBSA-BUL are characterized by numerous intermittent streams, three large flood structures that regulate surface flow downstream in certain areas of the Base (e.g., the cantonment area), and, to a lesser extent, man-made ponds (**Figure 3-4**). Many streams and ponded areas remain dry for most of the year and are subject to overflow during high-intensity rainfall events. As indicated by the sub-watershed names, smaller intermittent streams on JBSA-BUL drain to Salado Creek and Lewis Creek in the southwest portion of the Base, to Panther Springs Creek west and east of Blanco Road in its southeastern extent, and Indian Creek and Cibolo Creek in its northern extent. In general, surface waters in the southern half of JBSA-BUL flow south to southeast toward San Antonio, while those in the northern half of the Base flow northeast to east along the Comal and Bexar County lines.

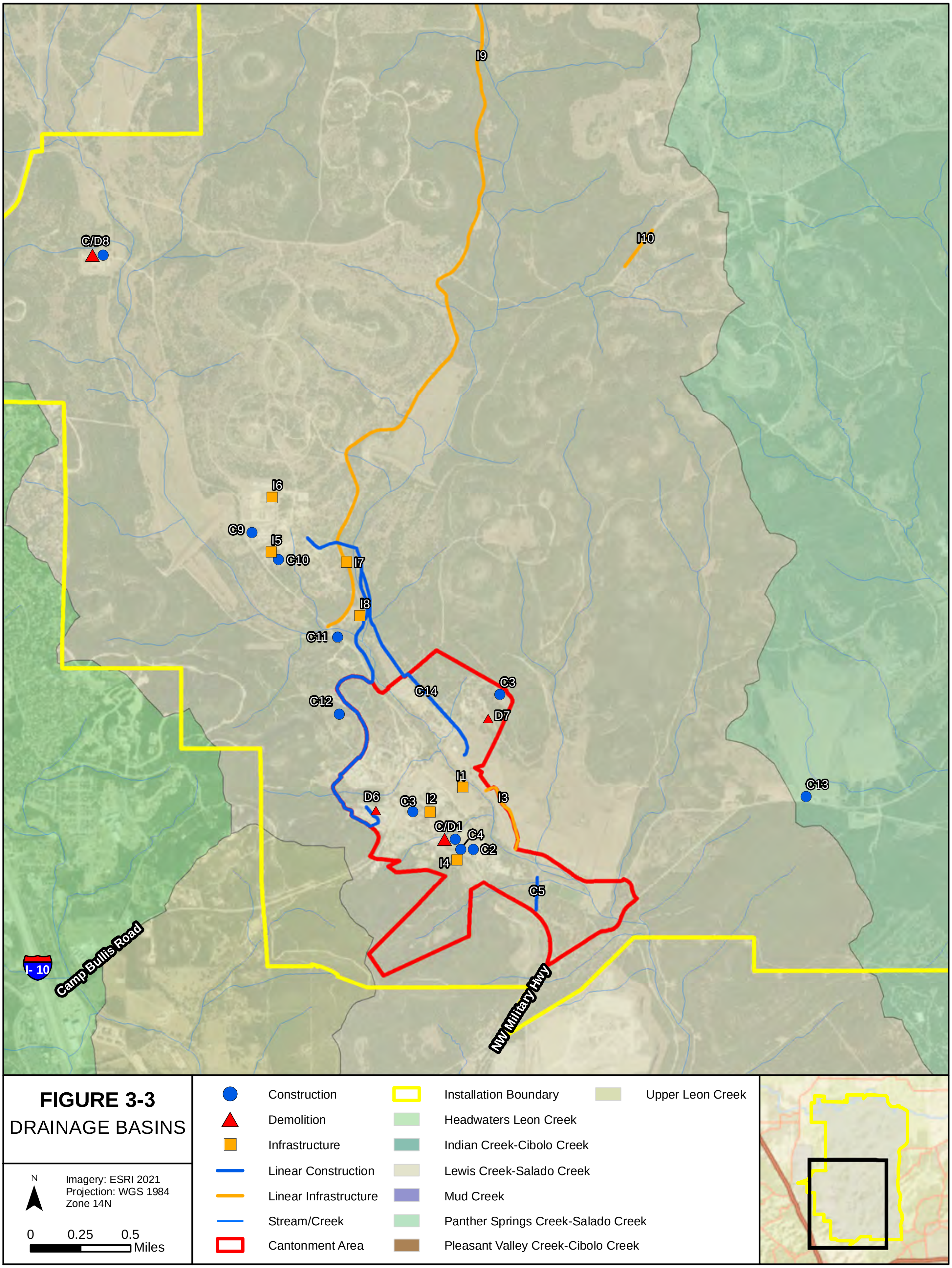


FIGURE 3-3
DRAINAGE BASINS

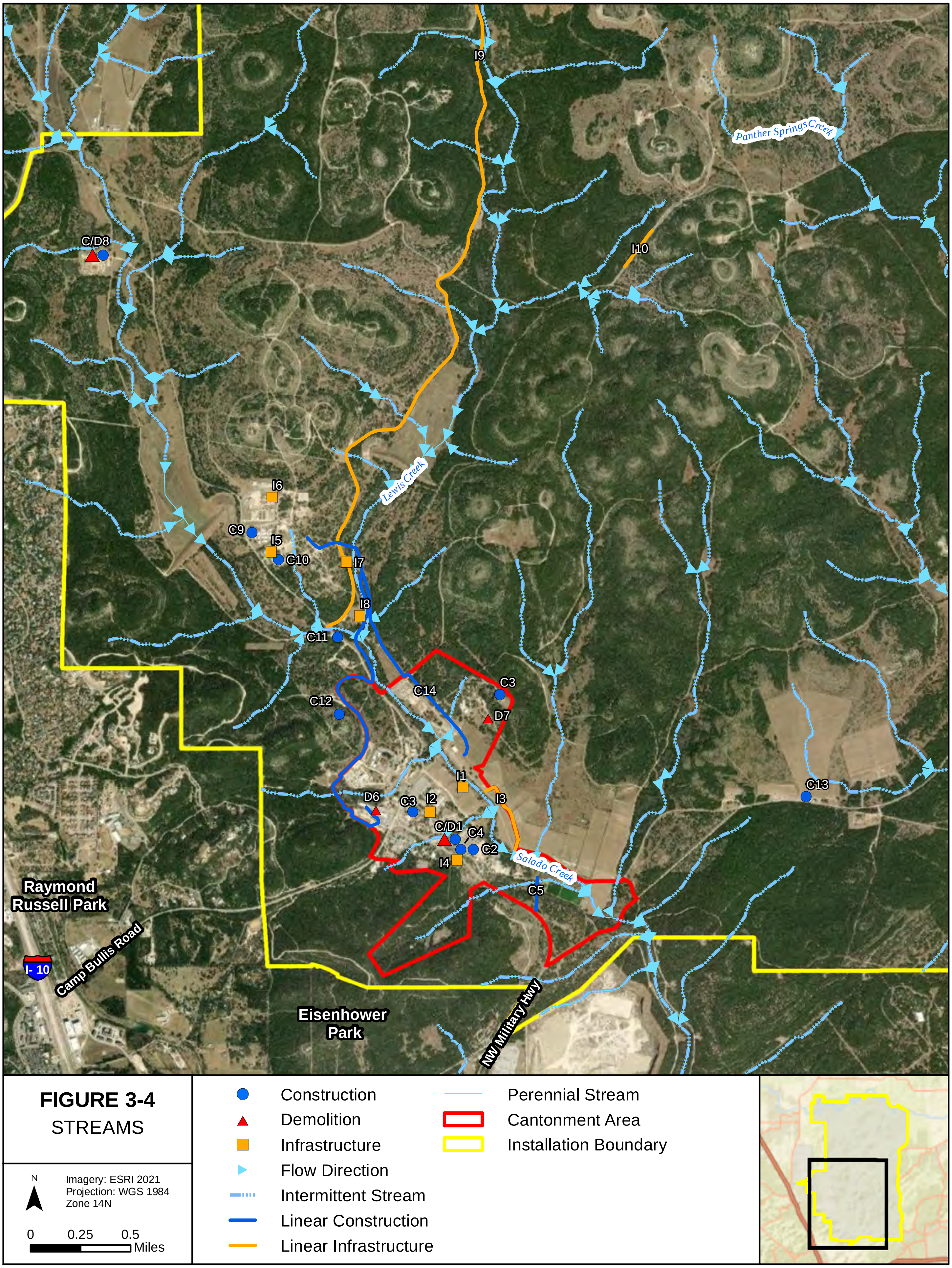


FIGURE 3-4
STREAMS

According to the USEPA's Watershed Assessment, Tracking & Environmental Results System, the segment of Salado Creek (TX-1910_07) from its headwaters in the city of Fair Oaks Ranch, through Camp Stanley, and to its confluence with Lewis Creek on JBSA-BUL is an "impaired" waterbody under Section 303(d) of the CWA. However, TCEQ's surface water quality data include this segment as part of a more extensive stream segment (1910F) that is not classified as an "impaired" waterbody.

3.8.1.3 Wetlands

The US Army Corps of Engineers (33 CFR § 328.3) and USEPA (40 CFR § 230.3) define wetlands as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands are a subset of Waters of the US, and those deemed "jurisdictional" are regulated under Section 404 of the CWA. When a federal agency proposed action requires Section 404 wetlands permit, states are provided authority to enforce surface water quality standards under Section 401 of the CWA by review of the proposed action and permit application.

The natural-function benefits of wetlands include flood control, groundwater recharge, maintenance of biodiversity, wildlife habitat, recreational opportunities, and maintenance of water quality. JBSA-BUL contains approximately 83 acres of wetlands, including freshwater emergent, freshwater pond, freshwater forested/shrub wetland, riverine, and lake wetlands. Wetlands on the Base are characterized by relatively small, isolated communities, many of which occur within portions of 100-year floodplains (see **Figure 3-5** and **Section 3.8.1.5**)

3.8.1.4 Stormwater Management

Dependent on location and localized environmental conditions, stormwater originating on JBSA-BUL is subject to varying levels of infiltration and conveyance. For example, areas of karst topography increase stormwater infiltration in soils or convey stormwater to natural springs on JBSA-BUL. In other areas of the Base, stormwater runoff is conveyed by an ad-hoc network of natural drainages and man-made infrastructure. The surface water impoundments also influence the quantity and rate of stormwater conveyed across the Base in certain areas. In general, surface flows on JBSA-BUL follow the drainage pattern of the natural environment, as described above.

Pursuant to the CWA, JBSA-BUL is regulated as a small municipal separate storm sewer system (MS4) operator and maintains a MS4 permit for its stormwater conveyance system. As a requirement of the MS4 permit, JBSA-BUL maintains a Base-wide SWP3. The SWP3 describes procedures for the management of stormwater on the Base, including stormwater conveyed to four regulated outfalls subject to compliance with JBSA-BUL's *Multi-Sector General Permit for Industrial Facilities* (TPDES General Permit No. TXR0550000). Three of these outfalls discharge to Salado Creek; the other discharges to Panther Springs Creek. The Base's multi-sector general permit is associated with vehicle maintenance, refueling, and explosives detonation operations, as well as with several landfill sites contaminated by historic operations. Stormwater discharges within the "contributing zone" of the Edwards Aquifer, the area upstream from the "recharge zone," must comply with 30 TAC 213 (i.e., the Edwards Aquifer Rule) in addition to the provisions set forth in the multi-sector general permit.

Stormwater discharges from construction activities on JBSA-BUL are also permitted under the TPDES. The type and extent of a construction activity on the Base determines stormwater management requirements on a case-by-case basis as follows:

- Disturbance of **1 acre** to less than **5 acres** that ***are not*** part of a larger common plan of development requires preparation, implementation, and maintenance of a site-specific SWP3.
- Disturbance of **1 acre** to less than **5 acres** that ***are*** part of a larger common plan of development requires authorization under TPDES General Permit No. TXR150000, including a TCEQ-approved SWP3 and NOI publication prior to construction.

- Disturbance of **5 acres or more** requires authorization under TPDES General Permit No. TXR150000, including a TCEQ-approved SWP3 and NOI publication (i.e., whether part of a larger common plan of development or not) prior to construction.

These CGPs establish standard measures to prevent or minimize potential soil erosion and sedimentation from construction sites (TCEQ, 2021b).

Section 438 of the *Energy Independence and Security Act* (EISA) (42 USC § 17094) directs federal agencies to incorporate, to the maximum extent technically feasible, LID measures to maintain the pre-development hydrology of a site for projects involving 5,000 sf or more of land disturbance. DOD technical criteria and requirements for compliance with Section 438 of EISA are provided in UFC 3-210-10, Change 1, *Low Impact Development*.

3.8.1.5 Floodplains

Floodplains are areas of low-lying, relatively flat ground adjacent to rivers, streams, large wetlands, or coastal waters with a potential for inundation due to rain or melting snow. In a natural vegetated state, floodplains slow the rate at which incoming overland flows reach the adjacent waterbody. Floodplains also function to recharge groundwater, maintain water quality, provide wildlife habitat, and support recreation.

The Federal Emergency Management Agency (FEMA) defines the 100-year floodplain or base flood, as an area that has a 1-percent chance of inundation in any given year; the area with a 0.2-percent chance of inundation in any given year is defined as the 500-year floodplain. FEMA designates 100-year floodplain zones to indicate the severity or type of flooding in an area. Zone A designates portions of 100-year floodplains where depths or base flood elevations are not yet known and require further study. Conversely, Zone AE portions of 100-year floodplains are those with defined base flood elevations. Beyond the 100-year floodplain, areas designated as Zone X are either shaded to indicate the 500-year floodplain or unshaded to indicate a lower risk of flooding outside the 100- and 500-year floodplains (FEMA, 2021).

EO 11988, *Floodplain Management*, requires federal agencies to determine whether proposed development would occur within a floodplain and to avoid floodplains, to the maximum extent possible, when there is a practicable alternative. Where construction within the floodplain is unavoidable, development of a FONPA is required detailing no other alternatives. EO 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input,* reinforces the tenets of EO 11988 to avoid actions in a floodplain or minimize potential harm if an action must take place in a floodplain. For example, EO 13690 directs federal agencies to use nature-based approaches when developing alternatives for actions under EO 11988.

EO 13690 further directs federal agencies to use higher standards for actions in floodplains by managing beyond the base flood to a higher vertical flood elevation and corresponding horizontal floodplain. The FFRMS describes varying ways to determine a higher flood elevation and extent for federally funded projects; however, the goal is to establish the level to which a structure or facility must be to minimize current and future flood risks. As a resilience standard, the FFRMS provides flexibility to use structural or nonstructural methods to reduce or prevent damage, elevate a structure, or, if appropriate, consider adaptation or recovery by design.

The San Antonio River Basin is part of an area commonly associated with "flash" flooding from high-intensity, short-in-duration rainfall (SARA, 2021). In coordination with FEMA, SARA regulates floodplain use in Bexar County. SARA also functions as a technical resource for floodplain management (e.g., the surface water impoundments on JBSA-BUL). Such flood control structures only hold water shortly after rain events to increase infiltration into groundwater.

There are approximately 3,311 acres of 100-year floodplains associated with JBSA-BUL. Most of these floodplains are associated with Salado Creek and Lewis Creek and designated Zone A (**Figure 3-5**).

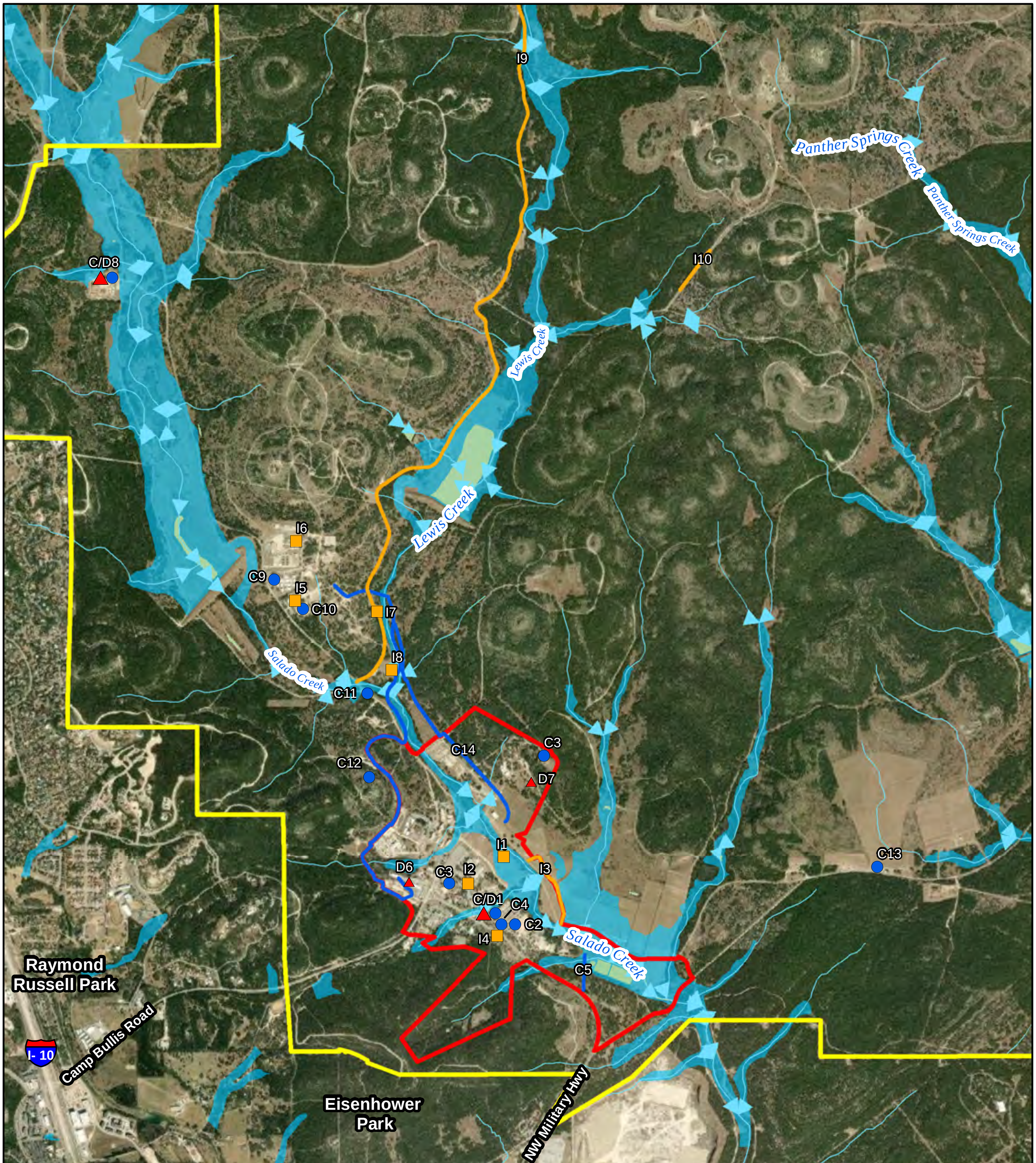


FIGURE 3-5

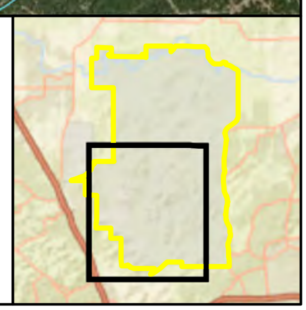
SURFACE WATERS AND FLOODPLAINS

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Construction
- Demolition
- Infrastructure
- Stream/Creek
- Linear Construction
- Linear Infrastructure
- Cantonment Area
- Installation Boundary
- Wetland
- 100-Year Floodplain



3.8.1.6 Groundwater and Water Quality

Groundwater is water that collects or flows beneath the land surface. As precipitation occurs, water percolates through the ground and occupies porous space in soil, sediment, and rocks. Groundwater resources are often used for potable water consumption, agricultural irrigation, and industrial applications. An aquifer is a body of porous rock or sediment saturated with groundwater. In Texas, aquifers are a critical source of water, supplying more than 60 percent of annual water use (TWDB, 2021a). As defined by the TWBD, there are two “major” aquifers associated with Bexar County, the Trinity Aquifer and the Edwards (Balcones Fault Zone) Aquifer.

The Trinity Aquifer extends across central and northeastern Texas. This aquifer system occupies 21,308 square miles of subsurface area, underlying all or parts of 61 Texas counties. Because it is composed of several smaller aquifers within the Trinity Group, the Trinity Aquifer is referred to by several different names across the state. For example, in Bexar County, the aquifer is often referred to as the Glen Rose Aquifer. Regardless of nomenclature, the smaller aquifers that comprise the Trinity Aquifer consist of limestones, sands, clays, gravels, and conglomerates. The Trinity Aquifer discharges to numerous springs throughout its reach. There are no major concerns with respect to the water quality of the Trinity Aquifer; however, increased total dissolved solids and concentrations of sulfate and chloride have been detected in portions of the aquifer. The groundwater of the Trinity Aquifer is primarily used as a source of potable water. JBSA-BUL is part of the Trinity Aquifer’s outcrop area, the part of an aquifer that lies at the land surface.

Total dissolved solids increase from less than 1,000 milligrams per liter in the east and southeast to between 1,000 and 5,000 milligrams per liter, or slightly to moderately saline, as the depth to the aquifer increases. Sulfate and chloride concentrations also tend to increase with depth.

The Edwards (Balcones Fault Zone) Aquifer occupies a subsurface area of 2,314 square miles in south-central Texas. The Edwards Aquifer extends across parts of 13 Texas counties, including Bexar County. Because it primarily consists of partially dissolved limestone, the Edwards Aquifer is highly permeable. The Edwards Aquifer discharges to numerous springs throughout its reach. The water quality of the Edwards Aquifer is generally considered to be of a high quality. The groundwater of the aquifer is primarily used as a source of potable water and for agricultural irrigation; the city of San Antonio obtains nearly all of its water supply from the Edwards Aquifer. Because of its high rate of permeability, water levels and spring flows in the Edwards Aquifer can fluctuate rapidly in response to rainfall, drought, or pumping. This characteristic also increases the aquifer’s susceptibility to pollution from stormwater runoff or spills. Groundwater contamination in the Edwards Aquifer is of particular concern with respect to drinking water and the unique ecology of the aquifer (see **Section 3.9.1**) (TWDB, 2021b, 2021c).

Most of JBSA-BUL overlies a portion of the Edwards Aquifer designated as the “contributing zone,” the area that drains to surface waters that are a source of recharge for the aquifer (**Figure 3-6**). Approximately 4,000 acres in the southeast portion of the Base is designated as an Edwards “recharge zone.” In the recharge zone, water recharge occurs directly from surface to groundwater in unconfined portions of the aquifer, such as springs and sinkholes (Edwards Aquifer Authority [EAA], 2021). Because of their proximity to one another in the sub-stratum, the Trinity and Edwards aquifers are hydrologically connected at JBSA-BUL. Hydrologic connectivity occurs in areas of combined groundwater where effects on one aquifer may also affect the other.

Edwards Aquifer Protection Zones

The TCEQ regulates activities in the EAA-designated Edwards protection zones, including during and after construction. Rules are different dependent on the type of activity and zone in which it would occur. However, any activity with potential to pollute the aquifer and surface streams that recharge it is subject to regulation. All activities, regardless of zone, must install erosion and sedimentation controls that meet specific requirements before any work begins. These controls must be maintained during construction and remain in place post-construction until vegetation is established.

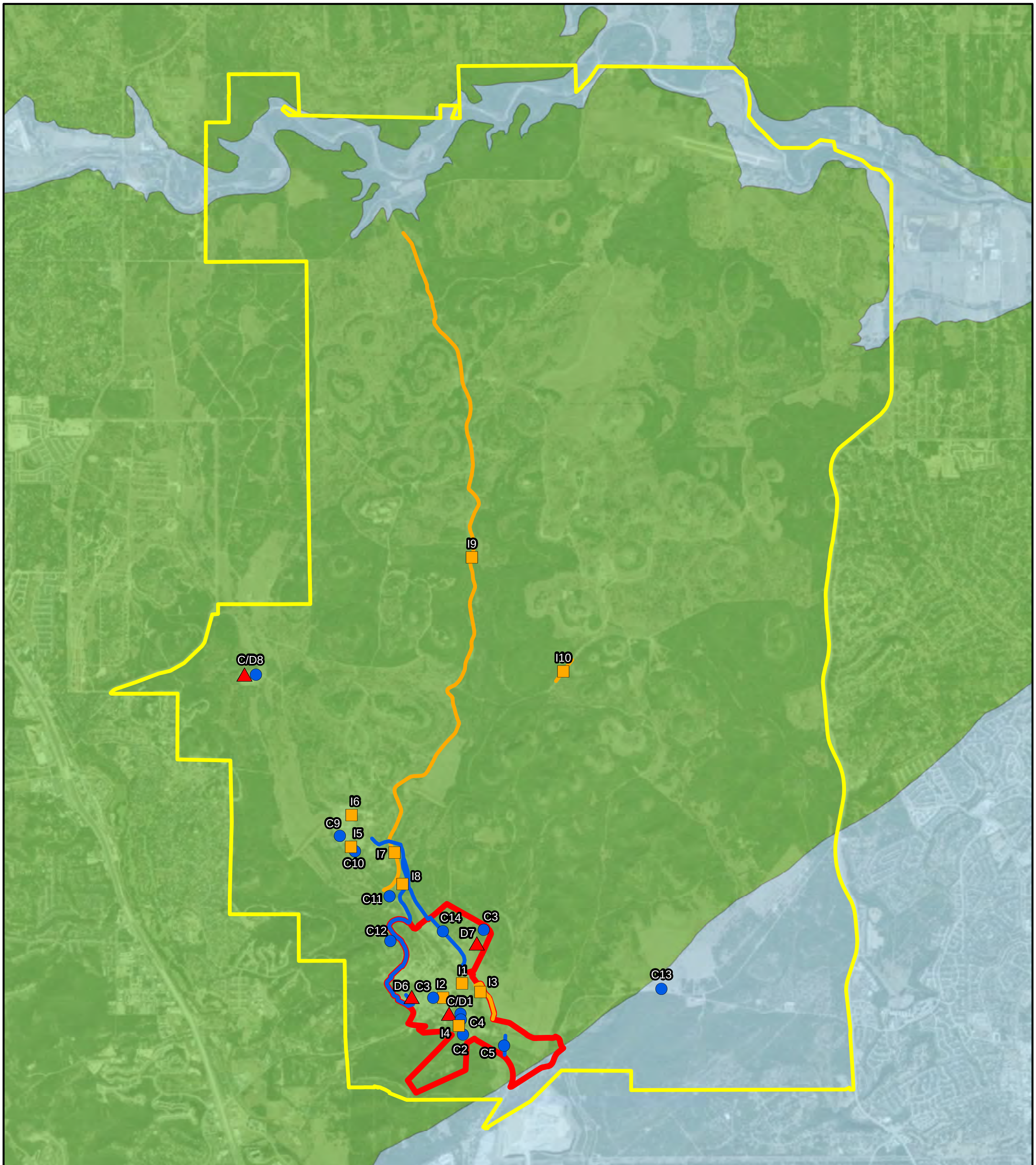


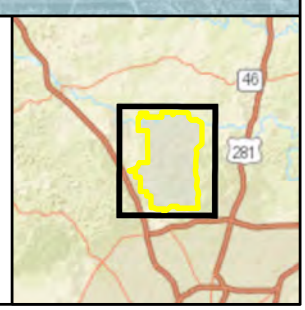
FIGURE 3-6
EDWARDS AQUIFER

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.5 1 Miles

Construction
Demolition
Infrastructure
Cantonment Area
Edwards Aquifer Contributing Zone
Edwards Aquifer Recharge Zone
JBSA-BUL



With some exceptions, activities that occur over an Edwards protection zone require the preparation of an Edwards Aquifer Protection Plan (EAPP) for TCEQ review and approval. In the contributing zone, an EAPP is required for disturbance of 5 or more acres of land, either individually or as a part of a larger plan of development. An EAPP outlines the BMPs that would be implemented and maintained, before and after construction, to prevent contaminants in stormwater from reaching the groundwater of the aquifer. However, a contributing zone plan (CZP) that serves a similar purpose is required for any regulated activity therein (i.e., disturbance of less than 5 acres).

