Draft

Environmental Assessment

Addressing Replacement of the Tactical Equipment Maintenance Facility

Joint Base San Antonio-Bullis, Texas

August
2017

ABBREVIATIONS AND ACRONYMS

ABW	Air Base Wing
ACM	asbestos-containing material
AFI	Air Force Instruction
APE	area of potential effect
AQCR	Air Quality Control Region
BMPs	best management practices
BO	Biological Opinion
BUL	Bullis
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CWA	Clean Water Act
CZP	Contributing Zone Plan
dB	decibels
dBA	A-weighted decibels
DoD	Department of Defense
EA	Environmental Assessment
EAPP	Edwards Aquifer Protection Plan
EIS	Environmental Impact Statement
EISA	Energy Independence and Security Act
EO	Executive Order
ERP	Environmental Restoration Program
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
ft^2	square foot/feet
GHG	greenhouse gas
I	Interstate
IRP	Installation Restoration Program
JBSA	Joint Base San Antonio
KPA	karst protection area
LBP	lead-based paint
LUC	land use controls
MBTA	Migratory Bird Treaty Act
MD	munitions debris
MEC	munitions and explosives of concern
MMRP	Military Munitions Response Program
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NOA	notice of availability
NO_x	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
NSR	noise-sensitive receptor
NW	northwest
OSHA	Occupational Safety and Health Administration
OWS	oil-water separator
PCB	polychlorinated biphenyls
pCi/L	picocuries per liter
PM_{10}	particulate matter less than or equal to 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
POL	petroleum, oils, and lubricants
POV	privately owned vehicle
RCRA	Resource Conservation and Recovery Act
SO_2	sulfur dioxide
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Stormwater Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
TEMF	tactical equipment maintenance facility
TMI	Texas Military Institute—The Episcopal School of Texas
TPWD	Texas Parks and Wildlife Department
tpy	tons per year
TxDOT	Texas Department of Transportation
UFC	Unified Facilities Criteria
UFGS	Unified Facilities Guide Specifications
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
UXO	unexploded ordnance
VOC	volatile organic compounds

Cover Sheet

Environmental Assessment Addressing Replacement of the Tactical Equipment Maintenance Facility at Joint Base San Antonio-Bullis, Texas

Responsible Agencies: U.S. Air Force and 502 Air Base Wing.

Affected Locations: Joint Base San Antonio-Bullis, San Antonio, Texas.

Report Designation: Draft Environmental Assessment (EA).

Abstract: The U.S. Air Force and 502 Air Base Wing propose to replace the tactical equipment maintenance facility (TEMF) at Joint Base San Antonio-Bullis with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage needs of the installation and complies with all applicable Unified Facilities Criteria (i.e., the Proposed Action). The proposed TEMF would be constructed to the southeast of the intersection of Camp Bullis Road and Wilderness Trail on an open field. It would include the TEMF building with a 35-ton overhead crane, concrete hardstand for parking tactical equipment, privately owned vehicle parking, three storage buildings, and supporting infrastructure. The Proposed Action includes the following connected actions: constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF.

This EA analyzes in detail the Proposed Action and No Action Alternative. The No Action Alternative is the continuation of current practices in that the existing TEMF would continue to operate and no construction or demolition would occur. The connected actions associated with the proposed TEMF would also not occur. Tactical equipment maintenance and storage would continue to be performed in a facility that is outdated and undersized and lacks standard shop components and sufficient functional space.

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

Draft

ENVIRONMENTAL ASSESSMENT

ADDRESSING REPLACEMENT OF THE TACTICAL EQUIPMENT MAINTENANCE FACILITY AT JOINT BASE SAN ANTONIO-BULLIS, TEXAS

Prepared for:

U.S. Army Corps of Engineers, Tulsa District

Prepared by:

HDR

AUGUST 2017

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1 Purpose of and Need for the Proposed Action