On the recharge and transition zones, specific requirements are in place for the installation of underground storage tanks (USTs) and aboveground storage tanks (ASTs) or piping that store hazardous substances or fuels. Further, a water pollution abatement plan is required for any regulated activity proposed to occur on the recharge zone. WRAPs are more-detailed plans that identify BMPs to ensure protection of the aquifer's water quality. Like EAPPs and CZPs, WRAPs require TCEQ review and approval in advance of any work on the recharge zone.

During construction on the recharge or transitions zones, if sensitive features (as defined in 30 TAC 213.3[29]) are encountered where a potential exists for hydrologic connectivity between the surface and subsurface portions of the Edwards Aquifer, work must stop immediately, and workers must adhere to additional rules for the activity. In such cases, a Texas-certified professional engineer or geoscientist must conduct a geologic assessment, including recommendations to protect the groundwater resources of the aquifer.

3.8.2 ENVIRONMENTAL CONSEQUENCES

Potential adverse impact(s) on water resources include fill or dredge of jurisdictional Waters of the US subject to Sections 401 and 404 of the CWA; the unauthorized release of contaminants into an "impaired" waterbody subject to a TMDL; non-compliance with applicable stormwater management requirements, including the erosion and sedimentation controls under the Edwards Aquifer Rules; development within a 100-year floodplain without full consideration of other practicable alternatives or methods to minimize adverse effects on floodplains; and non-compliance with the applicable provisions of the Edwards Aquifer Rules to prevent contamination of groundwater resources.

3.8.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. The surface water and groundwater resources associated with JBSA-BUL would continue to be managed in accordance with applicable federal, state, and local laws and regulations. Although no potential adverse effects on water resources from implementation of the Proposed Action would occur under the No Action Alternative, military operations and other current or proposed development projects would be expected to continue. Under the No Action Alternative, BMPs and other agreed upon measures to protect water resources on and around the Base would remain in place.

3.8.2.2 Proposed Action

The Proposed Action would involve construction-related activities such grading, excavation, and similar earthwork. Some of these activities would occur in or immediately adjacent to intermittent streams, wetlands, floodplains, and groundwater protection zones on JBSA-BUL. During construction, and for a period thereafter, soils would be exposed, increasing the potential for sedimentation of surface water features on the Base. Implementation of the Proposed Action also would increase the potential for leaching of sediments downward into groundwater. As the Proposed Action would result in increases to the amount of impermeable surface on JBSA-BUL, the potential exists for longer-term effects associated with increased rates of overland surface flows and possibly lead to more flooding during or after high-intensity rainfall events. By extension, such effects could exacerbate erosion, sedimentation, or other processes of management concern for water resources. Under the Proposed Action, potential adverse effects on water would be avoided or reduced at an individual project level by design and through the implementation of management measures that comply with applicable laws and regulations. These measures are further described below.

Surface Waters and Water Quality

Under the Proposed Action, all project sites except Project C13 would drain directly or indirectly to Salado Creek or Lewis Creek. From its confluence with Lewis Creek, Salado Creek runs southeasterly through the cantonment area and exits the Base to the south. Project C13 would drain to an unnamed tributary of Panther Springs Creek to a discharge point just outside the southeastern corner of JBSA-BUL's boundary.

Under the Proposed Action, most projects would not directly affect surface waters, including intermittent streams and wetlands on JBSA-BUL. Dependent on distance and localized environmental conditions such as erodibility and permeability of soils, slope, and imperviousness, stormwater generated at project sites could degrade water quality at and downstream of receiving waterbodies. The level of potential effects from sediments or contaminants transported overland in runoff and discharged to surface waters would depend on many factors. However, the Air Force would prevent and reduce potential effects by requiring that construction contractors obtain applicable TPDES permit(s), including a CGP for sites that individually or collectively disturb 1 or more acres of land. The CGP would identify measures to prevent and minimize stormwater discharges during construction and, when appropriate, require preparation of a TCEQ-approved SWP3. Because SWP3s and other TPDES stormwater requirements would be required for each individual project site under the Proposed Action, the measures would account for localized environmental conditions and other determinants of water quality. With these measures in place, potential adverse effects on surface waters from most of the involved projects would be minor and short term. Revegetation with native grasses, shrubs, and trees post-construction would ensure potential long-term effects do not occur or are negligible.

Projects I7 and I9 would occur across small segments of intermittent streams on JBSA-BUL; however, both projects involve the repair and improvement of existing roadway segments. Therefore, potential effects from these projects on streams would be negligible and temporary in nature.

Project C14 also occurs across small segments of intermittent streams on the Base. This project would construct low-water crossings to support large tactical vehicle driving on JBSA-BUL. Although Project C14 has the potential to adversely affect these stream segments, the Air Force would obtain a Nationwide Permit under Section 404 of CWA prior to construction. The Nationwide Permit would include measures to prevent and reduce potential adverse effects that are specific to the involved activity. As such, potential effects from Project C14 would be moderate and short term.

Under the Proposed Action, only Project C5 would occur in wetlands. This wetland community is encompassed by 100-year floodplains in this area of JBSA-BUL. For the reasons described below for floodplains, no other practicable alternatives for siting this project elsewhere on the Base were identified. Therefore, potential effects on wetlands from Project C5 would be managed by design, best practice, and by compliance. With these measures in place, Project C5 would result in moderate, short-term effects on these wetlands. Potential indirect effects on wetlands from other projects would be negligible given the stormwater measures required for the Proposed Action.

To comply with Section 438 of the EISA, LID measures would be incorporated into the applicable projects of the Proposed Action, to the maximum extent technically feasible. These design measures would help to maintain or restore stormwater runoff with regard to temperature, rate, volume, and duration of flow. Each of the involved project sites would use an analysis of pre-development hydrology to establish a baseline condition and set design objectives for stormwater management. Under the Proposed Action, if design objectives could not be met on one or more project sites, LID measures would be considered for application in areas downstream thereof (i.e., either on or in the vicinity of JBSA-BUL).

Floodplains

The Air Force has determined that certain facilities and infrastructure proposed in the ADP necessitate development within or proximate to 100-year floodplains on JBSA-BUL. In such cases, alternative sites were considered to avoid or minimize potential adverse effects on floodplain resources. The planning process began with development of the ADP and tentative decisions on where to site new facilities and infrastructure. The resultant siting decisions considered multiple factors, including the mission, safety, and relevant environmental constraints. Under the Proposed Action, project sites within or proximate to floodplains were determined necessary for JBSA-BUL to maintain its mission support capabilities and provide for safe training and operations.

Under the Proposed Action, Project C14 would cross the 100-year floodplains on JBSA-BUL; Projects I1 and I9 would occur within 100-year floodplains (see **Figure 3-5**). Numerous other projects included in the Proposed Action would occur immediately adjacent to 100-year floodplains, including Projects C1, C5, D6, C8/D8, C11, I3, I7 and I8. Although such projects would occur in proximity to 100-year floodplains, potential adverse effects would be manageable by design and best practice. Potential effects on floodplain resources from these projects would be minor and short term under the Proposed Action. Because the infrastructure improvement projects located in or immediately adjacent to 100-year floodplains would involve the repair, maintenance, or improvement of existing infrastructure, potential effects on floodplain resources also would be minor and short term. Once these routine activities were completed, no change on the quality, state, or function of 100-year floodplains would be anticipated under the Proposed Action.

Under the Proposed Action, Projects C1, C5, D6, C8/D8, and C11 would avoid development in the 100-year floodplains. Potential effects on floodplain resources from these projects also would be managed by design and best practice. With these considerations and measures in place, Projects C1, C5, D6, C8/D8, and C11 would result in minor, short-term effects on floodplain resources. Project designs under the Proposed Action likely would result in improvements to surface water drainage in relation to these floodplains. In such cases, minor, beneficial effects would accrue to portions of 100-year floodplains on JBSA-BUL.

To document planning conducted to avoid and minimize potential adverse effects of the Proposed Action on 100-year floodplains, the Air Force prepared a FONPA. The FONPA also identifies and documents the measures the Air Force would take to avoid and minimize such effects.

Groundwater and Water Quality

The Proposed Action would create the potential for contaminants to leach or discharge to groundwater of the Edwards Aquifer. Due to its hydrologic connectivity with the Trinity Aquifer, this potential extends to groundwater in this aquifer. To ensure protection of these groundwater resources during and after construction activities, the Air Force should comply with the applicable Edwards Aquifer Rules in coordination with the TCEQ. Under the Proposed Action, only Project C13 would occur on the recharge zone of the Edwards Aquifer. All other projects included in the Proposed Action would occur on the contributing zone; no projects would occur in the transition zone.

The Proposed Action would comply with the erosion and sedimentation requirements under the Edwards Aquifer Rules. For each individual project, a pre-construction meeting would occur to ensure contractors are in receipt of all approved, project-specific EAPPs or CZPs. These plans would be incorporated into the SWP3 developed for each project and maintained on Base during construction. The EAPP or CZP would be documented as part of JBSA's MS4 permit and TCEQ would be notified in advance of all construction start dates. Under the Proposed Action, construction contractors would be required to install temporary erosion and sediment controls and protective barriers around sensitive features, such as caves, sinkholes, and wells, as approved by the TCEQ. Temporary detention ponds with approved linings would be installed as an outlet structure for any water discharges generated during construction. All work would occur within the delineated construction limits of disturbance any changes to which would be subject to TCEQ review and approval. The Air Force would also conduct regular project site inspections to ensure erosion and sedimentation controls are in place, meet specifications, and remain functionally adequate.

Under the Proposed Action, any spills or accidental releases of hazardous substances would be immediately reported to the TCEQ and subject to JBSA-BUL's Spill Prevention, Control and Countermeasure (SPCC) Plan and any EAPP or CZP codified response measures. Should groundwater be encountered during construction, excavations would be de-watered and subject to filtering to remove sediments in the water.

As described above in **Section 3.8.1.6**, Project C13 would comply with all applicable rules for activities conducted on the recharge zone of the Edwards Aquifer. During construction, should an unknown sensitive feature be encountered, all work in the area would be halted and, if necessary, a geologic assessment conducted, and a void-mitigation plan developed to outline protection measures for the involved resources.

All activities associated with the Proposed Action would be conducted in accordance with 30 TAC 213, as approved by the TCEQ. With these measures in place, potential adverse effects on groundwater resources under the Proposed Action would be minor and short term in nature.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to water resources would be expected to occur with implementation of the Proposed Action.

3.8.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would require contractors to implement the following BMPs to reduce potential effects on water resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Comply with Sections 404/401 of the CWA including any site-specific BMPs established through the permitting process.
- Prior to construction, obtain an applicable TPDES permit to manage stormwater on a site-specific basis; prepare a State-approved SWP3 and submit an NOI as appropriate; adhere to permit conditions during construction to minimize soil erosion, sedimentation, and compaction under the Proposed Action.
- When practicable, identify and implement BMPs for construction and post-construction stormwater management in accordance with the USEPA's National Menu of Best Management Practices (BMPs) for Stormwater or other technical guidance.
- Comply with Section 438 of the EISA to maintain the pre-development hydrology where project activities would occur to the maximum extent technically feasible; incorporate low-impact development[10] measures and techniques into the design of the Proposed Action to increase on-Base infiltration of stormwater.
- When possible, establish construction staging areas on existing hardscape and at least 100 feet away from surface-water resources.
- Should any excavation encounter the water table, minimize potential effects through measures such as dewatering that would prevent discharge of contaminated water during construction or demolition.

No project-specific mitigation measures for water resources were identified by analysis.

3.9 BIOLOGICAL RESOURCES

Biological resources include plants, animals, and the habitats upon which they rely for sustenance and survival. These resources include terrestrial and aquatic species; game and non-game species; special status species (i.e., state or federally listed species and species of concern such as migratory birds); and environmentally sensitive habitats or natural areas that have functional or intrinsic value to humans.

[10] Low-impact development measures include filtration, infiltration, evaporation, plant transpiration, and rainwater reuse to retain and treat stormwater on Base, in contrast to conventional management practices that temporarily store and ultimately discharge stormwater to receiving waterbodies.

The historic use of JBSA-BUL as a military training base also preserved an ecologically unique area of central Texas by limiting development. As metropolitan San Antonio continues to expand beyond its original downtown area, this trend continues today as evidenced by the many types of birds, mammals, amphibians, and invertebrates that inhabit or use the Base as a source of food, water, or refuge.

Pursuant to the *Sikes Act* (16 USC § 670a), JBSA maintains an Integrated Natural Resources Management Plan (INRMP) to guide the use and management of natural resources within the joint region, including JBSA-BUL (Air Force, 2020b). The ESA, as amended by the *National Defense Authorization Act for Fiscal Year 2004* (Public Law 108-136), exempts military installations from "critical habitat" designations in cases where a Sikes Act-compliant INRMP provides a demonstrable benefit to one or more ESA-listed species.

The ROI for biological resources includes JBSA-BUL and its immediately adjacent areas that contain sensitive or beneficial natural resources. Beyond this ROI, potential adverse impacts on biological resources are not anticipated.

3.9.1 EXISTING CONDITIONS

3.9.1.1 Vegetation

The Edwards Plateau "ecoregion" is characterized by freshwater springs and rocky hills and canyons. Historically, open grasslands and savannahs were the predominant plant communities with higher-density shrubs and trees found within canyons and riparian areas. Today, due to fragmentation of the landscape, the dominant plant communities consist of woodlands, forests,[11] and grasslands.

There are four primary types of vegetation found on JBSA-BUL: managed grasses, herbaceous grasslands, shrublands, and woodland/ forests (Air Force, 2020b). Within developed/urban areas, which includes areas with buildings, roads, or other infrastructure, vegetation is used for aesthetics.

Managed grasses include areas of grasslands or savannah outside of the developed areas. These may consist of native or non-native grasses and are managed for operational or recreational purposes such as ranges, ammunition storage, golf courses, and parks. Herbaceous grassland consists of forbs and grasses as the predominant cover. Grasslands may have scattered trees covering less than 20 percent of the land area. These areas are not regularly maintained but may be managed for encroachment of woody species. Shrublands are dominated by shrubs that are not regularly maintained. Density within these areas may be reduced by prescribed fire or mechanical treatment. Woodland forest vegetation is dominated by mature trees of varying canopy densities, from open woodlands to dense riparian forests. The understory vegetation is dependent on density of the tree canopy.

Species composition of the major vegetation cover types on JBSA-BUL are described in the INRMP. Major upland woodland species include Ashe juniper (*Juniperus ashei*), Texas oak (*Quercus buckleyi*), live oak (*Quercus virginiana*), escarpment black cherry (*Prunus serotina* var. *eximia*), Texas persimmon (*Diospyros texana*), and agarito (*Mahonia trifoliolata*). Common native grassland species include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogen gerardii*), switchgrass (*Panicum virgatum*), sideoats gramma (*Bouteloua curtipendula*), plains lovegrass (*Eragrostis intermedia*), vine-mesquite (*Panicum obtusum*), Lindheimer muhly (*Muhlenbergia lindheimeri*), silver bluestem (*Bothriochloa laguroides*), green sprangletop (*Leptochloa dubia*), tall dropseed (*Sporobolus asper*), and Texas cupgrass (*Eriochloa sericea*).

[11] Forests are differentiated from woodlands as having more extensive canopies that limit light penetration to understory vegetation; that is, shrubs, bushes, and younger trees are commonly the understory of forests whereas grasses and shrubs typify the understory of woodlands.

3.9.1.2 Wildlife Species and Habitat

JBSA-BUL has a higher diversity of wildlife species than other JBSA locations because of a larger proportion of undeveloped land. The Installation has recorded 263 species of birds, 36 species of mammals, 50 species of reptiles and amphibians, 12 fish species, and 272 invertebrate species (Air Force, 2020b, Appendix B).

JBSA-BUL allows on-Base hunting for certain game species. All hunting can be shut down at any time if a quota is met to ensure healthy populations. Some species require an Exotic Mammals Only Permit. Species that are eligible for open harvest include Aoudad sheep (*Ammotragus lervia*), coyote (*Canis latrans*), feral hog (*Sus scrofa*), raccoon (*Procyon lotor*), white-winged dove (*Zenaida asiatica*), axis deer (*Axis axis*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), Rio Grande turkey (*Meleagris gallopavo*), rock pigeon (*Columba livia*), black-tailed jackrabbit (*Lepus californicus*), feral cat (*Felis catus*), mourning dove (*Zenaida macroura*), red squirrel (*Tamiascurius hudsonicus*), catalina goat (*Capra hircus*), Eurasian collared dove (*Streptopelia decaocto)*, feral dog (*Canis familiaris*), and white-tailed deer (*Odocoileus virginianus*) (Air Force, 2020b).

3.9.1.3 Threatened or Endangered and Other Protected Species

Protected species include plants and animals that receive protection under federal or state laws and regulations. These include the ESA (16 USC § 1536), the Migratory Bird Treaty Act (16 USC § 703), *Bald and Golden Eagle Protection Act* (16 USC § 668), EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, and the Texas Parks and Wildlife Code (Title 5, Chapters 67 and 68). There are no plant species known to occur on or adjacent to JBSA-BUL protected under federal or state law. The following sections describe protected species known or that have the potential to occur at JBSA-BUL. Because of the unique ecology in this area of Texas, this section also describes karst topographic conditions either known to be inhabited by, or of a quality to provide suitable habitat for, federal- and state-listed cave-dwelling species.

Pursuant to Section 7 of the ESA, JBSA engaged in *Informal Consultation for the Continuation of the Military Mission and Mission Sustainment Activities on Joint Base San Antonio – Camp Bullis in Relation to 5 Listed Species* with the USFWS for military activities and trainings at JBSA-BUL with a potential to adversely affect listed species or their habitat (JBSA, 2015). The informal consultation covered construction and maintenance activities and requested the following conservation measures:

- New construction projects will avoid sensitive areas (sensitive areas include but are not limited to GCWA habitat and karst preserve areas [KPAs]) on JBSA-BUL). Additionally, all work will be reviewed by and coordinated with the NRO prior to planning. If a project must occur in GCWA habitat or KPAs, JBSA-BUL would seek consultation with USFWS.
- Conduct structure, sign, and utility maintenance under the guidelines of the seasonal training restrictions.
- Limit road, trail, firebreak, culvert, fence, and easement maintenance within the 300-foot buffer zone of GCWA habitat to outside the nesting season (from approximately 15 August to 28 February). Do not exceed 8 feet from either side of existing road, trail, firebreak, culvert, fence, or easement for clearing activities. Restrict tree trimming to branches below 6 feet and paint all oak cuts with pruning paint no later than 30 minutes after the cut. Confine tree removal to re-growth juniper of less than 12 feet in height.
- Inform all personnel responsible for construction activities about the need to follow design plans, stay within demarcated construction boundaries, and minimize impacts to wildlife and other environmental concerns via scopes of works, contracts, and other written means.

Any activities not included in this informal consultation, or that would come into conflict with the established measures, would be subject to separate Section 7 consultation requirements.

Table 3-4 lists threatened or endangered species associated with JBSA-BUL that receive, or are under consideration to receive, protection under federal law and may be protected under state laws. JBSA-BUL currently has one final Biological Opinion (BO), *The Effects of JBSA Water Draw on Listed Species of the Edwards Aquifer* (Consultation No. 02ETAU00-2013-F-0060), and one draft BO, *Installation of Nine New Groundwater Monitoring Wells at Joint Base San Antonio–Bullis, and Its Effects on the Federally Endangered Golden-Cheeked Warbler* (*Setophaga chrysoparia*) *in Bexar County, Texas (Draft)* (Consultation No. 02ETAR00-2020-F-2901), in place. The first BO addresses effects of JBSA water withdrawal from the Edwards Aquifer on the following species: Texas wild-rice (*Zizania texana Hitchc.*), Peck's cave amphipod (*Stygobromus pecki*), Comal Springs dryopid beetle (*Stygoparnus comalensis*), Comal Springs riffle beetle (*Heterelmis comalensis*), San Marcos gambusia (*Gambusia georgei*), fountain darter (*Etheostoma fonticola*) Texas blind salamander (*Typhlomolge rathbuni*), and San Marcos salamander (*Eurycea nana*). The second BO addresses potential effects of installing new groundwater monitoring wells on the golden-cheeked warbler (GCWA; *Setophaga chrysoparia*). JBSA-BUL also manages ESA-listed species in accordance with the final Biological Evaluation, *Informal Consultation for the Continuation of the Military Mission and Mission Sustainment Activities* (*Consultation No. 02ETAU00-2015-I-0216*).

Table 3-4
Federal- and State-Listed Species Known or with Potential to Occur at JBSA-BUL

Common Name	Scientific Name	Federal Status	State Status	Documented at JBSA-BUL
Plants				
Bracted Twistflower	*Streptanthus bracteatus*	PT	-	Yes
Texas Wild-rice	*Zizania texana*	E	-	No
Mammals				
Black bear	*Ursus americanus*	-	T	No
White-nosed coati	*Nasua narica*	-	T	No
Birds				
Golden-cheeked warbler	*Setophaga chrysoparia*	E	E	Yes
Piping Plover	*Charadrius melodus*	T	T	No
Red Knot	*Calidris canutus rufa*	T	-	No
Whooping crane	*Grus americana*	E	E	No
White-faced ibis	*Plegadis chihi*	-	T	Yes
Tropical parula	*Setophaga pitiayumi*	-	T	No
Wood stork	*Mycteria americana*	-	T	No
Zone-tailed hawk	*Buteo albonotatus*	-	T	Yes
Amphibians				
San Marcos salamander	*Eurycea nana*	T	-	No
Texas blind salamander	*Eurycea rathbuni*	E	-	No
Cascade Caverns salamander	*Eurycea latitans*	-	T	Yes
Texas salamander	*Eurycea neotenes*	-	T	No
Reptiles				
Texas tortoise	*Gopherus berlandieri*	-	T	Yes
Texas horned lizard	*Phrynosoma cornutum*	-	T	Yes
Cagle's map turtle	*Graptemys caglei*	-	T	Yes
Crustaceans / Mollusks				
Peck's Cave Amphipod	*Stygobromus (=Stygonectes) pecki*	E	-	No
False spike	*Fusconaia mitchelli*	PE	T	No
Fish				
Fountain Darter	*Etheostoma fonticol*	E	-	No
Widemouth Blindcat	*Satan eurystomus*	-	T	No
Toothless Blindcat	*Trogloglanis pattersoni*	-	T	No
Insects				
Ground beetle [unnamed]	*Rhadine exilis*	E	-	Yes
Ground beetle [unnamed]	*Rhadine infernalis*	E	-	Yes
Comal Springs Dryopid Beetle	*Stygoparnus comalensis*	E	-	No
Comal Springs Riffle Beetle	*Heterelmis comalensis*	E	-	No

Common Name	Scientific Name	Federal Status	State Status	Documented at JBSA-BUL
Helotes Mold Beetle	*Batrisodes venyivi*	E	-	No
Monarch Buttery	*Danaus plexippus*	C	-	Yes
Arachnids				
Bracken Bat Cave Meshweaver	*Cicurina venii*	E	-	No
Cokendolpher Cave Harvestman	*Texella cokendolpheri*	E	-	No
Government Canyon Bat Cave Meshweaver	*Cicurina vespera*	E	-	No
Government Canyon Bat Cave Spider	*Neoleptoneta microps*	E	-	No
Madla's Cave Meshweaver	*Cicurina madla*	E	-	Yes
Robber Baron Cave Meshweaver	*Cicurina baronia*	E	-	No

Source: USFWS, 2022; TPWD, 2022
C = Candidate; E = Endangered; PE = Proposed Endangered; PT = Proposed Threatened; T = Threatened

Of the protected species identified above, the GCWA, *Rhadine exilis, Rhadine infernalis,* and Madla's Cave meshweaver (*Cicurina madla*) have the potential to occur in the vicinity of the Proposed Action and are briefly described below.

Golden-Cheeked Warbler
GCWA are federally and state-listed as endangered and were first listed under the ESA in May of 1990. The GCWA breeds exclusively in the regions of central Texas including the mixed Ashe juniper/deciduous woodlands of the Edwards Plateau on JBSA-BUL (USFWS, 2021a). The species was recorded at JBSA-BUL as early as 1887; territory and point counts occur each year to monitor populations on the Installation. Breeding season occurs from 1 March–15 August each year and requires military training restrictions within their core habitat and a 300-foot buffer within their breeding habitat (Air Force, 2020b). **Figure 3-7** shows the established bird protection zones, in which GCWA habitat has been confirmed, and associated 300-foot buffer.

Cave-Dwelling Invertebrates
Karst invertebrates, including *Rhadine exilis, Rhadine infernalis,* and Madla's Cave meshweaver, are those invertebrates that thrive in the specific karst habitat as described in **Section 3.9.1.4.** Studies conducted on JBSA-BUL have documented 111 caves and 1,494 karst features and collected representative invertebrate fauna from identified caves and surrounding areas. USFWS lists 11 species of karst invertebrates as endangered in Bexar County (USFWS 2011a, revised 2019), of which the *Rhadine exilis, Rhadine infernalis,* and Madla's Cave meshweaver inhabit caves on JBSA-BUL. Habitat for these species is protected by delineated KPAs, as depicted in **Figure 3-8** and described in further detail in **Section 3.9.1.4.**

Migratory Birds
In the US, migratory birds are protected by the *Migratory Bird Treaty Act*. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, further directs federal agencies to protect migratory birds.

JBSA-BUL is located in the Central Flyway, a migratory bird corridor that extends from northern Alaska, south through Canada and the central US, and into northern Mexico. More than 200 migratory birds have been documented to occur at the Base. **Table 3-5** lists migratory birds in Bexar County, Texas, that are of conservation concern across their range or regionally (USFWS, 2020). Nine such species are also identified by the USFWS' *Birds of Conservation Concern 2021* as species associated with the Edwards Plateau or Oaks and Prairie regions of the US.

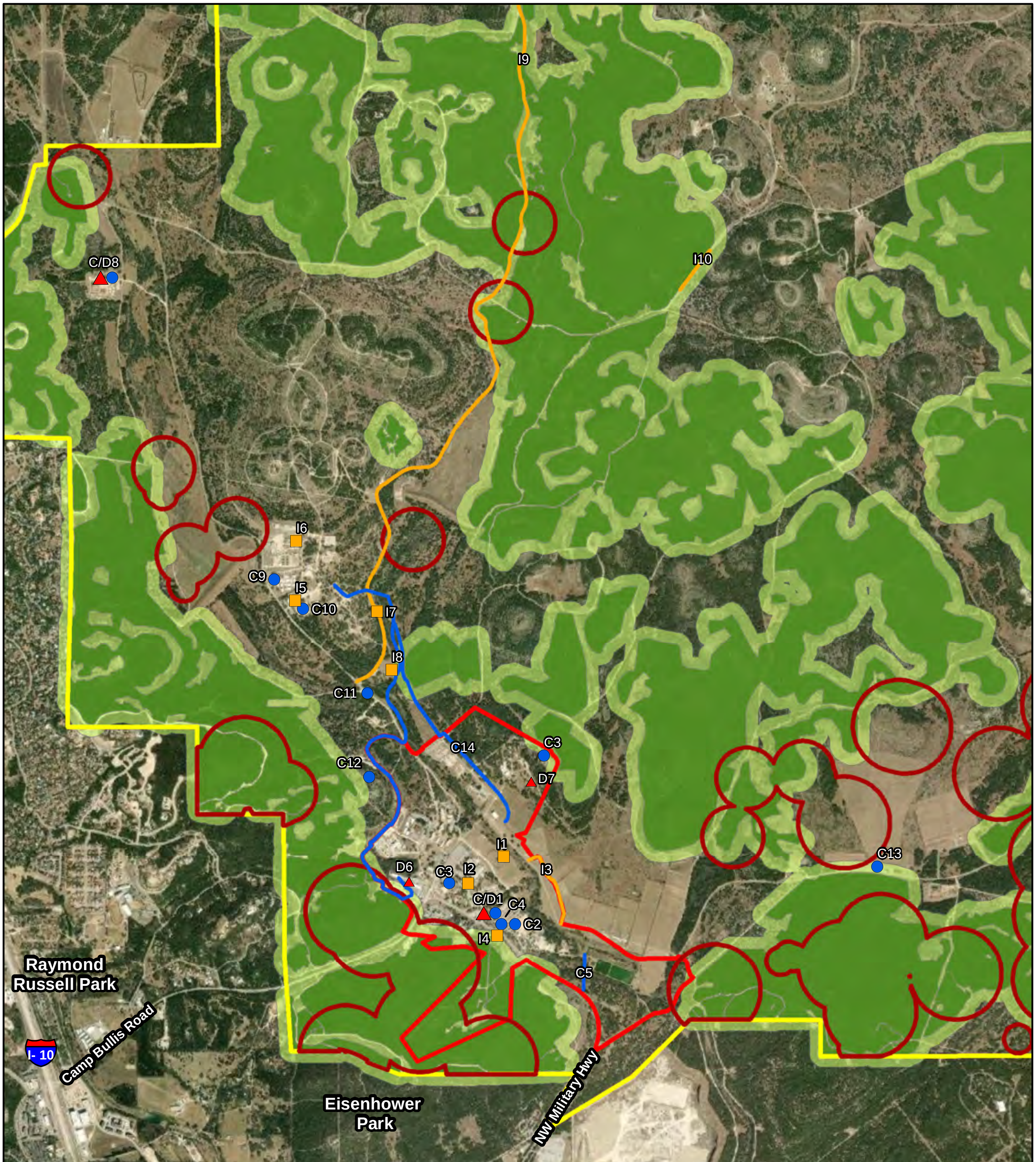


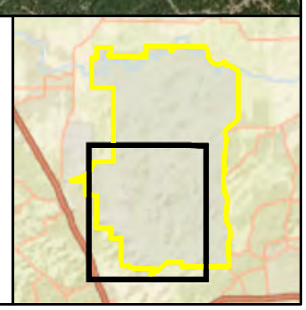
FIGURE 3-7
SPECIES HABITAT

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

- Construction
- Demolition
- Infrastructure
- Linear Construction
- Linear Infrastructure
- Cantonment Area
- Installation Boundary
- Karst Preserve Area
- GCW Buffer (300 ft)
- GCW Habitat



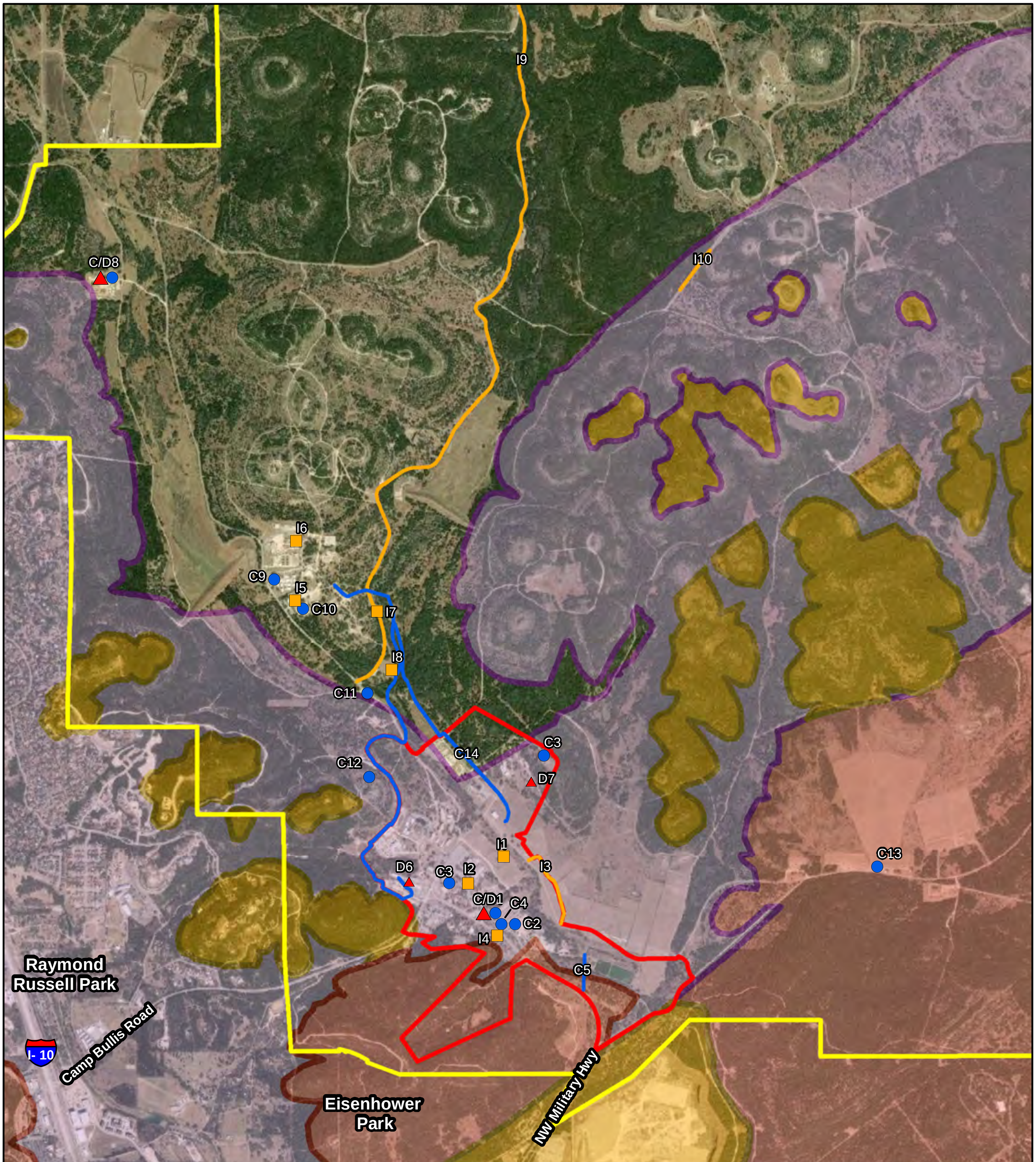


FIGURE 3-8
KARST ZONES

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

Table 3-5
Migratory Birds with Potential to Occur on JBSA-BUL

Common Name	Scientific Name	Observed on JBSA-BUL	Potential Use of JBSA-BUL
American Golden-plover[a]	*Pluvialis dominica*	No	Foraging or rest over
Chestnut-collared Longspur[a]	*Calcarius ornatus*	Yes	Foraging or rest over
Kentucky Warbler[a]	*Oporornis formosus*	Yes	Foraging and nesting; breeds 20 April to 20 August
Lesser Yellowlegs[a]	*Tringa flavipes*	Yes	Foraging or rest over
Long-billed Curlew[a]	*Numenius americanus*	No	Foraging or rest over
Mccown's Longspur	*Calcarius mccownii*	No	Foraging or rest over
Mountain Plover[a]	*Charadrius montanus*	No	Foraging or rest over
Orchard Oriole	*Icterus spurius*	No	Foraging and nesting; breeds 10 June to 15 August
Prothonotary Warbler[a]	*Protonotaria citrea*	No	Foraging and nesting; breeds 1 April to 31 July
Red-headed Woodpecker[a]	*Melanerpes erythrocephalus*	No	Foraging and nesting; breeds 10 May to 10 September
Sprague's Pipit[a]	*Anthus spragueii*	Yes	Foraging or rest over
Chimney swift	*Chaetura pelagica*	Yes	Foraging and nesting; breeds 21 April to 5 July
Buff-breasted sandpiper	*Calidris subruficollis*	No	Foraging or rest over
Pectoral sandpiper	*Calidris melanotos*	No	Foraging or rest over
Black-capped Vireo	*Vireo atricapillus*	Yes	Foraging and nesting; breeds 20 April to 8 July
Thick-billed Longspur	*Rhynchophanes mccownii*	No	Foraging and nesting
Grasshopper Sparrow (Northern)	*Ammodramus savannarum*	Yes	Foraging and nesting; breeds 20 April to 24 July
Field Sparrow	*Spizella pusilla*	Yes	Foraging and nesting; breeds 6 April to 10 July
Rufous-crowned Sparrow (Rock)	*Aimophila ruficeps*	Yes	Foraging and nesting; breeds 3 April to 9 August
Pyrrhuloxia	*Cardinalis sinuatus*	Yes	Foraging and nesting; breeds March to August
Eastern Meadowlark	*Sturnella magna*	Yes	Foraging and nesting; breeds mid-March to 8 August
Painted Bunting	*Passerina ciris*	Yes	Foraging and nesting; breeds 27 April to 19 August

Source: USFWS, 2022, Texas A&M AgriLife Research, 2022.
Note:
a. Also identified as a USFWS Birds of Conservation Concern species, defined as migratory (or non-migratory) bird species, beyond those designated as federally threatened and endangered species, that represent the highest conservation priorities (USFWS, 2021).

3.9.1.4 Karst Habitat

Karst geology is a terrain, generally underlain by limestone or dolomite, in which the topography is chiefly formed by the dissolving of rock, and which may be characterized by sinkholes, sinking streams, closed depressions, subterranean drainage, and caves (United States Geological Survey, 2021). Bexar County, in cooperation with USFWS Southwest Region, has delineated five zones that identify the probability of the presence of rare or endemic karst invertebrate species (**Figure 3-8**):

- **Zone 1:** Areas known to contain listed invertebrate karst species
- **Zone 2:** Areas having a high probability of containing suitable habitat for listed invertebrate karst species
- **Zone 3:** Areas that probably do not contain listed invertebrate karst species

- **Zone 4:** Areas that require further research but are generally equivalent to Zone 3, although they may include sections which could be classified as Zone 2 or Zone 5 as more information becomes available
- **Zone 5:** Areas that do not contain listed invertebrate karst species.

Bexar County Karst Zones 1 and 2 are associated with construction restrictions on JBSA-BUL that generally prohibit ground disturbance except in areas that are previously disturbed. In the event that karst or cave habitat is discovered during trenching, work in the area must stop immediately and the area must be surveyed by the JBSA-BUL NRO.

KPAs are established at all caves containing listed karst species and are restricted from certain activities in order to preserve the surface area around the location. KPAs are 90-acre circles that are established with the cave at the center; JBSA-BUL contains 2,757 acres of KPAs, mainly focused in the southwest and southeast regions of the Base. JBSA-BUL NRO is in the process of reassessing the existing on-Base KPAs with the National Cave and Karst Research Institute to consider current karst preserve design recommendations where consistent with the military mission. KPAs are located across JBSA-BUL but are not identified on maps in order to protect the sensitive habitat and protected invertebrates found within the caves. USFWS outlined management and monitoring strategies for KPAs in *Karst Preserve Managing and Monitoring Recommendations* (USFWS, 2014).

USFWS has designated critical habitat for karst invertebrates in two areas adjacent to the far southwestern boundary of JBSA-BUL and on the eastern side of Blanco Road outside of the Installation boundary (USFWS, 2020). Critical habitat consists of specific geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management protection as well as areas that are not currently occupied by the species but will be needed by its recovery (USFWS, 2021b). The ESA, as amended by the *National Defense Authorization Act for Fiscal Year 2004*, exempts military installations from “critical habitat” designations in cases where a Sikes Act-compliant INRMP provides a demonstrable benefit to one or more ESA-listed species.

Within JBSA-BUL, karst landforms including caves are located throughout the Installation with greater numbers in the south and north sides of the installation (Air Force, 2020b). Karst topography forms habitats for several threatened or endangered species, including the Bracken Bat Cave meshweaver, Cokendolpher Cave harvestman, Government Canyon Bat Cave meshweaver, Government Canyon Bat Cave spider, Madla Cave meshweaver, and Robber Baron Cave meshweaver (see **Table 3-4** above). Karst topography habitat is also home to 13 endemic species at JBSA-BUL (**Table 3-6**). None of the endemic species is currently federally or state listed. These species are found in caves protected by existing KPAs, as described above.

Table 3-6
Endemic Species Associated with Karst Habitat on JBSA-BUL

Common Name	Scientific Name
Ground Beetle (unnamed)	*Rhadine bullis*
Ground Beetle (unnamed)	*Rhadine ivyi*
Ground Beetle (unnamed)	*Rhadine sprousei*
Millipede (unnamed)	*Speodesmus ivyi*
Millipede (unnamed)	*Speodesmus falcatus*
Cave meshweaver (unnamed)	*Cicurina brunsi*
Cave meshweaver (unnamed)	*Cicurina bullis*
Cave meshweaver (unnamed)	*Cicurina platypus*
Armored harvestmen (unnamed)	*Texalla elliotti*
Armored harvestmen (unnamed)	*Texalla hilgerensis*
Dipluran (undescribed)	*Myxojapyx* sp.
Pseudoscorpion (unnamed)	*Tarttartogreagis reyesi*
Seed Shrimp	*Ostracoda podocopida*

3.9.1.5 Invasive Species

Invasive pest management is conducted on JBSA-BUL in accordance with the JBSA *Integrated Pest Management Plan*. JBSA-BUL has three main invasive species of importance that occur on the Base, including feral hogs, tawny crazy ants (*Nylanderia fulva*), red imported fire ants (RIFA; *Solenopsis invicta* sp.), and bamboo (*Bambusoideae* sp.).

Feral hogs are managed through a cooperative agreement between the JBSA-BUL NRO and the JBSA-BUL hunting program. The feral hogs at JBSA-BUL are the most managed invasive species at the Installation; their rooting and wallowing behaviors increase soil erosion and negatively impact water quality. The hogs also prey on small vertebrate animals and eat the eggs of ground nesting birds (Air Force, 2020b).

RIFA are an invasive species of particular concern because they may directly compete with or directly prey upon karst invertebrates and cave crickets, which are important sources of nutrient input for karst invertebrates (Air Force, 2020b). The NRO presently monitors and controls RIFA populations within a 50-meter radius of listed karst species locations, including monthly or bimonthly inspections and use of high-pressure hot water and soap treatments, conducted biannually. Presently, 75 caves and karst features are monitored for RIFA.

3.9.2 ENVIRONMENTAL CONSEQUENCES

The level of impact on biological resources is based on the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource; proportion of the resource that would be affected relative to its occurrence in the region; sensitivity of the resource to the proposed activities; and duration of potential ecological ramifications. The potential impacts on biological resources would be considered adverse if species or habitats of high concern would be negatively affected over relatively large areas. Impacts would also be considered adverse if estimated disturbances would cause reductions in population size or distribution of a species of high concern.

As a requirement under the ESA, federal agencies must provide documentation that ensures that the agency's proposed actions would not adversely affect the existence of any threatened or endangered species. The ESA requires that all federal agencies avoid "taking" federally threatened or endangered species (which includes jeopardizing threatened or endangered species habitat). Section 7 of the ESA establishes a consultation process with the USFWS that ends with USFWS concurrence or a determination of the risk of jeopardy from a federal agency's proposed project.

3.9.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. Biological resources on JBSA-BUL would continue to be managed in accordance with the JBSA INRMP. On a regional level, biological resources would continue to be managed by federal, state, and local governments, as well as through other private and public interests.

3.9.2.2 Proposed Action

Construction projects involving new buildings and structures have the potential to impact biological resources through new land disturbances. Improvement/maintenance projects typically involve renovation and maintenance on existing buildings and structures and are less likely to create new disturbances and potential impacts.

Vegetation
Impacts to vegetation would be negligible to minor for both the construction/demolition and improvement/maintenance projects. Most projects under the Proposed Action would occur in previously disturbed areas where native vegetation is minimal. However, numerous projects would affect vegetation on JBSA-BUL either through removal and/or trimming, including Projects C1/D1, C2, C3, C4, C5, D7,

C8/D8, C12, C13, and C14. The amount of vegetation removed or altered under the Proposed Action would be determined during the design phase of such projects. For example, vegetation effects under Project C14, the establishment of 3.4 miles of armored multi-purpose vehicle (AMPV) trail, would be vary as it would establish approximately 1.2 miles of new hardscape trails on JBSA-BUL whereas other portions of the project would leverage existing roadways.

Wildlife Species and Habitat
As described above, relatively small areas of vegetation would be affected by projects implemented under the Proposed Action, and most of these areas are near existing roads and other previously disturbed areas. Therefore, impacts to common wildlife species would be expected to be negligible.

Threatened or Endangered and Other Protected Species
Most projects included in the Proposed Action would occur in previously disturbed areas that do not contain habitat for any threatened or endangered and other protected species. However, Projects C2, C3, I4, I8, I9, I10, and portions of Project C14, would occur within the existing 300-foot buffer for GCWA core habitat. Under the Proposed Action, all agreed upon management measures and best practices pertaining to the GWCA, migratory birds, and their habitat on JBSA-BUL would remain in place. These include conducting all vegetation removal and trimming between 1 September and 28 February each year to ensure compliance with the MBTA and ESA and immediately painting oak trees that are cut to prevent oak wilt. When possible, trees would be pruned rather than completely removed in order to maintain soil stability, particularly near and in 100-year floodplains. Therefore, the Air Force has determined that the Proposed Action may affect, but is not likely to adversely affect, the GCWA.

The JBSA-BUL NRO has determined that implementation of Project C14 would not affect endangered species or cause adverse modifications to their habitats, specifically karst species and the GCWA (Air Force, 2021). All vegetation clearing associated with the project and the continued maintenance for the AMPV trail would occur between 1 September and 28 February to minimize impacts to migratory birds. A similar conclusion can be reached for other projects under the Proposed Action that would occur adjacent to, but not in, existing endangered species habitat. All ground-disturbing activities would be required to obtain a dig permit that allows review of each specific project and identification of any required mitigation action (USAF, 2021). Therefore, the Air Force has determined that the Proposed Action would have no effect on protected karst species, including *Rhadine exilis, Rhadine infernalis,* and Madla's Cave meshweaver.

In addition to restricting timing of vegetation clearing and trimming to protect migratory birds, any facility proposed for demolition would be inspected for active bird nests prior to project implementation in breeding season (1 March–31 August). Should an active nest (i.e., with a bird or egg present) be discovered, the demolition would be postponed until the nest is empty in compliance with the MBTA. Empty nests discovered during construction activities can be removed.

Karst Habitat
None of the projects under the Proposed Action would occur in KPA-designated areas. Project C13, construction of a new 5,000 sf storage facility adjacent to Building 6274, is located within an area designated as Bexar County Karst Zone 1. Karst Zone 1 includes areas known to contain listed invertebrate karst species and known to contain suitable habitat. Project C13 would occur within a previously disturbed area immediately adjacent to Building 6274. In the event that karst/cave would be discovered during trenching, all work would stop immediately, the JBSA-BUL NRO would be contacted, and the area would be surveyed for protected species before work would be allowed to continue.

When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on biological resources would be anticipated to occur with implementation of the Proposed Action.

3.9.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would require contractors to implement the following BMPs to reduce potential effects on biological resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Comply with the applicable provisions of the CWA and Section 438 of the EISA to control and manage erosion, minimize sedimentation of surface waters, and incorporate green infrastructure and techniques by design.
- Revegetate disturbed areas with native species; TPWD recommends incorporating pollinator conservations and management into revegetation and landscaping plans.
- Avoid construction (e.g., tree removal or noise-intensive activities) within the nesting season (15 August through 28 February) of migratory birds observed on or near project activities to avoid any incidental take. This timeline would also cover the 300-foot GCWA habitat buffer.
- Design, construct, and maintain project-specific stormwater management features to the benefit of wildlife habitat, when applicable and possible.

No project-specific mitigation measures are recommended.

3.10 CULTURAL RESOURCES

Cultural resources are any prehistoric or historic district, site, building, structure, or object considered important to a culture or community for scientific, traditional, religious, or other purposes. These resources are protected and identified under several federal laws and EOs. Cultural resources include the following subcategories:

- Archaeological (i.e., prehistoric or historic sites where human activity has left physical evidence of that activity, but no structures remain standing);
- Architectural (i.e., buildings, structures, groups of structures, or designed landscapes that are of historic or aesthetic significance); and
- Traditional Cultural Properties (TCPs) (resources of traditional, religious, or cultural significance to Native American Tribes).

Significant cultural resources are those that have been listed on the National Register of Historic Places (NRHP) or determined to be eligible for listing. To be eligible for the NRHP, properties must be 50 years old and have national, state, or local significance in American history, architecture, archaeology, engineering, or culture. They must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association to convey their historical significance, and meet at least one of four criteria for evaluation:

A. Associated with events that have made a significant contribution to the broad patterns of our history
B. Associated with the lives of persons significant in our past;
C. Embody distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; and/or
D. Have yielded or be likely to yield information important in prehistory or history.

Properties that are less than 50 years old can be considered eligible for the NRHP under Criterion G if they possess exceptional historical importance. Those properties must also retain historic integrity and meet at least one of the four NRHP criteria (Criteria A, B, C, or D). The term “historic property” refers to National Historic Landmarks, NRHP-listed, and NRHP-eligible cultural resources.

Federal laws protecting cultural resources include the *Archaeological and Historic Preservation Act of 1960*, as amended (16 USC § 469), the *American Indian Religious Freedom Act of 1978* (42 USC § 1996), the *Archaeological Resources Protection Act of 1979*, as amended (16 USC §§ 470aa–470mm), the *Native American Graves Protection and Repatriation Act of 1990* (25 USC § 3001, et seq.), the NHPA, as amended through 2016, and associated regulations (36 CFR Part 800). The NHPA requires federal agencies to consider effects of federal undertakings on historic properties prior to making a decision or taking an action and integrate historic preservation values into their decision-making process. Federal agencies fulfill this requirement by completing the NHPA Section 106 consultation process, as set forth in 36 CFR Part 800. NHPA Section 106 also requires agencies to consult with federally recognized American Indian tribes with a vested interest in the undertaking. NHPA Section 106 requires all federal agencies to seek to avoid, minimize, or mitigate adverse effects to historic properties (36 CFR § 800.1[a]).

For cultural resources analysis, the ROI is defined by the APE. The APE is defined as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR § 800.16[d]) and thereby diminish their historic integrity.

The direct and indirect APE for this study includes 50 meters and 800 meters around each project location, respectively. The ROI for cultural resources is commensurate with the APE of the Proposed Action. No adverse impacts on cultural resources would be anticipated beyond the ROI.

3.10.1 EXISTING CONDITIONS

Under the NHPA, "significant" cultural resources are those listed or determined eligible for listing on the NRHP. Historic properties 50 years or older that have national, state, or local significance in American history, architecture, archaeology, engineering, or culture are potentially eligible for listing on the NRHP; however, properties less than 50 years old that possess exceptional historical importance may also qualify as eligible for listing.

Under the NHPA, a property or site to be listed or eligible for listing on the NRHP must possess sufficient integrity of location, design, setting, materials, workmanship, feeling, and association, and meet one or more of the NRHP significance criteria (54 USC 302103).

Section 106 requires federal agencies to consider and assess the effects an undertaking may have on historic properties. It also requires federal agencies to consult with the SHPO to avoid, reduce, or minimize adverse effects. Further, federal agency consultations under Section 106 provide an opportunity for public involvement. The SHPO, federally recognized Native American Tribes, representatives of local governments, other federal agencies with jurisdiction related to the undertaking, and individuals and organizations with a demonstrated interest in the undertaking may participate in the Section 106 process as "consulting parties." Through the scoping process for this EA, these stakeholders were identified and invited to participate in the Section 106 and EIAP processes for the Proposed Action.

3.10.1.1 Archaeological Resources

Cultural resources surveys at JBSA-BUL began in 1977. Since that time, the entire Installation has been surveyed and a total of 446 archaeological sites have been documented (Air Force, 2020c, Appendix A). Of these sites, 30 have been found eligible for listing on the NRHP and 18 additional sites are under review for eligibility. Seven of the 48 sites are known to contain human remains. Types of resources that have been specifically identified in recent studies include, but are not limited to, rock art sites; "power" rocks and locations; medicine areas; and landscape features such as specific peaks or ranges, hot springs, meadows, valleys, and caves. Eligible and potentially eligible archaeological sites include prehistoric, historic, military-era, and burial sites.

3.10.1.2 Architectural Resources

Ongoing surveys at JBSA-Camp Bullis have identified 760 architectural resources on the Installation. Of these 760 buildings, 18 have been deemed eligible for listing on the NRHP either on individual merit, contributing to a historic district eligible for the NRHP, or for the purposes of a Program Alternative (**Table 3-7** and **Figure 3-9**). One proposed historic district known as the Cantonment Historic District (CHD) has also been identified.

Table 3-7
NRHP Eligible Architectural Resources on JBSA-BUL

Building Number	Site Date	Site Type	NRHP Eligibility
5147	1930	Decorative Fountain/Pond	NREI
5900	1930	Technical Training Classroom	NREC
5901	1930	Vehicle Operations Administration	NREC
5902	1930	AETC Technical Training Support	NREI, NREC
5903	1930	Administrative Office, Non-Air Force	NREC
5904	1930	Chapel, Base	NREC
5905	1930	Separate Toilet/Shower Building	NREC
5906	1951	Administrative Office, Non-Air Force	NREC
5907	1930	Separate Toilet/Shower Building	NREC
5908	1930	Headquarters Named/Numbered Division	NREI, NREC
6000	1931	Consolidated Open Mess	NREC
6088	1941	Storage magazine above ground Type A, B, & C	ELPA
6111	1935	Sanitary latrine	NREI
6266	1911	Family housing detached storage	NREI
6303	1951	Combat Arms Training Maintenance Building	NREI
6304	1951	Combat Arms Training Maintenance Building	NREI
6305	1960	Water well	NREI

Source: Freeman, 1998; Air Force, 2020b

AETC = Air Education and Training Command; ELPA = Eligible for the purposes of a Program Comment; NREC = Contributing element to an eligible National Register district (Cantonment Historic District); NREI = Individually eligible for the National Register; NRHP = National Register of Historic Places

The Texas Historical Commission (THC) recommended that the CHD (Buildings 5900–5908 and 6000) be formally submitted to the NRHP for listing. The CHD, which was planned in 1929 and 1930 and built between 1930 and 1945, is composed of 36 buildings (e.g., dining halls, classrooms), 2 sites (open spaces), 33 structures (e.g., culverts, target ranges), and 11 objects (e.g., flagpole, walls) (Freeman, 1997) and is associated with the Civilian Conservation Corps and Work Progress Administration work programs and military training programs during the late 1930s through WWII (Air Force, 2020c). This area represents a revised historic district originally identified as part of the Camp Bullis Cantonment Historic District in a 1998 survey and determined eligible for listing on the NRHP under Criteria A and C. The original historic district was revised and recommended for formal submittal as part of Section 106 consultation for the JBSA-BUL Dining Facility Construction and Demolition project (THC, 2021). The formal nomination of the revised Cantonment Historic District is included as part of the mitigation measures outlined by the THC for the JBSA-BUL Dining Facility Construction and Demolition project and must be completed and finalized prior to the demolition of the buildings proposed under that action (i.e., Buildings 5101, 5105, 5106, 5107, 5110, 5122, 5123, 5124, 6202, and 6204).

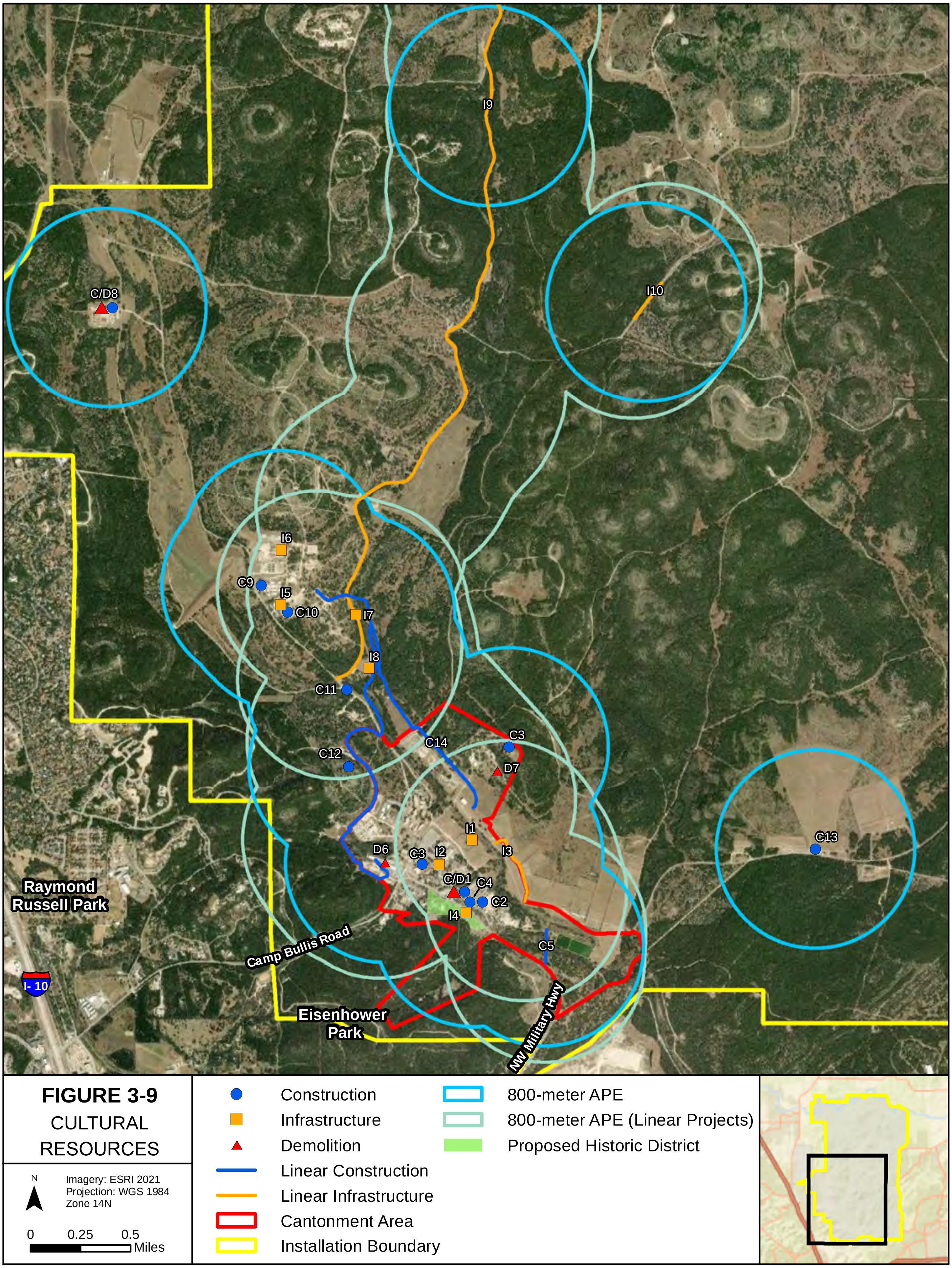


FIGURE 3-9
CULTURAL RESOURCES

3.10.1.3 Native American Sacred Sites and Properties of Traditional and Religious Cultural Importance

Native American Tribes identified as having a historical association with the JBSA area include three federally recognized tribes: Comanche Nation, Oklahoma; Mescalero Apache Tribe of the Mescalero Reservation, New Mexico; and Tonkawa Tribe of Indians of Oklahoma. These tribes have been identified as having an interest in area activities and historic properties. The Air Force consults with the Comanche Nation, Mescalero Apache Tribe of the Mescalero Reservation, and Tonkawa Tribe of Indians on federal actions occurring at JBSA.

No TCPs or sacred sites have been identified at JBSA. The Air Force maintains continued government-to-government communication to ensure compliance with applicable regulations. Although no TCPs or sacred sites have been identified at JBSA, Native American human remains have been identified at JBSA-BUL, and there is the potential for the discovery of additional human remains and funerary objects in the future (Air Force, 2020c).

Following the discovery of Native American human remains at JBSA-BUL, the following events were initiated:

- A NAGPRA inventory of archaeological collections was conducted in 1995, identifying a single human remain at JBSA-BUL.
- JBSA-BUL began the preparation of standard operating procedures in consultation with the four federally recognized Native American Tribes identified above. The consultation was completed in 2005, resulting in a formal agreement between JBSA-BUL and the four federally recognized tribes regarding NAGPRA standard operation procedures, which are outlined in the JBSA *Integrated Cultural Resources Management Plan*.
- The Air Force held meetings with the federally recognized tribes in 2019 and 2020 to discuss NAGPRA issues.

The potential for undocumented archaeological resources, including Native American human remains, exists at JBSA-BUL in small, scattered segments of undisturbed ground that may contain prehistoric, historic, military-era, or burial sites (Air Force, 2020c).

3.10.2 ENVIRONMENTAL CONSEQUENCES

Adverse impacts on cultural resources might include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; neglecting the resource to the extent that it deteriorates or is destroyed; or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate enforceable restrictions or conditions to ensure preservation of the property's historic significance. For the purposes of this EA, an impact is considered significant if it alters the integrity of a NRHP-listed, eligible, or potentially eligible resource or potentially impacts TCPs.

Potential adverse impact(s) on cultural resources would include an "adverse effect" on above- or below-ground historic resources, as determined in consultation with the THC under Section 106 of the NHPA.

3.10.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing facilities and infrastructure would continue to operate but, over time, would fall into disrepair. Cultural resources at JBSA-BUL would continue to be managed in accordance with the JBSA *Integrated Cultural Resources Management Plan*. On a regional level, cultural resources would continue to be managed by federal, state, and local governments, as well as through other private and public interests. Impacts to archaeological resources in the APE would remain unchanged from current conditions.

Under the No Action Alternative, renovation of Building 5903 (Project I4), which is eligible for listing on the NRHP due to its location within the CHD, would not occur. The renovation of Building 5903 is included as part of the agreed upon mitigation measures for the JBSA-BUL Dining Facility Construction and Demolition project. Failure to renovate the building would mean continued structural deterioration, potentially causing the building to fall into a state of disrepair over time from which it could not recover. Under 36 CFR § 800.5(a)(2)(vi), “neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization” constitutes an adverse effect on a historic property. Failure to renovate Building 5903 would cause the JBSA-BUL Dining Facility Construction and Demolition project to violate the terms of the formal Section 106 consultation agreement reached in July 2021, resulting in insufficient mitigation of impacts associated with the significant adverse effects that would otherwise result from implementation of the project. Therefore, implementation of the No Action Alternative would lead to an adverse effect to historic properties under Section 106 of the NHPA for Building 5903. No other impacts to architectural resources in the APE would be anticipated.

3.10.2.2 Proposed Action

Archaeological Resources

As noted in **Section 3.10.1.3**, there is the potential for undocumented archaeological resources, including Native American human remains, to occur at JBSA-BUL in small, scattered segments of undisturbed ground that may contain prehistoric, historic, military era, or burial sites (Air Force, 2020c). Such resources could be uncovered during ground-disturbing activities under the Proposed Action, including Projects C1/D1, C2, C3, C4, C5, C8/D8, C9, C11, C12, C13, and C14 (see **Table 2-**). Except for Project C14, each of these projects would be implemented in an area that has been previously disturbed. Project C14 would partially clear vegetation adjacent to existing trails or dirt roads while other portions of this linear project would involve vegetation removal or clearance. In these areas, the potential exists to uncover additional archaeological resources during construction.

Archaeological sites are located within the direct APEs of Projects C14 and C5, both of which involve road construction (Air Force, 2018a). In the event of an unanticipated discovery of an archaeological resource during demolition or construction, ground-disturbing activities would be suspended, and a cultural resources meeting called to determine if an Unanticipated Discovery Plan would be developed and implemented.

Architectural Resources

Under the Proposed Action, seven buildings within the proposed CHD would fall within the direct APE (**Table 3-8** and **Figure 3-9** above).

Under the Proposed Action, Project C3 involves the installation of two cell towers, one of which would be placed within 50 meters of Building 5000. Building 5000 was constructed in 1917 and has been determined individually eligible for listing on the NRHP. Installation of a cell tower within 50 meters of an eligible property would constitute an adverse effect under 36 CFR § 800.5(a)(2)(v), which includes “introduction of a visual, atmospheric, or audible elements that diminish the integrity of the property’s significant historic features” as an example of an adverse effect on historic properties. The installation of a cell tower in the vicinity of Building 5000 would also be visible from historic structures located within the CHD. Thus, implementation of the Proposed Action would have the potential to cause adverse impacts to the existing viewshed of these resources and the CHD as a whole.

Table 3-8
Historic Buildings Within the Direct APE

Building Number	Site Date	Site Type	NRHP Eligibility	Proposed Action[a]
5903	1930	Administrative Office, Non-Air Force	NREC	D
5904	1930	Chapel, Base	NREC	2
5905	1930	Separate Toilet/Shower Building	NREC	2
5906	1951	Administrative Office, Non-Air Force	NREC	2
5907	1930	Separate Toilet/Shower Building	NREC	D
5908	1930	Headquarters Named/Numbered Division	NREI, NREC	D

Source: Air Force, 2020b
Note:
a. See **Table 2-1** for Description of Proposed Action
AETC = Air Education and Training Command; ELPA = Eligible for the purposes of a Program Comment; NREC = Contributing element to an eligible National Register district (Cantonment Historic District); NREI = Individually eligible for the National Register; NRHP = National Register of Historic Places

Under the Proposed Action, Project I4 would involve the renovation of Building 5903, the former Officer's Mess, for use as an administrative headquarters. Renovation of Building 5903 was recommended by the THC as one of the mitigation measures for the JBSA-BUL Dining Facility Construction and Demolition project, which would otherwise have a significant adverse effect to cultural resources. Implementation of Project I4 would renovate the historic structure and restore it to appropriate use within the CHD, resulting in a beneficial effect to cultural resources.

All of the buildings that have been determined eligible for listing on the NRHP (see **Table 3-7**), including those eligible as part of the proposed CHD, would fall within the indirect APE for multiple projects under the Proposed Action (**Figure 3-9**). Architectural resources within the indirect APE for projects occurring under the Proposed Action could experience an altered viewshed from implementation of the proposed construction/demolition projects not outlined above. However, these resources are located within the existing cantonment area of the Installation, which undergoes regular construction and demolition of facilities in order to support the JBSA-BUL mission.

JBSA maintains a PA with the Texas SHPO for the management of cultural resources on its properties. The PA outlines procedures and protocols within and between the parties for this purpose, including the Section 106 consultations under the NHPA. The current PA is in effect through January 2023.

The need for additional SHPO consultation would be evaluated on a project-level basis by JBSA Cultural Resources as individual ADP project plans are developed. The applicability of the existing PA and eligibility determinations would be considered, and where adverse effects to eligible resources could not be avoided, JBSA would develop mitigation measures acceptable to the SHPO. With the SHPO's acceptance of mitigation measures, individual Section 106 Memoranda of Agreement would not be needed under the PA.

Native American Sacred Sites and Properties of Traditional and Religious Cultural Importance
The JBSA *Integrated Cultural Resources Management Plan* recommends that the seven archaeological sites at JBSA-BUL that have a high potential to contain additional human remains be avoided during ground disturbance. None of the 14 projects under the Proposed Action would require ground disturbance in the vicinity of these archaeological resources, which are not identified for their protection. In the event of an unanticipated discovery of an archaeological resource during demolition or construction activities, ground-disturbing activities would be suspended, and a cultural resources meeting called to determine if an Unanticipated Discovery Plan would be developed and implemented.

Under the Proposed Action, historic preservation laws and initiatives would continue to limit, control, or guide development in a manner that protects cultural resources in the public interest. JBSA-BUL would continue to maintain and implement its *Integrated Cultural Resources Management Plan* and PA in coordination with the SHPO and other interested consulting parties, including its obligations under Section

106 of the NHPA. These measures would ensure that cultural resources continue to be evaluated and considered in planning for future actions that could affect such resources on or around JBSA-BUL. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to cultural resources would be anticipated to occur with implementation of the Proposed Action.

3.10.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would implement the following BMPs to reduce potential effects on cultural resources under the Proposed Action:

- Comply with JBSA environmental specifications during construction activities.
- Incorporate design elements to minimize the potential to impact the proposed historic district.
- Plant native and habitat-appropriate trees and vegetation to limit undesirable views from historic properties that could result from projects included in the Proposed Action, such as newly constructed buildings or structures.
- Comply with applicable development standards and regulations with respect to architectural design of the Proposed Action in accordance with the JBSA IDP.

No project-specific mitigation measures for cultural resources were identified by analysis.

3.11 ENVIRONMENTAL JUSTICE AND PROTECTION OF CHILDREN

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (1994), as amended by EO 14008, *Tackling the Climate Crisis at Home and Abroad* (2021), directs federal agencies to address disproportionate adverse human health, environmental, and climate-related impacts on disadvantaged communities. As part of these directives, federal agencies are required to consider low-income and minority populations when implementing a federal action with the potential to affect the environment. Because children are more susceptible to environmental contaminants than adults, EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, provides similar direction to federal agencies to address these risks when implementing a federal action.

For the purposes of this analysis, minority populations are defined as Alaska Natives and American Indians, Asians, Blacks or African Americans, Native Hawaiians, and Pacific Islanders or persons of Hispanic origin (of any race); low-income populations include persons living below the poverty threshold as determined by the US Census Bureau (USCB); and youth populations are children under the age of 18 years.

The environmental justice ROI is San Antonio North Census County Division (CCD). This CCD includes the city of San Antonio, JBSA-BUL, portions of the City of San Antonio ETJ, as well areas in their vicinity, which are then compared with those populations in Bexar County, the state of Texas, and the US. The communities in the CCD would be most likely to receive a disproportionate share of impacts associated with the Proposed Action (e.g., traffic congestion, reduced water and air quality).

3.11.1 EXISTING CONDITIONS

3.11.1.1 Environmental Justice

An evaluation of minority and low-income populations in the San Antonio North CCD and Bexar County forms a baseline for the evaluation of the potential for disproportionate impacts on these populations from the Proposed Action.

In 2019, the state of Texas recorded a higher percentage of minorities in the population compared to the entire US, with Bexar County recording a higher percentage of minorities in the population than the state of Texas (USCB, 2021a) (**Table 3-9**). The San Antonio North CCD recorded a lower percentage of minorities than the state of Texas. Similarly, the state of Texas recorded a higher percentage of the population that is Hispanic or Latino compared to the rest of the US, with Bexar County recording a higher percentage of the population as Hispanic or Latino. Comparatively, the San Antonio North CCD reported a higher percentage of the population as Hispanic or Latino than the state of Texas or the US but remained approximately 20 percentage points lower than Bexar County.

Over the same period, Bexar County had higher rates of poverty than the state of Texas and the US, and the San Antonio North CCD recorded a lower rate of poverty than the other jurisdictions (**Table 3-9**). The state of Texas recorded poverty rates slightly higher than the US average.

Table 3-9
Total Population and Populations of Concern

Location	Total Population	Percent Minority	Percent Hispanic or Latino[a]	Percent Below Poverty	Percent Youth[b]	Percent Elderly
San Antonio North CCD	380,994	44.4	40.1	9.2	23.4	13.3
Bexar County	1,952,843	72.3	60.2	15.7	25.7	11.8
State of Texas	28,995,881	58.9	39.7	13.6	25.5	12.9
United States	328,239,523	40.0	18.4	12.3	22.2	16.5

Source: USCB, 2021a, 2021b
Note:
a. Hispanic and Latino denote a place of origin.
b Percent youth are all persons under the age of 18.

3.11.1.2 Protection of Children

The percentage of children in the city of San Antonio was similar to the percentage of children in Bexar County and the state of Texas while all three recorded higher percentages of children as a portion of the population than the US as a whole (USCB, 2021b).

3.11.2 ENVIRONMENTAL CONSEQUENCES

Potential adverse impact(s) on environmental justice communities would include a determination by analysis that potential adverse impacts would be disproportionately felt by minority, low-income, or youth populations present in the ROI.

3.11.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. Impacts to minority, low-income, and youth populations on JBSA-BUL and the surrounding environs would remain unchanged from current conditions. No significant impacts to minority, low-income, and youth populations would be anticipated.

3.11.2.2 Proposed Action

The Proposed Action would not be anticipated to result in disproportionately high and adverse impacts to minority, low-income, or youth populations. Improvement/maintenance and construction/demolition projects under the Proposed Action would not impact the availability of housing, community resources, and community services in the ROI. Construction noise associated with the Proposed Action would be temporary and confined to the Installation. The impact assessment for each of the resource topics considered in the preceding sections identified insignificant impacts on the physical, natural, and human environment. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to environmental justice communities or children would be anticipated to occur with implementation of the Proposed Action.

3.11.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

No BMPs are recommended (beyond those for related resources) to reduce potential environmental justice impacts.

No project-specific mitigation measures are recommended.

3.12 INFRASTRUCTURE, TRANSPORTATION, AND UTILITIES

Infrastructure consists of the systems and structures that enable a population in a specified area to function. Infrastructure is wholly man-made, with a high correlation between the type and extent of infrastructure and the degree to which an area is characterized as developed. The availability of infrastructure and its capacity to support more users, including residential and commercial expansion, are generally regarded as essential to the economic growth of an area.

The infrastructure components include transportation, utilities, solid waste management, and sanitary and storm sewers. Transportation is defined as the system of roadways, highways, and transit services in the vicinity of the installation that potentially could be affected by a proposed action. Utilities include electrical, potable water supply, sanitary sewage/wastewater, and communications systems. Solid waste management primarily relates to the availability of landfills to support a population’s residential, commercial, and industrial needs. Sanitary and storm sewers (also considered utilities) include those systems that collect, move, treat, and discharge liquid waste and stormwater.

The ROI for this resource is JBSA-BUL and areas adjacent to the Base boundary with associated infrastructure.

3.12.1 EXISTING CONDITIONS

3.12.1.1 Transportation

JBSA-BUL is located adjacent to the City of San Antonio and is approximately 21 miles northeast of the downtown area. The Base is situated predominantly in Bexar County, Texas, with a small portion of its northern border within Comal County. Intermodal road, rail, and air transportation networks connect City of San Antonio, the county seat of Bexar County and the second largest city in Texas, to other parts of the state and the US. The City of San Antonio and JBSA-BUL are serviced by Interstate 10, which runs along the western side of the Base boundary.

The roadway system within JBSA-BUL is made up of a network of roads and trails with different surface types, including pavement, gravel, and dirt. Roadway widths vary from one lane to two lanes, with and without shoulders, and all roadways are posted for 25 miles per hour speeds. The two paved primary roads on the JBSA-BUL cantonment are Northwest Military Highway and Camp Bullis Road, with most buildings on the Base adjacent to these roads. The main access roads to the training areas from the cantonment area are Camp Bullis Road, Lewis Valley Road, Marne Road, Malabang Trail, and Wilderness Trail.

3.12.1.2 Electricity

JBSA-BUL receives electrical power through City Public Service Energy. There are no contractual limitations on the amount of electricity the Base may purchase.

3.12.1.3 Potable Water Supply

JBSA-BUL operates its own water production, storage, and distribution system; its potable water source comes from the Trinity Group Aquifers. Three wells supply potable water to JBSA-Camp Bullis: Nos. 3 and 15, and the Deployable Medical Systems Equipment for Training (DMSET) well. All three wells receive injections of chlorine, fluoride, and phosphate corrosion inhibitor into the raw water supply before being pumped to elevated storage tanks. The total storage capacity on JBSA-BUL is approximately 0.45 million gallons.

3.12.1.4 Sanitary Sewer System and Stormwater Channels

The wastewater collection system at JBSA-BUL includes 43,000 lf of main pipelines and six lift stations that deliver wastewater to the JBSA-BUL wastewater treatment plant. The wastewater treatment plant (Facility 5920) is designed for a daily flow of 0.68 million gallons per day and a 2-hour peak flow of 2.48 MGD.

There currently is no advanced stormwater system in place at JBSA-BUL; stormwater generally follows natural drainage patterns (e.g., interim creeks, valleys) that are enhanced by curbing, parking lots, and ditches.

3.12.1.5 Solid Waste Management

Solid waste on JBSA-BUL is collected and disposed of off Base by a disposal services contractor at a TCEQ-approved and certified solid waste landfill (Fort Sam Houston, 2009).

3.12.2 ENVIRONMENTAL CONSEQUENCES

Impacts on infrastructure from a proposed action are evaluated for their potential to disrupt or improve existing levels of service in the ROI, and whether they will generate additional requirements for energy or water consumption. Impacts to resources such as sanitary sewer systems and solid waste management are also assessed.

Adverse transportation impacts would occur if a proposed action resulted in a substantial increase in traffic generation that would cause a decrease in the level of service, a substantial increase in the use of the connecting street systems or mass transit, or if onsite parking demand would not be met by projected supply. Adverse impacts related to utilities or services would occur if a proposed action required more than the existing infrastructure could provide or required services in conflict with adopted plans and policies for the area.

3.12.2.1 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. Local and regional roadways in the vicinity of JBSA-BUL would continue to operate under current conditions. Peak-hour traffic volumes likely would remain consistent with the status quo. Utility and infrastructure systems would continue to operate, providing essential services to the population of JBSA-BUL. Over time, the use, capacity, and condition of such systems would be expected to change with supply and demand or technology innovation. Impacts to utilities on JBSA-BUL would remain unchanged from current conditions.

3.12.2.2 Proposed Action

Transportation
Under the Proposed Action, 10,000 lf of Lewis Valley Road would be repaired under Project I7 and 10,764 sf of Houston Cutoff Rod would be repaired under Project I10. These roads would not be accessible to the public and would not impact the flow of traffic on JBSA-BUL. Construction and demolition would slightly increase the amount of local traffic from the delivery of equipment and construction materials, removal of

debris, and daily commuting of contractors. Construction traffic would be a small fraction of the existing traffic on roads at JBSA-BUL and would be expected to occur during daytime, normal working hours (i.e., between 7 a.m. and 5 p.m.). It is anticipated that repair of the roadways associated with the Proposed Action would improve travel conditions on JBSA-BUL.

Electricity
Potential short-term, negligible, adverse impacts on the electrical distribution system could occur during construction and demolition projects under the Proposed Action as a result of temporary electrical service interruptions, rerouting aboveground or underground electrical lines, or when a proposed facility would be connected to the Installation's electrical distribution system. New electrical lines would be installed under Projects C11 and C12 for the construction of new facilities.

Short-term, negligible, adverse impacts on the electrical distribution system could occur under the Proposed Action due to the operation of newly constructed buildings that may increase the demand on the system. However, energy-efficient construction to decrease consumption, consistent with EO 13990, *Climate Crisis; Efforts to Protect Public Health and Environment and Restore Science*, and cessation of operations at outdated and inefficient buildings proposed for demolition would decrease the demand. Therefore, net changes in long-term demand would be anticipated to be minimal. The electrical system would have the capacity required to meet new demands.

Potable Water Supply
Short-term, negligible, adverse impacts on the potable water supply system would occur during construction and demolition projects under the Proposed Action when existing lines are connected to new buildings or capped as appropriate. New water lines would be installed under Projects C11 and C12 for the construction of new facilities. Long-term, negligible, adverse impacts would occur because the operation of the new buildings would increase the demand on the potable water supply system; however, the cessation of operations at demolished buildings would decrease the demand. Changes in demand would be minimal, and the potable water supply system has the capacity required to meet new demands.

Sanitary Sewer
Short-term, negligible, adverse impacts on the sanitary sewer and wastewater treatment system would occur during construction and demolition projects under the Proposed Action when existing lines are connected to new buildings or capped as appropriate. New sanitary sewer lines would be installed under Projects C11 and C12 for the construction of new facilities. Long-term, negligible, adverse impacts would occur because the operation of the new buildings would increase the demand on the sanitary sewer and wastewater treatment system; however, the cessation of operations at demolished buildings would decrease the demand. Changes in demand would be minimal, and the sanitary sewer and wastewater treatment system has the capacity required to meet new demands.

Solid Waste Management
Short-term, minor, adverse impacts on solid waste management may occur during construction and demolition projects under the Proposed Action. Contractors would be required to comply with federal, state, and local regulations for the collection and disposal of solid waste generated with the implementation of the Proposed Action, and all solid waste generated would be collected and transported off Base for disposal or recycling in accordance with AFMAN 32-7002, *Environmental Compliance and Pollution Prevention*.

No long-term impacts on solid waste management would be anticipated to occur under the Proposed Action because the projects would not appreciably increase the amount of solid waste generated on the Base from everyday functions. When considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects to infrastructure, transportation, and utilities would be anticipated to occur with implementation of the Proposed Action.

3.12.3 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

No BMPs are recommended (beyond those for related resources) to reduce potential infrastructure impacts.

No project-specific mitigation measures are recommended.

3.13 HAZARDOUS MATERIALS AND WASTES

3.13.1 DEFINITION OF THE RESOURCE

CERCLA (42 USC § 9601), as amended by the *Superfund Amendments and Reauthorization Act* and *Toxic Substances Control Act* (15 USC § 2601, et seq., as implemented by 40 CFR Part 761), defines hazardous materials (HAZMAT) as any substance with physical properties of ignitability, corrosivity, reactivity, or toxicity that might cause an increase in mortality, serious irreversible illness, and incapacitating reversible illness, or that might pose a substantial threat to human health or the environment. The Occupational Safety and Health Administration is responsible for the enforcement and implementation of federal laws and regulations pertaining to worker health and safety under 29 CFR Part 1910. The Occupational Safety and Health Administration also regulates HAZMAT in the workplace and ensures appropriate training.

The *Solid Waste Disposal Act*, as amended by RCRA (42 USC § 6901), which was further amended by the *Hazardous and Solid Waste Amendments of 1984* (Public Law 98-616), defines hazardous wastes as any solid, liquid, contained gaseous, or semi-solid waste, or any combination of wastes, that pose a substantial present or potential hazard to human health or the environment. In general, both HAZMAT and hazardous wastes include substances that, because of their quantity, concentration, physical, chemical, or infectious characteristics, might present substantial danger to public health and welfare or the environment when released or otherwise improperly managed.

Air Force Policy Directive 32-70, *Environmental Considerations in Air Force Programs and Activities*, establishes the policy that the Air Force is committed to performing the following actions:

- Cleaning up environmental damage resulting from its past activities,
- Meeting all environmental standards applicable to its present operations,
- Planning its future activities to minimize environmental impacts,
- Responsibly managing the irreplaceable natural and cultural resources it holds in public trust, and
- Eliminating pollution from its activities wherever possible.

AFMAN 32-1067, *Water and Fuel Systems*, identifies compliance requirements for USTs and ASTs, and associated piping, that store petroleum products and hazardous substances. Evaluation of HAZMAT and hazardous wastes focuses on USTs and ASTs as well as the storage, transport, and use of pesticides, fuels, oils, and lubricants. Evaluation might also extend to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of a proposed action. In addition to being a threat to humans, the improper release of HAZMAT and hazardous wastes can threaten the health and wellbeing of wildlife species, botanical habitats, soil systems, and water resources. In the event of HAZMAT or hazardous waste release, the extent of contamination will vary based on the type of soil, topography, weather conditions, and water resources.

AFI 32-7086, *Hazardous Materials Management*, establishes procedures and standards that govern management of HAZMAT throughout the Air Force. It applies to all Air Force personnel who authorize, procure, issue, use, or dispose of HAZMAT, and to those who manage, monitor, or track any of those activities.

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

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

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

The ROI for potential HAZMAT and hazardous wastes effects is JBSA-BUL.

3.13.2 EXISTING CONDITIONS

3.13.2.1 Asbestos-Containing Materials and Lead-Based Paint

Many buildings in use on JBSA-BUL date from the 1930s through the 1980s, during which time asbestos-containing materials (ASM) were commonly used in construction. Nonfriable asbestos is not considered HAZMAT until it is removed or disturbed. The JBSA *Asbestos Management Plan* (AMP) identifies the need for asbestos management, abatement, and removal, where applicable, when funding is available or where damage or exposure warrants the need. The AMP focuses on in-place management of asbestos, meaning, where applicable, ACM can be left in place until there is a need for removal (i.e., due to conditions, renovation, demolition) (JBSA, 2021). The Air Force manages asbestos in accordance with AFI 32-1001, *Civil Engineer Operations*, and applicable USEPA regulations (HDR, Inc. [HDR], 2017). Buildings constructed prior to 1970 are likely to contain friable asbestos in building materials. Disruption of these materials allows asbestos to become airborne, producing a risk of inhalation.

Regulated by the USEPA (HDR, 2017), LBPs were commonly used in building materials, such as paints and metal fixtures, prior to 1978. Exposure to LBPs can cause damage to the brain, kidneys, nerves, and blood over time and is also known to contribute to behavioral problems, learning disabilities, seizures, and death, particularly in young children (US Department of Housing and Urban Development, 2021). Buildings and structure constructed before 1978 on JBSA-BUL could have the potential to contain LBP.

3.13.2.2 Polychlorinated Biphenyls

The Air Force manages PCBs in accordance with AFI 32-7002, *Environmental Compliance and Pollution Prevention*, as well as under USEPA regulations (HDR, 2017). The JBSA AMP defines PCBs as any PCB-containing equipment or material, as defined in 40 CFR Part 273, with a concentration in excess of 50 parts per million (JBSA, 2021). Buildings constructed prior to 1979, with a dependence on previous uses, potentially contain PCBs in various machinery and wiring.

3.13.2.3 Radon

Bexar County is located within Radon Zone 3. This zone has predicted average indoor radon screening levels of less than 2 picocuries per liter (USEPA, 2019). The JBSA IDP lists electromagnetic and radiation sources as a minor constraint to future development; due to the low probability of radon levels exceeding the USEPA's guidance level of 4 picocuries per liter (HDR, 2017), radon is not further evaluated.

3.13.2.4 Perfluoroalkyl Substances and Aqueous Film Forming Foam

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that are employed in a wide variety of residential, commercial, and industrial uses, and can be found in everyday items such as nonstick cookware, stain-resistant fabric and carpet, certain types of food packaging, and firefighting foam

(Air Force Civil Engineer Center [AFCEC], n.d.). In 2016, USEPA announced advisory levels for two types of PFAS in drinking water, perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA).

The USEPA has not yet enacted specific regulatory standards for PFAS. However, continued research shows that there are potential human health risks associated with these substances, and regulatory standards are being considered (AFCEC, n.d.). Aqueous Film Forming Foam (AFFF), which the Air Force began to use in the 1970s as a way to extinguish petroleum-based fires, contains both PFOS and PFOA. In August of 2016, the Air Force began phasing out PFOS-based AFFF and other AFFF products and introduced newer, more environmentally friendly formulas. In August of 2017, the Air Force finished the phase out and completed the new foam delivery (AFCEC, n.d.).

All Air Force investigation and mitigation work relating to PFOS and PFOA is done in accordance with CERCLA, applicable state laws, and the USEPA's lifetime drinking water health advisory of 70 parts per trillion (AFCEC, n.d.).

3.13.2.5 Hazardous Materials and Wastes

The RCRA program establishes the mandatory procedures and requirements for federal facilities that use, accumulate, transport, treat, store, or dispose of hazardous waste or substances. Under these requirements, USEPA can grant authority to the state to establish and enforce its own hazardous waste management program, provided the state's requirements are no less stringent than the USEPA's (USEPA, 2021b). In Texas, the TCEQ implements the RCRA program.

Activities at JBSA-BUL require the use and storage of a variety of HAZMAT that includes flammable and combustible liquids, acids, corrosives, caustics, compressed gases, solvents, paints, paint thinners, and pesticides. Hazardous and toxic substances disposal procedures are identified in the JBSA-BUL *Hazardous Waste Management Plan* (HWMP) (JBSA, 2016) and all wastes are disposed of in compliance with all federal, state, and local regulations.

JBSA-BUL is classified and permitted as a small quantity hazardous waste generator under RCRA (HDR, 2017). Under this classification, JBSA-BUL implements controlled cleanup for actions including human exposure and groundwater migration (RCRA #TX4210020133). Because the location of JBSA-BUL is in proximity to the Edwards Aquifer (see **Section 3.8.1.6**, **Figure 3-6**), hazardous waste is also regulated in part by the EAA. Under EAA Rules 713.400–409, spills of regulated substances in the Edwards Aquifer Recharge Zone or contributing zone within 5 miles of the recharge zone with the potential to pollute the aquifer and hydrologically connected surface streams are to be reported to the EAA within 72 hours. Additionally, the EAA monitors the storage of regulated substances on the recharge zone and specific portions of the contributing zone. Facilities in these environmentally sensitive areas are required to register with the EAA if they store an aggregate quantity exceeding 1,000 gallons of regulated substances in containers that are less than 500 gallons in size. Further, the EAA regulates ASTs and USTs located in, above, or on the Edwards Aquifer Recharge Zone and portions of the contributing zone. Numerous ASTs and USTs are located throughout the JBSA-BUL cantonment area, and several isolated tanks are located within the Installation training areas (**Figure 3-**).

Primary sources of HAZMAT and hazardous wastes generated at JBSA-BUL include those at Building 6104, Landfill 1, and Solid Waste Management Unit 3. JBSA-BUL's HWMP manages operations involving the handling, storage, transportation, and disposal of hazardous waste. The HWMP also serves to document the processes and procedures for HAZMAT and hazardous wastes management at JBSA-BUL, as required to remain in compliance with RCRA (JBSA, 2016).

Section 311 of the CWA, as amended by the *Oil Pollution Act* (Public Law 101-380), establishes requirements to prevent, prepare for, and respond to oil discharges at specific types of facilities, including military bases. JBSA-BUL maintains a SPCC Plan to minimize oil discharges to Waters of the US. Should an accidental spill occur at the Base, the SPCC Plan also formalizes and guides response and cleanup activities. The goal of the *Oil Pollution Act* is to prevent oil from reaching navigable waters and adjoining shorelines, and to contain discharges of oil. The Act requires these facilities to develop and implement SPCC Plans and establishes procedures, methods, and equipment requirements. Additionally, JBSA-BUL's SPCC Plan details specific procedures and responsibilities for responding to HAZMAT and petroleum product spills. The 502d Civil Engineer Squadron Installation Management Flight, Environmental Management Section, maintains the SPCC Plan, manages hazardous waste personnel, and coordinates spill responders/contractors (JBSA, 2016).

Past and current activities requiring the use of HAZMAT and petroleum products at JBSA-BUL include (HDR, 2017):

- Vehicle operation and maintenance (general and tactical)
- Infrastructure and equipment maintenance
- Pesticide applications
- Demolition and construction

Hazardous waste is created as a result of similar activities.

3.13.2.6 Environmental Restoration Program Sites

Six Installation Restoration Program (IRP) sites and four Military Munitions Response Program (MMRP) sites are located on JBSA-BUL. Of these, five of the IRP sites and two of the MMRP sites are closed and require no further action. One active IRP site, known as Site 8/Landfill 8, is located north of the cantonment area along Lewis Valley Road (**Figure 3-10**). The preliminary assessment of this site occurred in 1990 and was completed in 2013. Tetrachloroethylene (TCE) was identified as the primary Contaminant of Concern, with migration to groundwater occurring in the vicinity of Landfill 8. The Air Force has taken recent actions to reduce tetrachloroethylene concentrations. A mixture of emulsified vegetable oil and dechlorinating culture has been injected into the ground to replenish the carbon source and augment naturally occurring bacterial populations at the site (Air Force, 2020b). This led to improvements in groundwater quality; this program ceased operation in 2020.

JBSA continues to monitor Landfill 8 and other previous on-Base landfills or potential waste sites in accordance with all regulatory requirements and programs. The ERP will notify the Installation's NRO on the status of the migration of any contaminant releases into the environment and will invite NRO staff to participate in the decision-making process to ensure that impacts on natural resources are identified, considered, and addressed in the response process (Air Force, 2018b). One open MMRP site, the Stokes Mortar MMRP Site (FR001) encompasses 148.4 acres in the northern portion of the cantonment area (**Figure 3-10**). A RCRA facility investigation conducted in 2011 found munitions and explosives of concern (MEC) or munitions debris (MD) at 33 locations throughout the site, including 19 MEC items on the surface and at a subsurface depth of 12 inches. The majority of MEC and MD found at the site is concentrated in the northwestern portion of the site. MEC, MD, range-related debris, and general debris were removed from the site in 2014, but other MEC, MD, and debris may still be present.

The other open MMRP site, the 75 mm Munitions MMRP Site (FR004), encompasses 8.9 acres and is located in the southwestern portion of the cantonment area (**Figure 3-10**). The 2011 RCRA facility investigation found two MECs below the surface. MEC, MD, range-related debris, and general debris were removed from the site in 2014, but other MEC, MD, and debris may still be present.

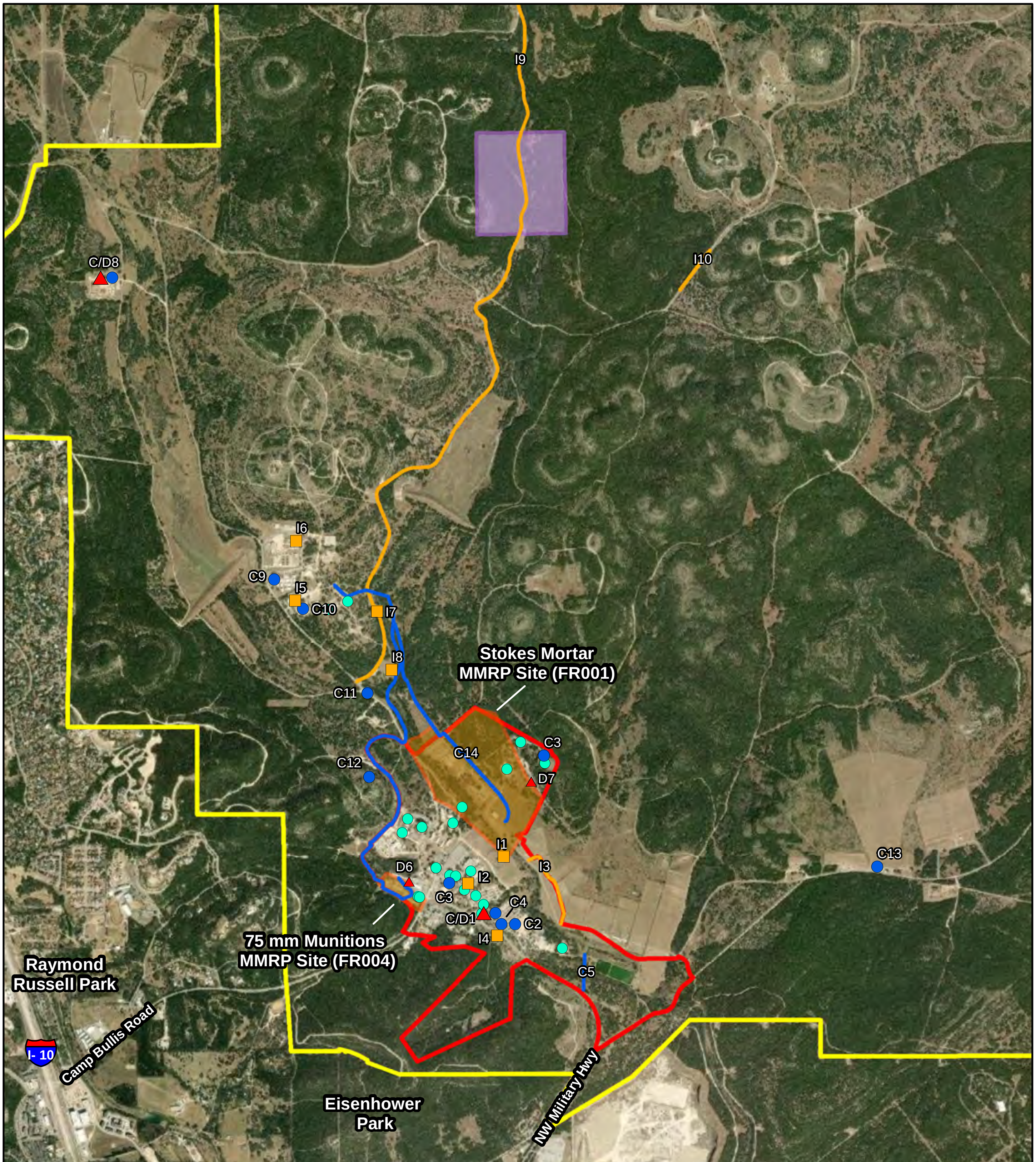


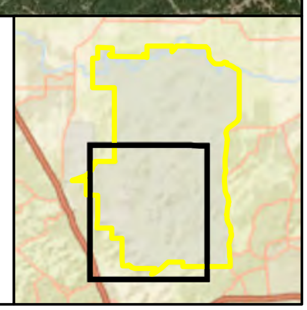
FIGURE 3-10
HAZARDOUS MATERIALS/WASTE

N

Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N

0 0.25 0.5 Miles

Construction
Demolition
Infrastructure
Storage Tank
Linear Construction
Linear Infrastructure
Cantonment Area
Installation Boundary
ERP Landfill 8
MMRP Site



3.13.3 ENVIRONMENTAL CONSEQUENCES

3.13.3.1 Evaluation Criteria

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

3.13.3.2 No Action Alternative

Under the No Action Alternative, the Proposed Action would not occur. The existing buildings and infrastructure at JBSA-BUL would continue to operate but, over time, would fall into disrepair. No impacts to hazardous materials, contaminated sites, or other resources would be expected. Any buildings targeted for construction, demolition, improvement, or maintenance that are known or suspected to contain any ACMs, LBP, or PCBs would not be updated or demolished. JBSA-BUL would continue to manage hazardous substances, materials, and wastes in compliance with applicable management plans and federal, state, and local regulations.

3.13.3.3 Proposed Action

Under the Proposed Action, the limited use of certain hazardous materials would be required during the construction, demolition, and repair phases of the Proposed Action. Associated HAZMAT might include paints, welding gases, solvents, preservatives, sealants, and pesticides. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction and demolition vehicles. Construction contractors would be responsible for monitoring exposure to hazardous materials (JBSA, 2016).

Concerns of ACMs, LBPs, and PCBs are also associated with the age of a building. Several facilities proposed for demolition or improvement/maintenance under the Proposed Action have the potential to contain these materials due to their year of construction (**Table 3-10**).

Table 3-10
Potential Presence of Hazardous Materials by Year Built

Building Number	Project Number	Year Built	ACM Potential	LBP Potential	PCBs Potential
B-5112	C1/D1	1951	Yes	Yes	Yes
B-5115	C4	1930	Yes	Yes	Yes
B-5116	C4	1930	Yes	Yes	Yes
B-5117	C4	1930	Yes	Yes	Yes
B-6104	D6	1945	Yes	Yes	Yes
B-6106	D6	1962	Yes	Yes	Yes
B-6222	D7	1997	No	No	No
B-6224	D7	1997	No	No	No
B-6350	C9	2010	No	No	No
B-5050	I2	1966	Yes	Yes	Yes
B-5903	I4	1930	Yes	Yes	Yes

Risks under the Proposed Action would be associated with improper handling of construction and building materials. Improper handling of these materials has the potential to adversely affect the state of HAZMAT and wastes at JBSA-BUL. These risks include:

- disruption and improper handling of ACMs,
- disruption and improper handling of LBPs, and
- disruption and improper handling of PCBs.

Several projects would be implemented in the vicinity of existing ASTs on JBSA-BUL (see **Figure 3-10**). **Table 3-11** lists ASTs located within approximately 50 meters of a proposed project.

Table 3-11
Aboveground Storage Tanks Within 50 Meters of Proposed Projects

Project Number	Storage Tank Type	Storage Tank Number	Tank Status
C1/D1	AST	CA-5184-1-AST	Active
C3	AST	CE-5000-2-AST	Active
C3	AST	CE-6208-2-AST	Active
C14	AST	CE-6149-1-AST	Active
I2	AST	CE-5044-1-AST	Active

Although Projects C1/D1, C3, C14, and I2 would be within 50 meters of an existing AST, any work under the Proposed Action would not be expected to result in impacts to ASTs. Contractors would be responsible for avoiding the ASTs during construction.

Project I7, the repair of 10,000 lf of Lewis Valley Road, would bisect the IRP site associated with Landfill 8. Ground disturbance and repair activities associated with Project I7 would not be anticipated to impact Landfill 8, as the majority of these activities would be at or near surface level. Ground disturbance in the area would be managed in accordance with applicable JBSA-BUL and Air Force guidance. Impacts to IRP sites would not be anticipated under the Proposed Action.

Projects I1 and D7 are located directly adjacent to the boundaries of the Stokes Mortar MMRP Site, and Project D6 is located directly adjacent to the boundaries of the 75 mm Munitions MMRP Site (see **Figure 3-10**). Due to their close proximity to the boundaries of the site, there is potential for the discovery of MEC, MD, and range-related debris during ground-disturbing activities associated with these projects. There are no land use controls for the project locations for Projects I1, D6, and D7 because associated activities would be located outside of MMRP site boundaries. However, should potential MEC, MD, or debris be encountered during any activities, all work activities would immediately stop, the discovery would be reported to JBSA-BUL Range Operations/Control, and appropriate safety measures would be implemented. Commencement of activities in the area would not resume until the issue was resolved. Impacts to MMRP sites would not be anticipated under the Proposed Action.

With proper handling and development procedures, when considered in conjunction with other past, present, and reasonably foreseeable environmental trends and planned actions at JBSA-BUL, no significant cumulative effects on hazardous materials and waste would be anticipated to occur with implementation of the Proposed Action.

3.13.4 BEST MANAGEMENT PRACTICES AND MITIGATION MEASURES

The Air Force would require contractors to implement the following BMPs to reduce potential effects on or from HAZMAT and hazardous wastes under the Proposed Action:

- Adhere to the JBSA HWMP to minimize impacts from the handling and disposal of hazardous substances and ensure compliance with state and federal hazardous materials regulations.
- Properly handle, remove, and dispose of ACMs in accordance with Air Force, local, state, and federal regulations.
- Properly handle, remove, and dispose of LBPs in accordance with Air Force, local, state, and federal regulations.
- Properly handle, remove, and dispose of PCBs in accordance with Air Force, local, state, and federal regulations.
- Continue monitoring of Landfill 8 for project site and groundwater contamination.

- Cease construction, notify Range Operations/Control, and implement appropriate safety measures in the event that MEC or MD are discovered.
- Report spills of any regulated substances to the EAA within 72 hours of the event.
- Properly handle and remove all hazardous and toxic substances used during construction, demolition, and renovation activities.

Failure to implement BMPs under the Proposed Action likely would result in adverse short- and long-term impacts to personnel due to exposure of materials that are known to be hazardous to humans. Removal of ACMs, LBPs, and PCBs during implementation of the Proposed Action would result in the beneficial impact of creating safer indoor spaces by avoiding future exposure.

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APPENDIX A
INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING

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Toby Baker
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Texas Commission on Environmental Quality
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Federal Emergency Management Agency
Floodplain Management and Insurance Branch
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Texas Historical Commission
State Historic Preservation Office
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Austin, TX 78701

Laura Zebehazy
Texas Parks & Wildlife Department
Wildlife Hapitat Assessment Program
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Austin, TX 78744-3291

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NFIP State Coordinator
Texas Water Development Board
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Environmental Manager
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Floodplain Administrator
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Conservation Society of San Antonio
107 King William Street
San Antonio, TX 78204-1312

Kerry Averyt, P.E.
Engineering Design and Construction Manager
San Antonio River Authority
100 E. Guenther Street
San Antonio, TX 78204

Aarin Teague
Ecological Engineering Manager
San Antonio River Authority
100 E. Guenther Street
San Antonio, TX 78204

Brandon Ross, AICP
San Antonio Parks and Recreation
P.O. Box 839966
San Antonio, TX 78283-3966

Attention: Visiting Documents
San Antonio Public Library
600 Soledad Street
San Antonio, TX 78205

Keith A. Campbell Library
3011 Harney Path
JBSA Sam Houston, TX 78234

Tobin Library at Oakwell
4134 Harry Wurzbach Road
San Antonio, TX 78209

Toni Davenport
Universal City Public Library
100 Northview Drive
Universal City, TX 78148

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

17 March 2022

Mr. Edward L. Roberson, P.E.
Chief, Environmental Management
802d CES/CEIE
1555 Gott Street
JBSA-Lackland Texas 78236-5645

Toby Baker
Executive Director
Texas Commission on Environmental Quality
Office of Permitting and Registration
MC 109, P.O. Box 13087
Austin TX 78711-3087

Dear Mr. Baker

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed development projects in accordance with the *Camp Bullis District Area Development Plan* (ADP) at Joint Base San Antonio, Bullis (JBSA-BUL), Texas (**Attachment 1**). To account for possible environmental concerns, the Air Force is engaging early with all potentially affected resource agencies as it formulates the undertaking. Accordingly, the Air Force seeks consultation with your office.

Proposed Action

The proposed ADP projects include a total of 25 short-term development actions and real property improvements that range in scope from new construction and demolition to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement these projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-BUL, now and in the future. The proposed projects were identified as short-term priorities for continuing to support military training and operations at JBSA-BUL.

Purpose and Need

The purpose of the Proposed Action is to maintain the joint training mission of JBSA-BUL through selected development actions and real property improvements. As the Proposed Action includes the current, short-term component of the ADP's phasing plan, it aligns with current Department of Defense and Air Force policy and strategy doctrine applicable to JBSA-BUL. A secondary objective of the Proposed Action is to develop JBSA-BUL in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition, capability, and configuration of JBSA's real property assets in the short and long term. The facilities and infrastructure on

JBSA-BUL are in poor condition and require maintenance or replacement. Many facilities and infrastructure on the Installation are also outdated or functionally inadequate to meet current training requirements.

Project Location

Most of JBSA-BUL consists of training lands or areas where development is generally limited. Other types of mission support facilities are concentrated in the southern half of the Installation in a smaller area referred to as the cantonment. The ADP projects included in the Proposed Action would occur in select areas throughout JBSA-BUL, as shown in **Attachment 3**.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological and cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable future actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

We intend to provide your agency with a copy of the Draft EA when the document is completed. Please inform us if additional copies are needed or if someone else within your agency other than you should receive the Draft EA.

Please reach out to my point of contact, provided below, on any issues or concerns you have in the development of this EA. We ask your assistance in identifying any issues or concerns of which we may be unaware, particularly those that may be affected by this proposal.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to my point of contact for this matter, as provided below, no later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Mr. Benjamin Lamm
802d CES/CEIE – Environmental Compliance
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236
Email: Benjamin.Lamm.1@us.af.mil

The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We thank you in advance for your assistance and look forward to your response.

Sincerely

ROBERSON.EDWARD.LEWIS.1124911636 Digitally signed by ROBERSON.EDWARD.LEWIS.1124911636 Date: 2022.03.14 13:50:46 -05'00'

EDWARD L. ROBERSON, P.E.

3 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Details of the Proposed Action
3. Proposed ADP Projects

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

17 March 2022

Mr. Edward L. Roberson, P.E.
Chief, Installation Management Flight
802d CES/CEIE
1555 Gott Street
JBSA-Lackland Texas 78236-5645

Mark Wolfe
Texas Historical Commission
State Historic Preservation Office
1511 Colorado Street
Austin TX 78701

Dear Mr. Wolfe

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed development projects in accordance with the *Camp Bullis District Area Development Plan* (ADP) at Joint Base San Antonio, Bullis (JBSA-BUL), Texas (**Attachment 1**). To account for possible environmental concerns, the Air Force is engaging early with all potentially affected resource agencies as it formulates the undertaking. Accordingly, the Air Force seeks consultation with the State Historic Preservation Office, also known as the Texas Historical Commission.

Proposed Action

The EA will, as required by law and regulations, consider the potential impacts resulting from the implementation of installation development planning activities. The Proposed Action would involve facility construction, demolition, renovation, and maintenance and infrastructure construction and improvement. Pursuant to 36 CFR §§ 800.4(a) and (b), we request your assistance in defining the Area of Potential Effect (APE) and providing information on any historic properties located therein that may be affected by this proposed undertaking. A location map of the proposed projects is attached for your review (see **Project Location** below).

The proposed ADP projects include a total of 25 short-term development actions and real property improvements that range in scope from new construction and demolition to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement these projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-BUL, now and in the future. The proposed projects were identified as short-term priorities for continuing to support military training and operations at JBSA-BUL.

Purpose and Need

The purpose of the Proposed Action is to maintain the joint training mission of JBSA-BUL through selected development actions and real property improvements. As the Proposed Action includes the current, short-term component of the ADP's phasing plan, it aligns with current Department of Defense and Air Force policy and strategy doctrine applicable to JBSA-BUL. A secondary objective of the Proposed Action is to develop JBSA-BUL in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition, capability, and configuration of JBSA's real property assets in the short and long term. The facilities and infrastructure on JBSA-BUL are in poor condition and require maintenance or replacement. Many facilities and infrastructure on the Installation are also outdated or functionally inadequate to meet current training requirements.

Project Location

Most of JBSA-BUL consists of training lands or areas where development is generally limited. Other types of mission support facilities are concentrated in the southern half of the Installation in a smaller area referred to as the cantonment. The ADP projects included in the Proposed Action would occur in select areas throughout JBSA-BUL, as shown in **Attachment 3**.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological and cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable future actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

We intend to provide your agency with a copy of the Draft EA when the document is completed. Please inform us if additional copies are needed or if someone else within your agency other than you should receive the Draft EA.

Please reach out to my point of contact, provided below, on any issues or concerns you have in the development of this EA. We ask your assistance in identifying any issues or concerns of which we may be unaware, particularly those that may be affected by this proposal.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to my point of contact for this matter, as provided below, no later than 30 days from receipt of this correspondence. Please send your response via postal mail or email (preferred) to:

ATTN: Ms. Dayna Cramer
802d CES/CEIEA
1555 Gott Street
JBSA Lackland TX 78236-5645
Email: dayna.a.cramer.civ@army.mil

The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We thank you in advance for your assistance and look forward to your response.

Sincerely

EDWARD L. ROBERSON, P.E.

3 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Details of the Proposed Action
3. Proposed ADP Projects

DEPARTMENT OF THE AIR FORCE
502D AIR BASE WING
JOINT BASE SAN ANTONIO

17 March 2022

Mr. Michael D. Waldrop
JBSA Tribal Liaison
AETC 502 ABW
502 MSG/CD (Building 122)
JBSA-Fort Sam Houston Texas 78234

William Nelson Sr.
Chairman
Comanche Nation, Oklahoma
P.O. Box 908
Lawton OK 73502

Dear Chairman Nelson Sr.

The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) for proposed development projects in accordance with the *Camp Bullis District Area Development Plan* (ADP) at Joint Base San Antonio, Bullis (JBSA-BUL), Texas (**Attachment 1**). To account for possible environmental concerns, the Air Force is engaging early with all potentially affected Native American Tribes as it formulates the undertaking. Accordingly, the Air Force seeks consultation with the Comanche Nation, Oklahoma.

Proposed Action

The proposed ADP projects include a total of 25 short-term development actions and real property improvements that range in scope from new construction and demolition to repairs, renovations, and upgrades. Details of the Proposed Action are included in **Attachment 2**. The Air Force proposes to implement these projects from approximately 2023 to 2027. The intent of these projects is to provide improvements and infrastructure necessary to support the mission and mission support capabilities of JBSA-BUL, now and in the future. The proposed projects were identified as short-term priorities for continuing to support military training and operations at JBSA-BUL.

Pursuant to Section 106 of the *National Historic Preservation Act* (NHPA), implementing regulations at 36 CFR Part 800, and Department of Defense (DOD) Instruction 4710.02, *DoD Interactions with Federally Recognized Tribes,* we would like to initiate government-to-government consultation on the Proposed Action. Pursuant to 36 CFR §§ 800.4(a) and (b), we request your assistance defining the Area of Potential Effect (APE) and information on any historic properties located therein that may be affected by the proposed undertaking. The Air Force desires to discuss the proposal in detail with you so that we may understand and consider any comments, concerns, and suggestions you may have. In particular, we invite you, pursuant to 36 CFR § 800.4(a)(4), to provide information on any properties of historic, religious, or cultural significance that may be affected by our proposed undertaking. Regardless of whether the Comanche Nation, Oklahoma chooses to consult on this project, the

Air Force will comply with the *Native American Graves Repatriation Act* by informing you of any inadvertent discovery of archaeological or human remains and consulting on their disposition. Being defined as a federal undertaking, we will be seeking input and inviting other potential consulting parties, such as the Texas State Historic Preservation Office.

Purpose and Need

The purpose of the Proposed Action is to maintain the joint training mission of JBSA-BUL through selected development actions and real property improvements. As the Proposed Action includes the current, short-term component of the ADP's phasing plan, it aligns with current DOD and Air Force policy and strategy doctrine applicable to JBSA-BUL. A secondary objective of the Proposed Action is to develop JBSA-BUL in a manner that provides flexibility to meet future mission requirements, some of which are not yet known.

The Proposed Action is needed to address the condition, capability, and configuration of JBSA's real property assets in the short and long term. The facilities and infrastructure on JBSA-BUL are in poor condition and require maintenance or replacement. Many facilities and infrastructure on the Installation are also outdated or functionally inadequate to meet current training requirements.

Project Location

Most of JBSA-BUL consists of training lands or areas where development is generally limited. Other types of mission support facilities are concentrated in the southern half of the Installation in a smaller area referred to as the cantonment. The ADP projects included in the Proposed Action would occur in select areas throughout JBSA-BUL, as shown in **Attachment 3**.

Environmental Assessment

The EA will assess the potential environmental consequences associated with the Proposed Action and No Action Alternative. Potential impacts identified during the initial planning stages include effects on air quality, infrastructure/utilities, biological and cultural resources, geological resources, and water resources. The EA will also examine the reasonably foreseeable future actions that, when combined with the Proposed Action, could result in potential adverse cumulative effects on a regional scale. In support of this process, we request your input in identifying general or specific issues or areas of concern you believe should be addressed in the EA.

As a government-to-government consultation, we would appreciate any input you have to identify properties of cultural and religious significance that may be located within the APE for this action and regarding concerns of potential effects of the Proposed Action on significant cultural resources.

So that we remain on schedule to complete the environmental impact analysis process in a timely manner, please provide your response to me no later than 30 days from receipt of this correspondence. Please send your response via postal mail at the address above or via email (preferred) to michael.d.waldrop6.civ@mail.mil.

The Air Force appreciates your interest in and support of its military mission at JBSA-BUL. We thank you in advance for your assistance and look forward to your response.

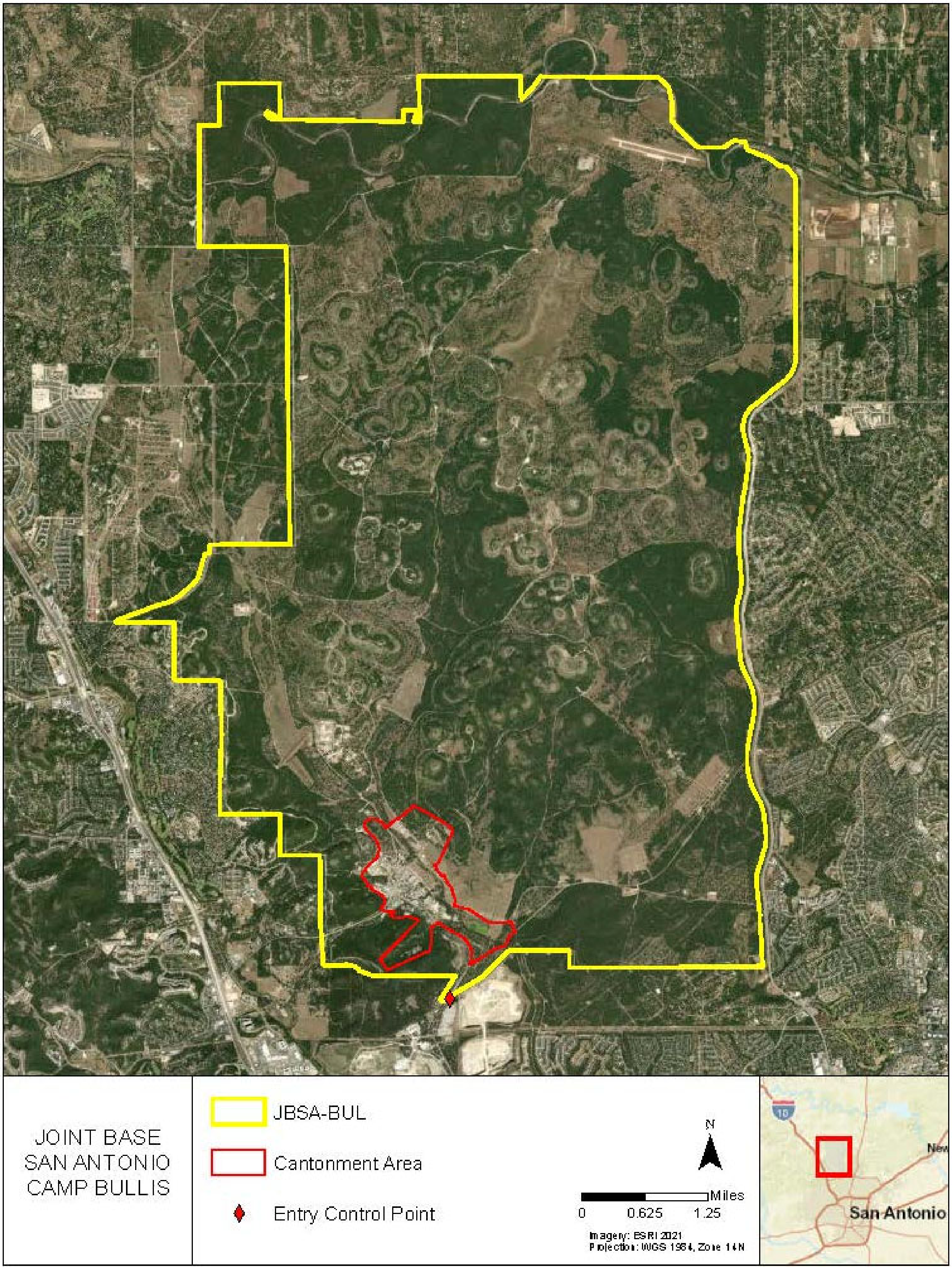
Sincerely

WALDROP.MICHAEL.DUANE.1160753451 Digitally signed by WALDROP.MICHAEL.DUANE.1160753451 Date: 2022.03.14 10:05:48 -05'00'

MICHAEL D. WALDROP

3 Attachments:
1. Map of Joint Base San Antonio, Bullis
2. Details of the Proposed Action
3. Proposed ADP Projects

Attachment 1 – Map of Joint Base San Antonio, Bullis



Attachment 2 – Details of the Proposed Action

List of Proposed Construction and Demolition Projects at JBSA-BUL

Map ID[a]	Project	Approximate Size or Footprint
Cantonment Area		
C1/D1	Demolish B-5112 and construct a general instruction building.	+ 2,250 sf
C2	Construct a hazardous waste storage facility.	+ 3,067 sf
C3	Install two cell towers.	+ 2,500 sf
C4	Construct K-span/trailers to support B-5115, B-5116, and B-5117 functions; install a shade structure.	+ 10,000 sf
C5	Construct or extend a tactical road/route.	+ 19,998 sf
D6	Demolish B-6104 and B-6106.	- 24,487 sf
D7	Demolish B-6222 and B-6224.	- 5,152 sf
Training Area		
C8/D8	Remove tents, demolish/remove 12 asphalt pads, and replace with 24 BOLC tent concrete pads; construct a storm shelter.	+ 10,000 sf
C9	Expand the MRTC administrative facility (B-6350) and its associated parking area.	+ 4,560 sf
C10	Expand the ARMAG concrete pad at SMTS.	+ 720 sf
C11	Construct training/storage space, parking, and storm shelters at the Center for Pre-Deployment, including installation of utilities for water, electric, and sanitary sewer.	+ 40,000 sf + 1,000 lf
C12	Construct Live Model Tissue Site facilities, including installation of utilities for water, electric, and sanitary sewer.	+ 5,000 sf + 1,000 lf
C13	Construct storage facility adjacent to B-6274.	+ 5,000 sf
C14	Establish approximately 3.4 miles of 12 feet wide, reinforced, hardscape trails to support future AMPV training; interconnect AMPV training and operational support facilities.	+ 17,961 lf
C14a	Partially clear vegetation adjacent to existing trails or dirt roads; construct 2.2 miles of reinforced, hardscape trails to support future AMPV training.	+11,835 lf
C14b	Fully clear vegetation to construct 1.2 miles of new reinforced, hardscape trails to support future AMPV training.	+ 6,126 lf

Notes:

a Numeral Map IDs correspond with **Attachment 3.**

AMPV = armored multi-purpose vehicle ARMAG = Arms Vault (portable storage); ATMC = Army Training Medical Command; BOLC = Basic Officer Leader Course; lf = linear feet; MRTC = Medical Readiness Training Center; SMTS = Soldier Medic Training Site; sq = square feet

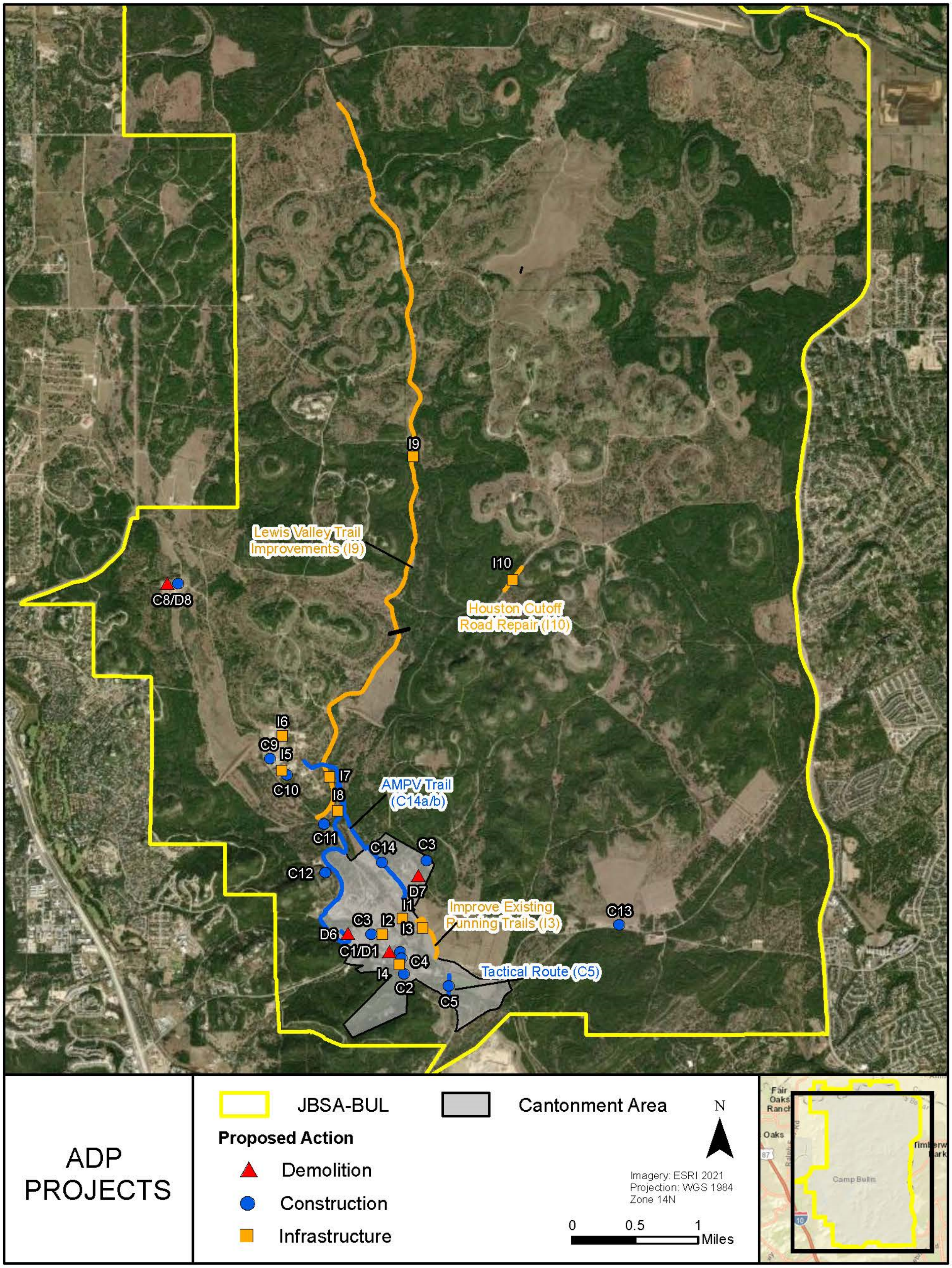
List of Proposed Infrastructure Improvement Projects at JBSA-BUL

Map ID[a]	Project	Approximate Size or Footprint
Cantonment Area		
I1	Repair, replace, and resurface an existing running track.	2,200 sf
I2	Renovate B-5050.	6,532 sf
I3	Improve and delineate existing running trails.	6,056 sf
I4	Renovate B-5903, Environmental Headquarters.	5,200 sf
Training Area		
I5	Install metal Quonset hut structures (on existing concrete slabs).	1,365 sf
I6	Replace overhead power distribution wiring at the DMSET FOB.	10,000 lf
I7	Repair Lewis Valley Road.	10,000 lf
I8	Improve Blackjack Village structures.	2,000 sf
I9	Repair Lewis Valley Trail.	24,000 lf
I10	Repair Houston Cutoff Road.	10,764 sf

Notes:

a Alphabetical Map IDs correspond with **Attachment 3.**

DMSET = Deployable Medical Systems Equipment for Training; FOB = Forward Operating Base; lf = linear feet; sf = square feet



I9
Lewis Valley Trail Improvements (I9)
I10
Houston Cutoff Road Repair (I10)
C8/D8
I6
C9
I5
C10
I7
I8
AMPV Trail (C14a/b)
C11
C14
C3
C12
D7
I1
Improve Existing Running Trails (I3)
C13
C3
I2
I3
D6
C1/D1
C4
I4
C2
Tactical Route (C5)
C5
ADP PROJECTS
JBSA-BUL
Cantonment Area
Proposed Action
Demolition
Construction
Infrastructure
N
Imagery: ESRI 2021
Projection: WGS 1984
Zone 14N
0
0.5
1
Miles
Fair Oaks Ranch
Oaks
Camp Bullis

From: Gray Eck <geck@sariverauthority.org>
Sent: Thursday, March 24, 2022 4:20 PM
To: LAMM, BENJAMIN T GS-12 USAF AETC 802 CES/CEIE <benjamin.lamm.1@us.af.mil>
Subject: [Non-DoD Source] JBSA-Bullis Development and Improvements
Importance: High

Good afternoon Benjamin,

I am responding to your letter on behalf of Dr. Aarin Teague regarding the upcoming development set to occur at JBSA- Bullis.

The River Authority has two earthen filled dams located on the base and would just like to provide a reminder to please keep all operations and development away from the dam structures and spillways.

According to the map provided C9 is relatively close (approximately 500 ft.) to one of the dam spillways so please do be mindful when performing construction operations at this location. Also, the Lewis Valley Trail Improvements appear to run close (at some locations approximately 100 ft.) to the boundary of the other dam spillway and upstream of the dam structure.

Please let me know if you have any questions or concerns for best practices regarding the dams and I will be happy to assist you. If you would like to call and speak with me directly my direct line is 210-302-3628.

Thank you.

Gray Eck
Real Estate Representative
San Antonio River Authority
100 E. Guenther St.
San Antonio, TX 78204
(210) 302-3628 ph
geck@sara-tx.org

SARA Logo-side-email-sm

From: Gray, Natasha A CIV USARMY CESWF (USA) <Natasha.A.Gray@usace.army.mil>
Sent: Thursday, March 31, 2022 1:07 PM
To: LAMM, BENJAMIN T GS-12 USAF AETC 802 CES/CEIE <benjamin.lamm.1@us.af.mil>
Cc: Roeder, Katie O CIV USARMY CESWF (USA) <Katie.O.Roeder@usace.army.mil>
Subject: SWF-2022-00154 (Camp Bullis District Area Development Plan)

Dear Mr. Lamm:

Thank you for your letter received March 24, 2022, concerning a proposal by the United States Air Force for 25 short term development actions and real property improvements located at Joint Base San Antonio, Bullis, Texas. The project has been assigned Project Number SWF-2022-00154, please include this number in all future correspondence concerning this project.

Ms. Katie Roeder has been assigned as the regulatory project manager for your request and will be evaluating it as expeditiously as possible.

You may be contacted for additional information about your request. For your information, please refer to the Fort Worth District Regulatory Division homepage at http://www.swf.usace.army.mil/Missions/regulatory and particularly guidance on submittals at https://swf-apps.usace.army.mil/pubdata/environ/regulatory/introduction/submital.pdf and mitigation at https://www.swf.usace.army.mil/Missions/Regulatory/Permitting/Mitigation that may help you supplement your current request or prepare future requests.

If you have any questions about the evaluation of your submittal or would like to request a copy of one of the documents referenced above, please refer to our website at http://www.swf.usace.army.mil/Missions/Regulatory or contact Ms. Katie Roeder by telephone (817) 886-1740, or by email Katie.O.Roeder@usace.army.mil, and refer to your assigned project number. Please note that it is unlawful to start work without a Department of the Army permit if one is required.

Please help the regulatory program improve its service by completing the survey on the following website: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey

Brandon W. Mobley
Chief, Regulatory Division

Please do not mail hard copy documents to Regulatory staff or office, unless specifically requested. For further details on corresponding with us, please view our Electronic Application Submittals special public notice at:

https://www.swf.usace.army.mil/Portals/47/docs/regulatory/publicnotices/2020/PublicNoticeElectronicApplications.pdf?ver=2019-11-21-123723-627

USACE Fort Worth District Regulatory Division Website http://www.swf.usace.army.mil/Missions/Regulatory.aspx

Please assist us in better serving you by completing the survey at the following website:
https://regulatory.ops.usace.army.mil/customer-service-survey/

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

April 11, 2022

Benjamin Lamm
Environmental Compliance
U.S. Air Force
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236

Via: **E-mail**

Re: **TCEQ NEPA Request #2022-034. Area Development Plan Projects (JBSA-BUL). Bexar County.**

Dear Mr. Lamm,

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

In accordance with the General Conformity regulations in 40 CFR Part 93, this proposed action will be reviewed for air quality impact. The action will occur in Bexar County, which is designated nonattainment for the 2015 eight-hour ozone National Ambient Air Quality Standard (NAAQS) with a classification of marginal and pending expected reclassification by the United States Environmental Protection Agency to moderate. General conformity requirements apply.

Volatile organic compounds (VOC) and nitrogen oxides (NOX) are precursor pollutants that lead to the formation of ozone. A general conformity demonstration may be required when the total projected direct and indirect VOC or NOX emissions from an applicable action are equal to or exceed the de minimis emissions level, which is 100 tons per year (tpy) for ozone NAAQS marginal and moderate nonattainment areas. The TCEQ looks forward to receiving the environmental assessment for this project.

We recommend the environmental assessment address actions that will be taken to prevent surface and groundwater contamination.

The proposed ADP projects at JBSA – BUL are located within the Edwards Aquifer Contributing Zone, as defined in Title 30, Texas Administrative Code, Chapter 213. Based on the nature of the proposed activities, pollution control measures would be required under these rules to protect the Edwards Aquifer. In developing the Environmental Assessment, please address the Edwards Aquifer Protection rules (30 TAC 213), including appropriate water pollution abatement structures and other best management practices.

The management of industrial and hazardous waste at the site including waste treatment, processing, storage and/or disposal is subject to state and federal regulations. Construction and Demolition waste must be sent for recycling or disposal at a facility authorized by the TCEQ. Special waste authorization may be required for the disposal of asbestos containing material.

TCEQ Industrial Hazardous Waste (IHW) Permit No. 50335 sets out specific corrective action or remedial requirements for the Solid Waste Management Unit (SWMU) 10 - Landfill 12, outlined in Compliance Plan (CP) Table VIII, which may be impacted by the proposed construction/redevelopment activities. The Remediation Division recommends that the environmental assessment take this into consideration.

Thank you for the opportunity to review this project. If you have any questions, please contact the agency NEPA coordinator at (512) 239-2619 or NEPA@tceq.texas.gov

Sincerely,

Ryan Vise,
Division Director
External Relations

April 14, 2022

ATTN: Benjamin Lamm
802d CES/CEIE-Environmental Compliance
1555 Gott Street, Building 5595
JBSA-Lackland, TX 78236

RE: United States Air Force Environmental Assessment evaluating proposed Area Development Plan, Joint Base San Antonio, Bullis, Bexar County, Texas

Dear Mr. Lamm:

Texas Parks and Wildlife Department (TPWD) received the review request regarding the proposed project referenced above. The United States Air Force (Air Force) is preparing an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with the project.

Project Description

The proposed Area Development Project (ADP) would include 25 short-term development actions and real property improvements ranging in scope from new construction and demolition to repairs, renovations, and upgrades. The components of the project would occur in select areas throughout the Cantonment and Training Areas of Joint Base San Antonio, Bullis (JBSA-BUL). The majority of proposed ADP construction, demolition, and infrastructure improvement projects occur in developed, previously disturbed areas.

TPWD staff reviewed the information provided and offers the following comments and recommendations.

General Construction Recommendation

TPWD provides the following beneficial management practices (BMPs) to assist in project planning.

> **Recommendation:** TPWD recommends the judicious use and placement of sediment control fence to exclude wildlife from discrete construction areas, when applicable. In many cases, sediment control fence placement for the purposes of controlling erosion and protecting water quality can be modified minimally to also provide the benefit of excluding wildlife access to construction areas. The exclusion fence should be buried at least six inches and be at least 24 inches high. The exclusion fence should be maintained for the life of the project and only removed after the construction is completed and disturbed areas have been revegetated with site-specific native species. Construction personnel should be encouraged to examine the inside of exclusion areas daily to determine if any wildlife species have been trapped inside the areas of impact and provide safe egress opportunities prior to initiation of construction activities.

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800

www.tpwd.texas.gov

Recommendation: TPWD recommends that any open trenches or excavation areas (e.g., buried utility lines; Project C12, Training Area) be covered overnight and/or inspected every morning to ensure no wildlife species have been trapped. For open trenches and excavated areas that cannot be covered overnight, escape ramps fashioned from soil or boards should be installed at an angle of less than 45 degrees (1:1) in the trenches to allow wildlife to climb out on their own.

Recommendation: For soil stabilization and/or revegetation of disturbed areas, TPWD recommends erosion and seed/mulch stabilization materials that avoid entanglement hazards to snakes and other wildlife species. TPWD recommends the use of no-till drilling, hydromulching and/or hydroseeding due to a reduced risk to wildlife.

Recommendation: Because the mesh found in many erosion control blankets or mats pose an entanglement hazard to wildlife, TPWD recommends avoiding the use of plastic mesh matting. If erosion control blankets or mats containing netting must be used, the netting should be loosely woven, natural fiber material where the mesh design allows the threads to move, therefore allowing expansion of the mesh openings. Plastic mesh matting and hydromulch containing microplastics should be avoided.

Recommendation: For encounters with rare species that will not readily leave a work area, TPWD recommends an authorized individual translocate the animal. Translocations of reptiles should be the minimum distance possible from the work area. Ideally, individuals to be relocated should be transported to the closest suitable habitat outside of the active construction area; preferably within 100 to 200 yards and not greater than one mile from the capture site. State-listed species may only be handled by persons with appropriate authorization from the TPWD Wildlife Permits Office. For more information regarding Wildlife Permits, please contact the Wildlife Permits Office at (512) 389-4647.

<u>Impacts to Vegetation/Wildlife Habitat</u>

Some proposed projects would require the removal of vegetation including trees (e.g., vegetation removal along trails and roads; Projects C14, C14a, C14b). There were minimal details provided on vegetation removal or proposed revegetation/landscaping; therefore, TPWD has provided the following recommendations to assist in project planning.

Recommendation: TPWD recommends reducing the amount of vegetation proposed for clearing if possible and minimizing clearing native vegetation, particularly mature, mast producing native trees and shrubs, and riparian vegetation, to the greatest extent practicable. Revegetation or post-construction landscaping plans should focus on native plant species. Colonization by invasive species, particularly invasive grasses and weeds, should be actively prevented. Vegetation management should include removing invasive species early on while allowing existing native plants to revegetate disturbed areas. TPWD recommends referring to the Lady Bird Johnson Wildflower Center Native Plant Database for regionally adapted native species that would be appropriate for landscaping and revegetation.

Landscaping for Monarch Butterflies and Pollinators

Significant declines in the population of migrating monarch butterflies (*Danaus plexippus*) have led to widespread concern about this species and the long-term persistence of the North American monarch migration. As part of an international conservation effort, TPWD has developed the *Texas Monarch and Native Pollinator Conservation Plan*. One of the broad categories of action in the plan is to augment larval feeding and adult nectaring opportunities.

Recommendation: TPWD recommends incorporating pollinator conservation and management into revegetation and landscaping plans. TPWD recommends revegetation efforts include planting or seeding native milkweed (*Asclepias* spp.) and nectar plants as funding and seed availability allow. Information about monarch biology, migration, and butterfly gardening can be found on the Monarch Watch website. Information related to pollinator conservation in Texas, including planting recommendations, are available in the TPWD publication *Management Recommendations for Native Insect Pollinators in Texas* (available online).

Additional information and guidance regarding pollinator conservation can be found in the U.S. Air Force Pollinator Conservation Reference Guide (2017).

Federal Regulations

Endangered Species Act

Federally-listed animal species and their habitat are protected from "take" on any property by the Endangered Species Act (ESA). Take of a federally-listed species can be allowed if it is "incidental" to an otherwise lawful activity and must be permitted in accordance with Section 7 or 10 of the ESA. Federally-listed plants are not protected from take except on lands under federal jurisdiction or for which a federal nexus (i.e., permits or funding) exists. Take of a federally-listed species or its habitat without allowance from the U.S. Fish and Wildlife Service (USFWS) is a violation of the ESA.

Karst invertebrates

The majority of JBSA-BUL is located in Karst Zones 3 or 5; however, Projects C2 and C5 in the Cantonment Area and C13 in the Training Area may be located in a Karst

Zone 1 region which is defined as, "areas known to contain endangered karst invertebrate species." Karst invertebrates are troglobites, spending their entire lives underground, inhabiting caves and mesocavernous voids in karst limestone. Surface activities that may fill voids, cap or seal cave entrances, alter surface vegetation or alter drainage patterns can affect karst invertebrates. Excavations or other surface activities could inadvertently alter subsurface cave habitat.

> **Recommendation:** The USFWS has developed a five-step approach for determining if karst invertebrates may be present in a project area. More information and the karst survey protocol are available online at the USFWS Southwest Region Ecological Services website. TPWD recommends contacting the USFWS-Ecological Services Office in Austin (512-490-0057) regarding appropriate measures to take to ensure potential impacts to karst invertebrates are avoided and/or minimized. At a minimum, a survey should be conducted by a qualified karst geologist or karst biologist with demonstrated experience identifying karst features.

<u>Golden-cheeked warbler (*Setophage chrysoparia*)</u>

Golden-cheeked warblers (GCWA) have been observed in the general project area. Additionally, review of a predictive habitat model for the species (Diamond 2007) indicates that the project site is located within suitable habitat for this species. TPWD notes that the *USFWS Section 10(a)(1)(A) Scientific Permit Requirements for Conducting Presence/Absence Surveys and Habitat Assessment for Endangered Golden-cheeked Warblers* (available online) outlines very detailed processes for surveys and reporting.

> **Recommendation:** TPWD recommends conducting a GCWA suitable habitat survey according to USFWS Guidelines, particularly within 300 feet of a project site, if potential GCWA habitat may be impacted. Even if habitat for this species would not be directly impacted by vegetation removal, if nesting pairs are present in the surrounding vegetation they could be disrupted by noise and activity during construction. Because the definition of take in the ESA includes harming or harassing a listed species, this type of disturbance could constitute a violation of the ESA. If a suitable habitat survey according to USFWS Guidelines is performed and suitable habitat for the GCWA is present within or adjacent to the project area, TPWD recommends performing presence/absence surveys (according to USFWS Guidelines) during the nesting season to determine if the habitat is occupied by this species. If suitable habitat is present and performing a presence/absence survey is not feasible, TPWD recommends assuming presence for the species and conducting project activities outside of the breeding and nesting season in any area where suitable habitat may occur (with the appropriate authorization from the USFWS). The USFWS should be contacted for species occurrence data, guidance, permitting, survey protocols, and mitigation for this federally listed species.

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, or nests, except when specifically authorized by the Department of the Interior. This protection applies to most native bird species, including ground nesting species. The USFWS Migratory Bird Office can be contacted at (505) 248-7882 for more information on potential impacts to migratory birds.

> **Recommendation:** TPWD recommends the EA evaluate potential impacts to nesting birds in proposed project areas. Potential adverse impacts to nesting birds can be avoided or minimized by scheduling vegetation clearing to occur outside of the general bird nesting season (March 15 through September 15). If disturbance within the project areas must be scheduled to occur during the nesting season, TPWD recommends any vegetation to be impacted (trees, shrubs, and grasses) or bare ground where occupied nests may be located should be surveyed for active nests by a qualified biologist prior to clearing. Nest surveys should be conducted no more than five days prior to scheduled clearing in order to maximize the detection of active nests, including recently constructed nests. If active nests are observed during surveys, TPWD recommends a 100-foot radius buffer of vegetation remain around nests until eggs have hatched and the young have fledged; however, the size of the buffer zone is dependent on various factors and can be coordinated with the local or regional USFWS office.

The proposed action includes installing two cell towers. Please note that this project is located within the Central Migration Flyway for migratory birds. Collisions with communications towers are known causes of avian mortality, such as when flying at night or in fog. Birds are also attracted to tower lights and aggregate in the lighting zone, circle the tower and collide with the tower, other birds, or fall to the ground from exhaustion. Studies have shown that night migrating birds are attracted to solid red beacon lights. The Federal Aviation Administration (FAA) 11-16-2020 policy on obstruction marking addresses this concern, Obstruction Marking and Lighting Advisory Circular AC 70/7460-1M, which requires new towers greater than 150 feet above ground level to be built with flashing lighting only and allows aircraft detection lighting systems (ADLS) on all towers. The FAA policy can be found at online. Please refer to the USFWS Migratory Bird Office's communication tower website for the March 2021 U.S. Fish and Wildlife Service Communication Tower Guidance (also referred to as the Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning), the USFWS Communication Tower Lighting Fact Sheet, and the Federal Communications Commission (FCC) 2017 publication on Opportunities to Reduce Bird Collisions with Communications Towers While Reducing Tower Lighting Costs which outlines the FCC and FAA guidance for ensuring that tower lighting is bird-safe while also reducing construction and maintenance costs to tower owners.

> **Recommendation:** TPWD recommends following the USFWS best practices for communication tower design, construction, and operation. These include installing self-supporting towers that do not use guy wires and installing towers that are less than 199-feet tall to avoid the requirement for lighting.

State Regulations

Parks and Wildlife Code – Chapter 64, Birds

Texas Parks and Wildlife Code (PWC), section 64.002, regarding the protection of nongame birds, provides that no person may catch, kill, injure, pursue, or possess a bird that is not a game bird. PWC section 64.003, regarding destroying nests or eggs, provides that, no person may destroy or take the nests, eggs, or young and any wild game bird, wild bird, or wild fowl. PWC chapter 64 does not allow for incidental take.

Although not documented in the Texas Natural Diversity Database (TXNDD), many bird species which are not listed as *threatened* or *endangered* are protected by chapter 64 of the PWC and are known to be year-round or seasonal residents or seasonal migrants through the proposed project area.

> **Recommendation:** Please review the *Federal Regulations: Migratory Bird Treaty Act* section above for recommendations as they are applicable for compliance with Chapter 64 of the Parks and Wildlife Code.

Parks and Wildlife Code, Section 68.015

PWC regulates state-listed threatened and endangered animal species. The capture, trap, take, or killing of state-listed threatened and endangered animal species is unlawful unless expressly authorized under a permit issued by the USFWS or TPWD. 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 the TPWD Wildlife Habitat Assessment Program website. As indicated above, state-listed species may only be handled by persons with appropriate authorization from the TPWD Wildlife Permits Office.

The potential occurrence of state-listed species in the project area is primarily dependent upon the availability of suitable habitat. Direct impacts to high quality or suitable habitat therefore are directly proportional to the magnitude and potential to directly impact state-listed species. State-listed reptiles that are typically slow moving or unable to move due to cool temperatures are especially susceptible to being directly impacted (i.e., crushing by heavy equipment) during site preparation activities. Small wildlife such as lizards, turtles, and snakes are susceptible to falling into open pits, excavations, trenches, etc. left open and/or uncovered in a project area.

Please be aware that 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.

> **Recommendation:** TPWD recommends reviewing the most current TPWD annotated county lists of rare species for Bexar County. The annotated county lists are available online at the TPWD Wildlife Diversity website. Environmental documents prepared for the project should include an inventory of existing natural resources within the project area. Specific evaluations should be designed to predict project impacts upon these natural resources including potential impacts to state-listed species.

I appreciate the opportunity to review and comment on this project. Please contact me at (361) 825-3240 or **russell.hooten@tpwd.texas.gov** if we may be of further assistance.

Sincerely,

Russell Hooten
Wildlife Habitat Assessment Program
Wildlife Division

/rh 48325

References

USFWS. 2017. *U.S. Air Force Pollinator Conservation Reference Guide*, Air Force Civil Engineer Center, San Antonio, TX, 182 pp. + Appendix A (Species maps and profiles) and B (Restoration and landscaping information).

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Austin Ecological Services Field Office
10711 Burnet Road, Suite 200
Austin, TX 78758-4460
Phone: (512) 490-0057 Fax: (512) 490-0974

In Reply Refer To: June 02, 2022
Project Code: 2022-0049577
Project Name: Proposed Area Development Plan (ADP) Projects at Joint Base San Antonio, Camp Bullis (JBSA-BUL)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Migratory Birds: In addition to responsibilities to protect threatened and endangered species under the Endangered Species Act (ESA), there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts see https://www.fws.gov/birds/policies-and-regulations.php.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable NEPA documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.php.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat. For information regarding the implementation of Executive Order 13186, please visit https://www.fws.gov/birds/policies-and-regulations/executive-orders/e0-13186.php.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Code in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

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

Project Summary

Project Code: 2022-0049577
Event Code: None
Project Name: Proposed Area Development Plan (ADP) Projects at Joint Base San Antonio, Camp Bullis (JBSA-BUL)
Project Type: Military Development
Project Description: The proposed ADP projects vary from new construction, expansion, and demolition actions to repairs, renovations, and upgrades. These projects can be classified into three general categories:

1) Construction. New development or redevelopment for expansion of the existing built environment, including new buildings, building additions, and new or expanded infrastructure for operational support (e.g., parking and utilities).
2) Demolition. Temporary or permanent removal of existing buildings and structures.
3) Infrastructure. Repair, renovation, maintenance, or improvement actions ranging from routine management actions (e.g., road, sidewalk, or utility system repairs or maintenance activities) to building renovation or modernization.

In total, 25 development actions and real property improvements are proposed at JBSA-BUL from approximately 2023 to 2027.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@29.68879145,-98.5597923281515,14z

Counties: Bexar and Comal counties, Texas

Endangered Species Act Species

There is a total of 21 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Golden-cheeked Warbler *Setophaga chrysoparia* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33	Endangered
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened

Amphibians

NAME	STATUS
San Marcos Salamander *Eurycea nana* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6374	Threatened
Texas Blind Salamander *Eurycea rathbuni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5130	Endangered

Fishes

NAME	STATUS
Fountain Darter *Etheostoma fonticola* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5858	Endangered

Insects

NAME	STATUS
[no Common Name] Beetle *Rhadine exilis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/6942	Endangered
[no Common Name] Beetle *Rhadine infernalis* There is **final** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/3804	Endangered
Comal Springs Dryopid Beetle *Stygoparnus comalensis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7175	Endangered
Comal Springs Riffle Beetle *Heterelmis comalensis* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3403	Endangered
Helotes Mold Beetle *Batrisodes venyivi* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/1149	Endangered
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Arachnids

NAME	STATUS
Braken Bat Cave Meshweaver *Cicurina venii* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7900	Endangered
Cokendolpher Cave Harvestman *Texella cokendolpheri* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/676	Endangered
Government Canyon Bat Cave Meshweaver *Cicurina vespera* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/7037	Endangered
Government Canyon Bat Cave Spider *Tayshaneta microps* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/553	Endangered
Madla Cave Meshweaver *Cicurina madla* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2467	Endangered
Robber Baron Cave Meshweaver *Cicurina baronia* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/2361	Endangered

Crustaceans

NAME	STATUS
Peck's Cave Amphipod *Stygobromus (=Stygonectes) pecki* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/8575	Endangered

Flowering Plants

NAME	STATUS
Bracted Twistflower *Streptanthus bracteatus* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2856	Proposed Threatened
Texas Wild-rice *Zizania texana* There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/805	Endangered

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
[no Common Name] Beetle *Rhadine infernalis* https://ecos.fws.gov/ecp/species/3804#crithab	Final
Bracted Twistflower *Streptanthus bracteatus* https://ecos.fws.gov/ecp/species/2856#crithab	Proposed

IPaC User Contact Information

Agency: Department of Defense
Name: Michael Robertson
Address: 350 Hills Street, Suite 112
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State: WA
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APPENDIX B
PUBLIC NOTICES

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NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTIVITIES WITHIN FLOODPLAINS – UNITED STATES AIR FORCE

The U.S. Air Force (USAF) is inviting early public input on proposed activities at Joint Base San Antonio (JBSA) with potential to affect floodplains and wetlands resources. The USAF is proposing to implement various development and modernization projects on the four primary military basesthat comprise JBSA: Bullis, Lackland, Randolph, and Sam Houston. The proposed projects were identified as part of JBSA's integrated installation (master) planning process as being of a high priority for JBSA to continue its military mission and mission support functions within and around the San Antonio, Texas metropolitan area. More specifically, the projects were recommended as short-term phase components in area development plans (ADPs) prepared for different geographic areas on each JBSA base. The ADPs are sub-component plans of JBSA's installation development plan (IDP), a region-level plan that guides future development across all JBSA real property assets.

The proposed development actions and improvements under consideration by the USAF at JBSA range in scope from new construction and demolition to repairs, renovations, and upgrades. The USAF proposes to implement these projects in phases from approximately 2023 to 2027. To comply with the National Environmental Policy Act (NEPA), the USAF is preparing environmental assessments (EAs) for the proposed actions at each JBSA military base to analyze the potential environmental impacts of its development plans. The Draft EAs will be made available for public review and comment in the summer and fall of 2022.

Because select projects under consideration at each military base would affect or potentially affect floodplains and wetlands under USAF management, this early notice seeks public input on any practical alternatives to avoid or minimize adverse effects on these natural resources. As the projects are currently in the pre-planning stage, additional details will be made available in the forthcoming Draft EAs for public review. The USAF plans to use these NEPA processes to comply with Executive Orders (EOs) 11988, Floodplain Management; 13690, Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input; and 11990, Protection of Wetlands, respectively.

Accordingly, the USAF seeks your input with respect to potential effects on floodplains and wetlands that could result from the proposed actions at JBSA. Public comments received in response to this notice, as well as those received through public participation in the NEPA processes currently underway, will assist the USAF to comply with its obligations under the EOs noted above.

Please address written comments to the USAF 802 CES/CEI, 1555 Gott Street, JBSA-Lackland, TX 78236, via email (preferred) to 802CES.CEIE.NEPATeam@us.af.mil.

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SAN ANTONIO EXPRESS - NEWS
AFFIDAVIT OF PUBLICATION

STATE OF TEXAS:
COUNTY OF BEXAR

Before me, the undersigned authority, a Notary Public in and for the State of Texas, on this day personally appeared: Geena Garza, who after being duly sworn, says that she is the Bookkeeper of HEARST NEWSPAPERS, LLC - dba: SAN ANTONIO EXPRESS - NEWS, a newspaper published in Bexar County, Texas and that the publication, of which the annexed is a true copy, was published to wit:

Customer ID	Customer	Order ID	Publication	Pub Date
20031375	EAS	34187271	SAE Express-News	03/11/22
			SAE Express-News	03/12/22

Geena Garza

Geena Garza
Bookkeeper

Sworn and subscribed to before me, this 15th **day of** Mar. **A.D.** 2022

Notary public in and for the State of Texas

MARK RAYMOND PORTER
Notary Public, State of Texas
Comm. Expires 10-27-2025
Notary ID 133416864

NOTARY PUBLIC STATE OF TEXAS

NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTIVITIES WITHIN FLOODPLAINS – UNITED STATES AIR FORCE

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34187271

AFFIDAVIT OF PUBLICATION

I am a regular employee of American City Business Journals and have personal knowledge of the publication information described in this Affidavit of Publication. The Notice for Early Public Review attached below was published under United States Air Force in the following issues of the San Antonio Business Journal: 3/11/22.

Michael Wall

(Signature)

PRINTED NAME: Michael Wall
who provided a Washington DL

State of Florida
County of Miami-Dade

March 28th, 2022

I certify that I know or have satisfactory evidence (1) that Michael Wall signed this Affidavit of Publication, (2) that he or she acknowledged that he or she signed this Affidavit of Publication and (3) that he or she acknowledged it to be his or her free and voluntary act for the uses and purposes mentioned therein.

(Notary's Signature)

Printed Name: Samer Gorrin Vazquez

NOTARY PUBLIC • STATE OF FLORIDA

SAMER GORRIN VAZQUEZ
Notary Public - State of Florida
Commission # HH17982
Expires on July 6, 2024

Notarized online using audio-video communication

NOTICE FOR EARLY PUBLIC REVIEW OF A PROPOSED ACTIVITIES WITHIN FLOODPLAINS – UNITED STATES AIR FORCE

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APPENDIX C
PROPOSED AREA DEVELOPMENT PLAN PROJECTS ADDENDUM

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PROPOSED AREA DEVELOPMENT PLAN PROJECTS ADDENDUM

Joint Base San Antonio, Camp Bullis, Texas
October 2021

Introduction

This Addendum supplements the Draft Environmental Assessment (EA) for proposed Area Development Plan (ADP) projects at Joint Base San Antonio, Camp Bullis (JBSA-BUL). As identified and evaluated by the *Camp Bullis District Area Development Plan* (2018), the Air Force proposes to implement 25 development actions and real property improvements on the Base from approximately 2022 to 2026. These projects are a component of the ADP's short-term program phase to maintain and modernize JBSA-BUL's training support mission. The Draft EA analyzes the potential environmental effects of the proposed ADP projects.

The ADP project information summarized below is representative of the Air Force's continual process of planning and evaluation to inform the future development of JBSA-BUL. The information is drawn from project-level plans, designs, and program documents prepared in response to the ADP. As available and relevant to the impact analyses, this information is incorporated by Addendum into the Draft EA. The projects discussed below were selected from **Table 2-1** of the Draft EA as being representative of the Proposed Action. Should additional project-level details become available following the public comment period of the Draft EA, this Addendum and the Final EA will be updated, as appropriate.

Construction/Demolition Projects

Project 1 – General Instruction Building

Project 1 would demolish Building (B-) 5112 to construct an approximately 5,000 square feet general instruction building (GIB). The new GIB is needed to support the training requirements of the Army Training Medical Command. Comparable to existing B-6001, the facility would include administrative, office, and classroom space for up to 100 personnel. Mission support capabilities would also include standard utility systems and information technology (IT) equipment.

Project 2 – Hazardous Waste Storage Facility

Project 2 would demolish B-5906 and construct a new hazardous waste (HW) storage facility to the north along NW Military Highway; existing roads and parking would support operations. JBSA-BUL currently uses CONEX boxes near B-1150 for HW storage. A new facility would allow JBSA-BUL to remain in compliance with applicable federal laws and regulations pertaining to HW management. This facility would be equipped to store HW generated on JBSA-BUL for up to 180 days prior to its transport off site for disposal at a permitted facility. The Air Force evaluated siting the facility elsewhere on the Base; however, these sites were eliminated due to factors such as lack of access, incompatible land use, and cultural resources constraints, among others. The new HW storage facility would be equipped to meet current standards for secondary containment, security, and health and safety.

Project 4 – K-Span/Trailers for Operational Support

The Defense Medical Readiness Training Institute (DMRTI) is a JBSA mission partner and tenant activity of JBSA-BUL. The DMRTI currently occupies B-5115, B-5116, and B-5117. These facilities are outdated, in sub-standard condition, and lack many functional capabilities required by DMRTI's mission. **Project 7** would construct a 7,000-square-foot, pre-engineered, metal facility within an existing parking lot area in the JBSA-BUL cantonment area. The DMRTI would use the facility for instruction-led medical training. The new facility would require standard utility systems, parking for privately owned and Government-owned vehicles, and a shade structure. In consultation with the DMRTI, the Air Force evaluated siting this facility elsewhere on JBSA-BUL; however, the proposed site was the only one considered that met DMRTI's size and location requirements.

Project 8 – Basic Officer Leader Course Tents, Concrete Pads, and Storm Shelter

Project 11 would remove 24 tents; demolish and remove 12 asphalt pads; and construct 24 concrete pads to found 24 new tents. **Project 11** would also construct a storm shelter of approximately 4,200 square feet to provide lightning protection for up to 500 soldiers. This project is needed to address deteriorating infrastructure and safety risks associated with the Basic Officer Leader Course (BOLC) training mission. The Air Force prioritized the tent area and asphalt foundations for reinvestment based on their poor condition and quality-of-life benefits that would accrue to soldiers training at BOLC. Although other sites were considered, reuse of the existing tent area and siting the storm shelter based on the current BOLC configuration (i.e., the BOLC forward operational base) ultimately determined site selection. Site preparation activities associated with **Project 11** would include grading and clearing; the addition of fill soils and compaction would also be required pre-construction.

Project 12 – Live Model Tissue Site Facilities

The Army Medical Department (AMEDD) provides expertise and training for doctors, nurses, and combat medics across the Department of Defense to include US coalition forces. AMEDD's educational and prehospital/tactical medical training mission requires diverse support facilities such as laboratories, clinics, and warehouses, as well as field training areas to ensure the combat readiness of medic soldiers. AMEDD functions within JBSA reside in multiple, separate facilities with discontiguous training areas. For example, most AMEDD schools are at JBSA, Fort Sam Houston while many related field training exercises take place at JBSA-BUL. To address these concerns, AMEDD is evaluating plans to relocate and realign its diverse functions to JBSA-BUL.

In concert with the ADP planning process for JBSA-BUL, AMEDD began evaluating its space and functional requirements to inform its relocation and realignment plans. These data provided a basis for an initial conceptual site plan which was then used to evaluate potential sites on JBSA-BUL that could support a future AMEDD campus area. The space and functional requirements carried forward in the conceptual site plan allowed for a more detailed evaluation of potential siting options on the Base. Site selection criteria included development constraints relating to land use, terrain, transportation/access, and natural and cultural resources management, among other potential issues or concerns. Through this process of evaluation, an area on JBSA-BUL was identified that would support the short-term objectives of AMEDD's relocation and realignment plans. **Project 12** would implement AMEDD's short term development plans at JBSA-BUL by constructing several new facilities, including utilities and infrastructure required to support their operations. However, this area was also selected for more detailed study as a potential future site for developing an AMEDD campus area on JBSA-BUL in the long term.

Project 13 – Storage Facility

Project 13 would construct a 5,000-square-foot storage facility to house equipment and support operations on the Base. This facility would require a basement vault to accommodate all incoming ductwork, a backup generator, and installation of a high-powered heating, ventilation, and air conditioning unit to meet its operational requirements.

Project 14 – Armored Multi-Purpose Vehicle Trails

The Armored Multi-Purpose Vehicle (AMPV) is the replacement platform for the M113 in the Armored Brigade Combat Team. The AMPV is an armored, tracked vehicle that offers improved force protection, survivability, mobility, situational awareness, and maintainability as compared to the M113. The combat capabilities of the AMPV are needed to support current and evolving military missions and threats. For example, AMPV variants will operate in urban and natural combat settings and be equipped for transportation by land, sea, or air.

The alternatives evaluation process for **Project 14** began with the *Armored Multi-Purpose Vehicle Life Cycle Environmental Assessment (LCEA)* (July 2020) which codified the Army's decision to execute the Armored Multi-Purpose Vehicle (AMPV) program. The program encompasses the life cycle of the AMPV from production, testing, and training to fielding and operation, maintenance, and disposal. This decision set forth plans to field the AMPV to provide support across a range of military operations. In part, fielding decisions for the AMPV were driven by one of five variants to include the Medical Treatment (MT) and Medical Evacuation (ME) variants. Currently, the Army's Medical Center of Excellence (MEDCoE) at JBSA-BUL is scheduled to receive 2 MT and 2 ME AMPVs in 2022.

Project 14 is required to support the AMPV training mission at JBSA-BUL. Because AMPVs require special trails to meet certain training requirements, **Project 14** would site and construct two, approximately 12 feet wide, reinforced concrete trails to support soldier medic training on the Base. To support and expedite the AMPV training mission at JBSA-BUL, the trails would need to connect with one another and provide linkage between existing training areas and mission support facilities. In coordination with the Army, the Air Force considered multiple routing options to achieve these objectives. These routing options were evaluated to consider the potential effects of training on the AMPV mission, other mission support activities, and natural and cultural resources, among other factors. Ultimately, a proposed course of action was selected to leverage existing, undeveloped trails on the Base to meet training requirements and minimize the environmental effects of clearing, constructing, maintaining, and operating the AMPV trails. If implemented, construction of **Project 14** would occur in incremental phases to further minimize potential adverse effects on the mission or environmental resources of JBSA-BUL.

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APPENDIX D
AIR CONFORMITY APPLICABILITY MODEL ANALYSIS

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AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

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

a. Action Location:
Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

b. Action Title: Proposed Area Development Plan Projects for Joint Base San Antonio, Camp Bullis, Bexar and Comal Counties, Texas

c. Project Number/s (if applicable): NA

d. Projected Action Start Date: 5 / 2022

e. Action Description:

The Proposed Action would implement a total of 25 short-term development actions and real property improvements on JBSA-BUL from approximately 2022 to 2026. Of these projects, 12 would occur in the cantonment area; 13 are associated with training areas.

Overall, the Proposed Action would demolish or remove approximately 45,000 sf of existing building gross square footage (gsf) at JBSA-BUL; approximately 58,000 sf building gsf would be constructed under the Proposed Action. Parking and ancillary structures associated with newly constructed buildings would cover approximately 40,000 sf of additional land area on the Base; utility and infrastructure construction under the Proposed Action, primarily Project 14, would cover approximately 20,000 linear feet .
As part of the ADP's phasing plan, the Proposed Action would incorporate the planning considerations addressed in other elements of the ADP, as required by AFI 32-1015. For example, the Proposed Action would adhere to development standards for siting the new facilities and regulate design parameters such as height, scale, and orientation. Because the ADP conforms to the IDP, the Proposed Action would also incorporate elements of the IDP. When appropriate, the standards and component plans of the ADP and IDP are discussed and referenced throughout this EA.

f. Point of Contact:
Name: Ryan Sauter
Title: Senior Scientist
Organization: EAS, LLC
Email: ryan.sauter@easbio.com
Phone Number: 6513419955

2. Analysis: Total combined direct and indirect emissions associated with the action were estimated through ACAM on a calendar-year basis for the "worst-case" and "steady state" (net gain/loss upon action fully implemented) emissions. General Conformity under the Clean Air Act, Section 1.76 has been evaluated for the action described above according to the requirements of 40 CFR 93, Subpart B.

Based on the analysis, the requirements of this rule are: _____ applicable
__X__ not applicable

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

Conformity Analysis Summary:

2022

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	2.075	100	No
NOx	12.096	100	No
CO	13.136		
SOx	0.031		
PM 10	64.768		
PM 2.5	0.540		
Pb	0.000		
NH3	0.007		
CO2e	3140.3		

2023

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	2.748	100	No
NOx	11.299	100	No
CO	13.201		
SOx	0.033		
PM 10	38.321		
PM 2.5	0.501		
Pb	0.000		
NH3	0.007		
CO2e	3544.4		

2024

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.712	100	No
NOx	4.438	100	No
CO	5.287		
SOx	0.014		
PM 10	34.537		
PM 2.5	0.210		
Pb	0.000		
NH3	0.003		
CO2e	1752.8		

AIR CONFORMITY APPLICABILITY MODEL REPORT
RECORD OF CONFORMITY ANALYSIS (ROCA)

2025

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.344	100	No
NOx	2.360	100	No
CO	2.652		
SOx	0.008		
PM 10	17.282		
PM 2.5	0.122		
Pb	0.000		
NH3	0.001		
CO2e	1177.2		

2026 - (Steady State)

Pollutant	Action Emissions (ton/yr)	GENERAL CONFORMITY	
		Threshold (ton/yr)	Exceedance (Yes or No)
San Antonio, TX			
VOC	0.032	100	No
NOx	0.580	100	No
CO	0.487		
SOx	0.003		
PM 10	0.044		
PM 2.5	0.044		
Pb	0.000		
NH3	0.000		
CO2e	697.7		

None of estimated emissions associated with this action are above the conformity threshold values established at 40 CFR 93.153 (b); Therefore, the requirements of the General Conformity Rule are not applicable.

Ryan Sauter, Senior Scientist DATE

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: CAMP BULLIS
State: Texas
County(s): Bexar
Regulatory Area(s): San Antonio, TX

- Action Title: Proposed Area Development Plan Projects for Joint Base San Antonio, Camp Bullis, Bexar and Comal Counties, Texas

- Project Number/s (if applicable): NA

- Projected Action Start Date: 5 / 2022

- Action Purpose and Need:

The purpose of the Proposed Action is to maintain the joint training mission of JBSA-BUL through selected development actions and real property improvements. As the Proposed Action includes the current, short-term component of the ADP's phasing plan, it aligns with current DOD and Air Force policy and strategy doctrine applicable to JBSA-BUL. A secondary objective of the Proposed Action is to develop JBSA-BUL in a manner that provides flexibility to meet future mission requirements, some of which are not yet known. The Proposed Action, if implemented, would support these objectives by maintaining and modernizing JBSA-BUL from approximately 2022 to 2026, consistent with the ADP.

The Proposed Action is needed to address the condition, capability, and configuration of JBSA's real property assets in the short and long term. The facilities and infrastructure on JBSA-BUL are in poor condition and require maintenance or replacement. Many real property assets are also outdated and functionally inadequate to meet current training requirements. As a result, numerous facilities on JBSA-BUL are underutilized.

In the long term, the Proposed Action is needed to chart a more flexible, phased approach for the future development of JBSA-BUL. Developable land at JBSA-BUL is limited due to numerous constraints, and the existing built environment lacks cohesion among land uses (e.g., community support functions are segregated by administrative and industrial functions). JBSA-BUL needs to address incompatible land use and improve the physical layout of the Base to operate more efficiently.
The Proposed Action would implement selected ADP projects in a strategic, orderly, efficient, and sustainable manner, thereby allowing JBSA-BUL to maintain and improve its mission-support capabilities. JBSA-BUL would continue to meet the mission-specific standards and objectives of the DOD and Air Force personnel that utilize the Base as their primary training venue, ensuring combat readiness. The Proposed Action would also result in more compatible and efficient land use in support of JBSA-BUL's longer-term plans to modernize the Base.

- Action Description:

The Proposed Action would implement a total of 25 short-term development actions and real property improvements on JBSA-BUL from approximately 2022 to 2026. Of these projects, 12 would occur in the cantonment area; 13 are associated with training areas.

Overall, the Proposed Action would demolish or remove approximately 45,000 sf of existing building gross square footage (gsf) at JBSA-BUL; approximately 58,000 sf building gsf would be constructed under the Proposed Action. Parking and ancillary structures associated with newly constructed buildings would cover approximately 40,000 sf of additional land area on the Base; utility and infrastructure construction under the Proposed Action, primarily Project 14, would cover approximately 20,000 linear feet .
As part of the ADP's phasing plan, the Proposed Action would incorporate the planning considerations addressed in other elements of the ADP, as required by AFI 32-1015. For example, the Proposed Action would adhere to development standards for siting the new facilities and regulate design parameters such as height,

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- Point of Contact

Name: Ryan Sauter
Title: Senior Scientist
Organization: EAS, LLC
Email: ryan.sauter@easbio.com
Phone Number: 6513419955

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	Demolish B-5112 and construct a general instruction building
3.	Construction / Demolition	Demolish B-5906 and construct a hazardous waste storage facility
4.	Construction / Demolition	Construct K-span/trailers to support B-5115, B-5116, and B-5117 functions; install a shade structure
5.	Construction / Demolition	Construct or extend a tactical road/route
6.	Construction / Demolition	Demolish B-6104 and B-6106
7.	Construction / Demolition	Demolish B-6222 and B-6224
8.	Construction / Demolition	Expand the MRTC administrative facility (B-6350) and its associated parking area
9.	Construction / Demolition	Construct training/storage space, parking, and storm shelters at the Center for Pre-Deployment.
10.	Construction / Demolition	Construct Live Model Tissue Site facilities
11.	Construction / Demolition	Construct storage facility adjacent to B-6274
12.	Construction / Demolition	Establish approximately 3.4 miles of 12 feet wide, reinforced, hardscape trails
13.	Construction / Demolition	Repair, replace, and resurface an existing running track
14.	Construction / Demolition	Renovate B-5050
15.	Construction / Demolition	Improve and delineate existing running trails
16.	Construction / Demolition	Renovate B-5903, Environmental Headquarters
17.	Construction / Demolition	Install metal Quonset hut structures (on existing concrete slabs)
18.	Construction / Demolition	Repair Lewis Valley Road
19.	Construction / Demolition	Improve Blackjack Village structures
20.	Construction / Demolition	Repair Lewis Valley Trail
21.	Construction / Demolition	Repair Houston Cutoff Road
22.	Construction / Demolition	Remove 12 asphalt pads, replace with 24 BOLC tent concrete pads; construct storm shelter
23.	Construction / Demolition	Expand the ARMAG concrete pad at SMTS
24.	Heating	Heating for Enclosed Structures

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Demolish B-5112 and construct a general instruction building

- Activity Description:
Demolish B-5112 and construct a general instruction building

- Activity Start Date
Start Month: 7
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.276014
SO_x	0.002835
NO_x	0.915307
CO	1.187270
PM 10	0.132466

Pollutant	Total Emissions (TONs)
PM 2.5	0.035145
Pb	0.000000
NH_3	0.000813
CO_2e	275.4

2.1 Demolition Phase

2.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

2.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 3600
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

2.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

2.1.4 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

- 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

2.2 Site Grading Phase

2.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

2.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8712
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

2.2.3 Site Grading Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

2.2.4 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

2.3 Building Construction Phase

2.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 11
Number of Days: 0

2.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 10000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

2.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

2.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

2.4 Architectural Coatings Phase

2.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

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

2.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

2.4.3 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	000.265	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

2.4.4 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

3. Construction / Demolition

3.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Demolish B-5906 and construct a hazardous waste storage facility

- Activity Description:
Demolish B-5906 and construct a hazardous waste storage facility

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 11
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.165846
SO_x	0.002406
NO_x	0.714956
CO	1.011891
PM 10	0.071136

Pollutant	Total Emissions (TONs)
PM 2.5	0.026089
Pb	0.000000
NH_3	0.000655
CO_2e	233.7

3.1 Demolition Phase

3.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

3.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 570
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

3.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

3.1.4 Demolition Phase Formula(s)

- Fugitive Dust Emissions per Phase

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

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
0.00042: Emission Factor (lb/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

3.2 Site Grading Phase

3.2.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

3.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 4356
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

3.2.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

3.2.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (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

3.3 Building Construction Phase

3.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 9
Number of Days: 0

3.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 3067
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

3.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

3.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

3.4 Architectural Coatings Phase

3.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 11
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

3.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 3067
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

3.4.3 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	000.265	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

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3.4.4 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

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4. Construction / Demolition

4.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construct K-span/trailers to support B-5115, B-5116, and B-5117 functions; install a shade structure

- Activity Description:
Construct K-span/trailers to support B-5115, B-5116, and B-5117 functions; install a shade structure.

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.059993
SO_x	0.001045
NO_x	0.354762
CO	0.410630
PM 10	0.143785

Pollutant	Total Emissions (TONs)
PM 2.5	0.013744
Pb	0.000000
NH_3	0.000294
CO_2e	102.6

4.1 Site Grading Phase

4.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

4.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 13068
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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 (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

4.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

4.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (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

4.2 Building Construction Phase

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4.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

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

4.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 10000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

4.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

4.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

$VMT_{WT} = WD * WT * 1.25 * NE$

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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

5. Construction / Demolition

5.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construct or extend a tactical road/route

- Activity Description:
Construct or extend a tactical road/route

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.122081
SO_x	0.001722
NO_x	0.723537
CO	0.793973
PM 10	0.467059

Pollutant	Total Emissions (TONs)
PM 2.5	0.033616
Pb	0.000000
NH_3	0.000696
CO_2e	170.1

5.1 Site Grading Phase

5.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

5.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 21780
Amount of Material to be Hauled On-Site (yd^3): 3000
Amount of Material to be Hauled Off-Site (yd^3): 3000

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

5.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

5.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

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

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

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

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (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

5.2 Paving Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

5.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 4
Number of Days: 0

5.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 19998

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

5.2.3 Paving Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

5.2.4 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

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- 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

6. Construction / Demolition

6.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Demolish B-6104 and B-6106

- Activity Description:
Demolish B-6104 and B-6106

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.069959
SO_x	0.001171
NO_x	0.429742
CO	0.516036
PM 10	0.458373

Pollutant	Total Emissions (TONs)
PM 2.5	0.017220
Pb	0.000000
NH_3	0.000324
CO_2e	116.6

6.1 Demolition Phase

6.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

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

6.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 17870
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

6.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

6.1.4 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

6.2 Site Grading Phase

6.2.1 Site Grading Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 15

6.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 26136
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

6.2.3 Site Grading Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

6.2.4 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

7. Construction / Demolition

7.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Demolish B-6222 and B-6224

- Activity Description:
Demolish B-6222 and B-6224

- Activity Start Date
Start Month: 5
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

VOC	0.029863	PM 2.5	0.007215
SO_x	0.000498	Pb	0.000000
NO_x	0.180764	NH_3	0.000088
CO	0.197549	CO_2e	49.5
PM 10	0.096886		

7.1 Demolition Phase

7.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 0
Number of Days: 15

7.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 1020
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

7.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

7.1.4 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

7.2 Site Grading Phase

7.2.1 Site Grading Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 5
Start Quarter: 3
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

7.2.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8712
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

7.2.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

7.2.4 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

8. Construction / Demolition

8.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Expand the MRTC administrative facility (B-6350) and its associated parking area

- Activity Description:
Expand the MRTC administrative facility (B-6350) and its associated parking area

- Activity Start Date
Start Month: 6
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.137946
SO_x	0.001829
NO_x	0.564668
CO	0.778389
PM 10	0.194907

Pollutant	Total Emissions (TONs)
PM 2.5	0.021543
Pb	0.000000
NH_3	0.000513
CO_2e	177.6

8.1 Site Grading Phase

8.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

8.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 17424
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

8.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

8.1.4 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

8.2 Building Construction Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

8.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 6
Number of Days: 0

8.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 3000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

8.2.3 Building Construction Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

8.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

8.3 Architectural Coatings Phase

8.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 12
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

8.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 3000
Number of Units: N/A

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

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

- Worker Trips Vehicle Mixture (%)

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

8.3.3 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	000.265	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

8.3.4 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
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

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

8.4 Paving Phase

8.4.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 1

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Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

8.4.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 4200

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

8.4.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

8.4.4 Paving Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

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

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9. Construction / Demolition

9.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construct training/storage space, parking, and storm shelters at the Center for Pre-Deployment.

- Activity Description:
Construct training/storage space, parking, and storm shelters at the Center for Pre-Deployment, including installation of utilities for water, electric, and sanitary sewer.

- Activity Start Date
Start Month: 6
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.771974
SO_x	0.004779
NO_x	1.831227
CO	2.187088
PM 10	1.062232

Pollutant	Total Emissions (TONs)
PM 2.5	0.078312
Pb	0.000000
NH_3	0.001639
CO_2e	463.4

9.1 Site Grading Phase

9.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 15

9.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 65340
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

9.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

9.1.4 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

9.2 Trenching/Excavating Phase

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9.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 3
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 15

9.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2500
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: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

9.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

9.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (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

9.3 Building Construction Phase

9.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 8
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 9
Number of Days: 0

9.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 40000
Height of Building (ft): 14
Number of Units: N/A

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

9.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

9.3.4 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

9.4 Architectural Coatings Phase

9.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

9.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 40000
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

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9.4.3 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	000.265	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

9.4.4 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

9.5 Paving Phase

9.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 2
Number of Days: 0

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9.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 56000

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

9.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

9.5.4 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)

10. Construction / Demolition

10.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construct Live Model Tissue Site facilities

- Activity Description:
Construct Live Model Tissue Site facilities, including installation of utilities for water, electric, and sanitary sewer.

- Activity Start Date
Start Month: 9
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.245944
SO_x	0.002195
NO_x	0.737076
CO	0.934158
PM 10	0.389768

Pollutant	Total Emissions (TONs)
PM 2.5	0.029911
Pb	0.000000
NH_3	0.000672
CO_2e	213.1

10.1 Site Grading Phase

10.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

10.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 34848
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

10.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.1.4 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

10.2 Trenching/Excavating Phase

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10.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 9
Start Quarter: 2
Start Year: 2022

- Phase Duration
Number of Month: 0
Number of Days: 16

10.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 2500
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: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

10.2.3 Trenching / Excavating Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

VMT_{VE} = (HA_{OnSite} + $HA_{OffSite}$) * (1 / HC) * HT

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (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

10.3 Building Construction Phase

10.3.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 6
Number of Days: 0

10.3.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5000
Height of Building (ft): 40
Number of Units: N/A

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

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- Construction Exhaust (default)

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): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

10.3.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.3.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

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

10.4 Architectural Coatings Phase

10.4.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 3
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

10.4.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 10000
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

10.4.3 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	000.265	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

10.4.4 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

10.5 Paving Phase

10.5.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 4
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 15

10.5.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 14000

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

10.5.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

10.5.4 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

11. Construction / Demolition

11.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Construct storage facility adjacent to B-6274

- Activity Description:
Construct storage facility adjacent to B-6274

- Activity Start Date
Start Month: 6
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 12
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.146019
SO_x	0.001632
NO_x	0.484738
CO	0.660135
PM 10	0.104353

Pollutant	Total Emissions (TONs)
PM 2.5	0.017654
Pb	0.000000
NH_3	0.000428
CO_2e	158.8

11.1 Site Grading Phase

11.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

11.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 8712
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

11.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

11.1.4 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

11.2 Building Construction Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

11.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 6
Number of Days: 0

11.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

11.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

11.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

11.3 Architectural Coatings Phase

11.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 12
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

11.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 5000
Number of Units: N/A

- Architectural Coatings Default Settings

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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

11.3.3 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	000.265	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

11.3.4 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
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

12. Construction / Demolition

12.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Establish approximately 3.4 miles of 12 feet wide, reinforced, hardscape trails

- Activity Description:
Establish approximately 3.4 miles of 12 feet wide, reinforced, hardscape trails to support future AMPV training; interconnect AMPV training and operational support facilities.

- Activity Start Date
Start Month: 7
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.416673
SO_x	0.006564
NO_x	2.618273
CO	2.517406
PM 10	25.836029

Pollutant	Total Emissions (TONs)
PM 2.5	0.106737
Pb	0.000000
NH_3	0.000842
CO_2e	650.0

12.1 Site Grading Phase

12.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

12.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 215532
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

12.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

12.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD}$ = (20 * ACRE * WD) / 2000

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$PM10_{FD}$: 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

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13. Construction / Demolition

13.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Repair, replace, and resurface an existing running track

- Activity Description:
Repair, replace, and resurface an existing running track

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 7
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.085049
SO_x	0.001227
NO_x	0.507611
CO	0.543271
PM 10	0.092481

Pollutant	Total Emissions (TONs)
PM 2.5	0.022832
Pb	0.000000
NH_3	0.000309
CO_2e	120.7

13.1 Site Grading Phase

13.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

13.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 3500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

13.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

13.1.4 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

13.2 Paving Phase

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13.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 2
Number of Days: 0

13.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 2200

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

13.2.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

13.2.4 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

14. Construction / Demolition

14.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Renovate B-5050

- Activity Description:
Renovate B-5050

- Activity Start Date
Start Month: 6
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 10
End Month: 2022

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.132536
SO_x	0.001013
NO_x	0.326080
CO	0.441326
PM 10	0.031856

Pollutant	Total Emissions (TONs)
PM 2.5	0.012607
Pb	0.000000
NH_3	0.000358
CO_2e	98.6

14.1 Demolition Phase

14.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

14.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 6532
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

14.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0410	0.0006	0.2961	0.3743	0.0148	0.0148	0.0037	58.556
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

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 Building Construction Phase

14.2.1 Building Construction Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 4
Number of Days: 0

14.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 6532
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

14.2.3 Building Construction Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

14.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

14.3 Architectural Coatings Phase

14.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 10
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 1
Number of Days: 0

14.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 6532
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

14.3.3 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	000.265	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

14.3.4 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
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

15. Construction / Demolition

15.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Improve and delineate existing running trails

- Activity Description:
Improve and delineate existing running trails

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 4
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.121465
SO_x	0.001841
NO_x	0.703979
CO	0.807793
PM 10	0.238649

Pollutant	Total Emissions (TONs)
PM 2.5	0.030765
Pb	0.000000
NH_3	0.000465
CO_2e	181.1

15.1 Site Grading Phase

15.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

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

15.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 6965
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

15.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

15.1.4 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

15.2 Paving Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

15.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2023

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

15.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 6056

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

15.2.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

15.2.4 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

16. Construction / Demolition

16.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Renovate B-5903, Environmental Headquarters

- Activity Description:
Renovate B-5903, Environmental Headquarters

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.113954
SO_x	0.001005
NO_x	0.296179
CO	0.438123
PM 10	0.026061

Pollutant	Total Emissions (TONs)
PM 2.5	0.010734
Pb	0.000000
NH_3	0.000337
CO_2e	97.7

16.1 Demolition Phase

16.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

16.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 5200
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

16.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0382	0.0006	0.2766	0.3728	0.0127	0.0127	0.0034	58.549
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

16.1.4 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

16.2 Building Construction Phase

16.2.1 Building Construction Phase Timeline Assumptions

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- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 4
Number of Days: 0

16.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 5200
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

16.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

16.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

16.3 Architectural Coatings Phase

16.3.1 Architectural Coatings Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

16.3.2 Architectural Coatings Phase Assumptions

- General Architectural Coatings Information
Building Category: Non-Residential
Total Square Footage (ft^2): 5200
Number of Units: N/A

- Architectural Coatings Default Settings

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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

16.3.3 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	000.265	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

16.3.4 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
$VOC_{AC} = (AB * 2.0 * 0.0116) / 2000.0$

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

17. Construction / Demolition

17.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Install metal Quonset hut structures (on existing concrete slabs)

- Activity Description:
Install metal Quonset hut structures (on existing concrete slabs)

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.179352
SO_x	0.003039
NO_x	1.065710
CO	1.384696
PM 10	0.041336

Pollutant	Total Emissions (TONs)
PM 2.5	0.041180
Pb	0.000000
NH_3	0.001152
CO_2e	293.7

17.1 Building Construction Phase

17.1.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 8
Number of Days: 0

17.1.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 36720
Height of Building (ft): 14
Number of Units: N/A

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

- Vendor Trips

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

- Vendor Trips Vehicle Mixture (%)

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

17.1.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0320	0.0006	0.2612	0.2683	0.0103	0.0103	0.0028	61.065
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0242	0.0003	0.1487	0.1761	0.0067	0.0067	0.0021	25.657

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

17.1.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

18. Construction / Demolition

18.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Repair Lewis Valley Road

- Activity Description:
Repair Lewis Valley Road

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 6
End Month: 2025

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.935885
SO_x	0.014627
NO_x	5.340667
CO	6.496361
PM 10	51.713358

Pollutant	Total Emissions (TONs)
PM 2.5	0.232498
Pb	0.000000
NH_3	0.003291
CO_2e	1438.6

18.1 Site Grading Phase

18.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 18
Number of Days: 0

18.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 287500
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

18.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

18.1.4 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

18.2 Paving Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

18.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 18
Number of Days: 0

18.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 25000

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cement and Mortar Mixers Composite	4	6
Pavers Composite	1	7
Paving Equipment Composite	1	8
Rollers Composite	1	7
Tractors/Loaders/Backhoes Composite	1	7

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

18.2.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0714	0.0014	0.3708	0.5706	0.0167	0.0167	0.0064	132.90
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0461	0.0012	0.2243	0.3477	0.0079	0.0079	0.0041	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

18.2.4 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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

19. Construction / Demolition

19.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Improve Blackjack Village structures

- Activity Description:
Improve Blackjack Village structures

- Activity Start Date
Start Month: 1
Start Month: 2024

- Activity End Date
Indefinite: False
End Month: 3
End Month: 2024

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.040681
SO_x	0.000788
NO_x	0.216388
CO	0.350513
PM 10	0.013388

Pollutant	Total Emissions (TONs)
PM 2.5	0.007488
Pb	0.000000
NH_3	0.000246
CO_2e	76.5

19.1 Demolition Phase

19.1.1 Demolition Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

- Phase Duration
Number of Month: 1
Number of Days: 0

19.1.2 Demolition Phase Assumptions

- General Demolition Information
Area of Building to be demolished (ft^2): 2000
Height of Building to be demolished (ft): 14

- Default Settings Used: Yes

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

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- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

19.1.3 Demolition Phase Emission Factor(s)

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

Concrete/Industrial Saws Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0357	0.0006	0.2608	0.3715	0.0109	0.0109	0.0032	58.544
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1747	0.0024	1.1695	0.6834	0.0454	0.0454	0.0157	239.47
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2e
LDGV	000.265	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

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 Building Construction Phase

19.2.1 Building Construction Phase Timeline Assumptions

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2024

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

19.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 2000
Height of Building (ft): 14
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

19.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0715	0.0013	0.4600	0.3758	0.0161	0.0161	0.0064	128.78
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0246	0.0006	0.0973	0.2146	0.0029	0.0029	0.0022	54.451
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0348	0.0007	0.1980	0.3589	0.0068	0.0068	0.0031	66.875

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

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2e**
LDGV	000.265	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

19.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

20. Construction / Demolition

20.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Repair Lewis Valley Trail

- Activity Description:
Repair Lewis Valley Trail

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.831100
SO_x	0.012005
NO_x	4.912360
CO	5.441831
PM 10	39.770873

Pollutant	Total Emissions (TONs)
PM 2.5	0.233559
Pb	0.000000
NH_3	0.002103
CO_2e	1178.4

20.1 Site Grading Phase

20.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

20.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 331200
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

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

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

20.1.3 Site Grading Phase Emission Factor(s)

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

Excavators Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

20.1.4 Site Grading Phase Formula(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- 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

20.2 Paving Phase

20.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

20.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 288000

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

20.2.3 Paving Phase Emission Factor(s)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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

Excavators Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0648	0.0013	0.3170	0.5103	0.0136	0.0136	0.0058	119.72
Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

20.2.4 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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

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 $(43560 \text{ ft2 / acre})^2$ / acre)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

21. Construction / Demolition

21.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Repair Houston Cutoff Road

- Activity Description:
Repair Houston Cutoff Road

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 5
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.709863
SO_x	0.009708
NO_x	4.279928
CO	4.387840
PM 10	32.331069

Pollutant	Total Emissions (TONs)
PM 2.5	0.206991
Pb	0.000000
NH_3	0.001769
CO_2e	961.7

21.1 Site Grading Phase

21.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

21.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 269100
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Construction Exhaust (default)

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

- Vehicle Exhaust

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

21.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

21.1.4 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

21.2 Paving Phase

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

21.2.1 Paving Phase Timeline Assumptions

- Phase Start Date
Start Month: 6
Start Quarter: 1
Start Year: 2022

- Phase Duration
Number of Month: 12
Number of Days: 0

21.2.2 Paving Phase Assumptions

- General Paving Information
Paving Area (ft^2): 296100

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

21.2.3 Paving Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

21.2.4 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

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

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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)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

22. Construction / Demolition

22.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Remove 12 asphalt pads, replace with 24 BOLC tent concrete pads; construct storm shelter

- Activity Description:
Remove tents, demolish/remove 12 asphalt pads, and replace with 24 BOLC tent concrete pads; construct a storm shelter

- Activity Start Date
Start Month: 5
Start Month: 2022

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.147468
SO_x	0.002344
NO_x	0.903646
CO	0.973514
PM 10	1.532087

Pollutant	Total Emissions (TONs)
PM 2.5	0.037047
Pb	0.000000
NH_3	0.000545
CO_2e	229.5

22.1 Site Grading Phase

22.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 5
Start Quarter: 1
Start Year: 2022

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

22.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 50094
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

22.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0806	0.0014	0.4657	0.5731	0.0217	0.0217	0.0072	132.92
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0507	0.0012	0.2785	0.3488	0.0105	0.0105	0.0045	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1919	0.0024	1.3611	0.7352	0.0536	0.0536	0.0173	239.51
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884

- 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

22.1.4 Site Grading Phase Formula(s)

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- 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

22.2 Building Construction Phase

22.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 7
Start Quarter: 1
Start Year: 2022

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

22.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 40320
Height of Building (ft): 2
Number of Units: N/A

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

- Construction Exhaust (default)

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

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

22.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0797	0.0013	0.5505	0.3821	0.0203	0.0203	0.0071	128.81
Forklifts Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0274	0.0006	0.1265	0.2146	0.0043	0.0043	0.0024	54.457
Generator Sets Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0340	0.0006	0.2783	0.2694	0.0116	0.0116	0.0030	61.069
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0383	0.0007	0.2301	0.3598	0.0095	0.0095	0.0034	66.884
Welders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0260	0.0003	0.1557	0.1772	0.0077	0.0077	0.0023	25.661

- 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

22.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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)

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

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

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23. Construction / Demolition

23.1 General Information & Timeline Assumptions

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Expand the ARMAG concrete pad at SMTS

- Activity Description:
Expand the ARMAG concrete pad at SMTS

- Activity Start Date
Start Month: 1
Start Month: 2023

- Activity End Date
Indefinite: False
End Month: 1
End Month: 2023

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.034989
SO_x	0.000611
NO_x	0.202836
CO	0.234586
PM 10	0.016060

Pollutant	Total Emissions (TONs)
PM 2.5	0.007798
Pb	0.000000
NH_3	0.000113
CO_2e	60.2

23.1 Site Grading Phase

23.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

23.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 830
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	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 (default)

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

- Vehicle Exhaust Vehicle Mixture (%)

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

- Worker Trips

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

- Worker Trips Vehicle Mixture (%)

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

23.1.3 Site Grading Phase Emission Factor(s)

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

Graders Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0757	0.0014	0.4155	0.5717	0.0191	0.0191	0.0068	132.91
Other Construction Equipment Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0483	0.0012	0.2497	0.3481	0.0091	0.0091	0.0043	122.61
Rubber Tired Dozers Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.1830	0.0024	1.2623	0.7077	0.0494	0.0494	0.0165	239.49
Tractors/Loaders/Backhoes Composite								
	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	CH_4	CO_2e
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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 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

23.2 Building Construction Phase

23.2.1 Building Construction Phase Timeline Assumptions

- Phase Start Date
Start Month: 1
Start Quarter: 1
Start Year: 2023

- Phase Duration
Number of Month: 1
Number of Days: 0

23.2.2 Building Construction Phase Assumptions

- General Building Construction Information
Building Category: Office or Industrial
Area of Building (ft^2): 720
Height of Building (ft): 1
Number of Units: N/A

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

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Cranes Composite	1	4
Forklifts Composite	2	6
Tractors/Loaders/Backhoes Composite	1	8

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

- Vehicle Exhaust Vehicle Mixture (%)

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

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

- Worker Trips Vehicle Mixture (%)

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

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

- Vendor Trips Vehicle Mixture (%)

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

23.2.3 Building Construction Phase Emission Factor(s)

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

Cranes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0754	0.0013	0.5027	0.3786	0.0181	0.0181	0.0068	128.79
Forklifts Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0258	0.0006	0.1108	0.2145	0.0034	0.0034	0.0023	54.454
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2e**
Emission Factors	0.0364	0.0007	0.2127	0.3593	0.0080	0.0080	0.0032	66.879

- 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

23.2.4 Building Construction Phase Formula(s)

- Construction Exhaust Emissions per Phase

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

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

- Vehicle Exhaust Emissions per Phase

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

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
BA: Area of Building (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

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24. Heating

24.1 General Information & Timeline Assumptions

- Add or Remove Activity from Baseline? Add

- Activity Location
County: Bexar
Regulatory Area(s): San Antonio, TX

- Activity Title: Heating for Enclosed Structures

- Activity Description:
the cumulative square footage of enclosed structures included in the proposed action is 112,787 sq ft. This input represents the heating activity required to cover all 112,787 sq ft.

- Activity Start Date
Start Month: 10
Start Year: 2022

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

- Activity Emissions:

Pollutant	Emissions Per Year (TONs)
VOC	0.031873
SO_x	0.003477
NO_x	0.579510
CO	0.486789
PM 10	0.044043

Pollutant	Emissions Per Year (TONs)
PM 2.5	0.044043
Pb	0.000000
NH_3	0.000000
CO_2e	697.7

24.2 Heating Assumptions

- Heating
Heating Calculation Type: Heat Energy Requirement Method

- Heat Energy Requirement Method
Area of floorspace to be heated (ft^2): 112787
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): 0.1079

- Default Settings Used: Yes

- Boiler/Furnace Usage
Operating Time Per Year (hours): 900 (default)

24.3 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

24.4 Heating Formula(s)

- Heating Fuel Consumption ft³ per Year

FC_{HER}= HA * EI / HV / 1000000

FC_{HER}: Fuel Consumption for Heat Energy Requirement Method
HA: Area of floorspace to be heated (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