1.1 Introduction

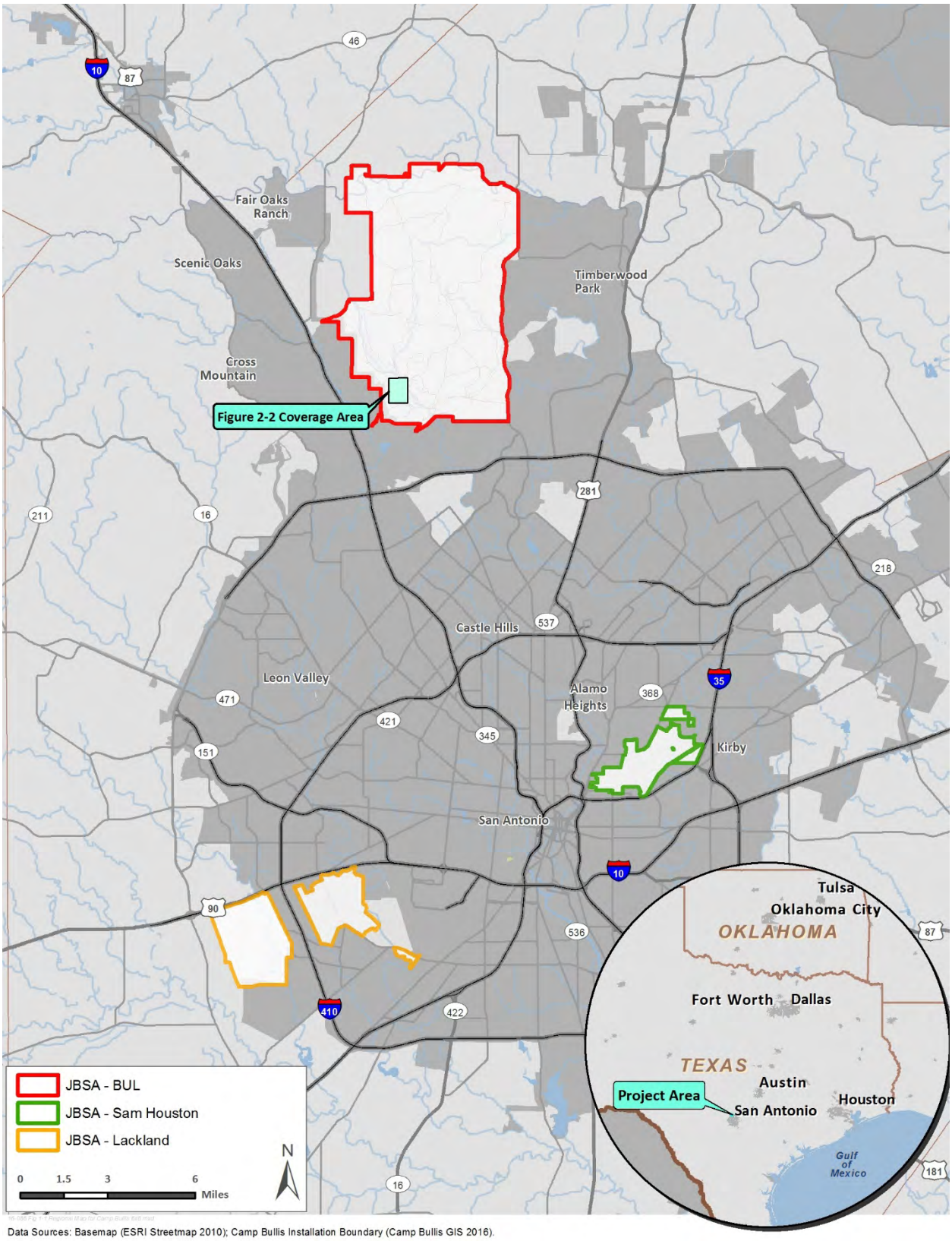
The U.S. Air Force (USAF) and 502 Air Base Wing (ABW) propose to replace the tactical equipment maintenance facility (TEMF) and undertake connected actions such as constructing and operating a vehicle wash facility; making road improvements; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF at Joint Base San Antonio (JBSA)-Bullis (BUL), Texas (i.e., the Proposed Action). This Environmental Assessment (EA) analyzes the potential for environmental and socioeconomic impacts from this Proposed Action and alternatives, including the No Action Alternative. This EA was prepared in accordance with the National Environmental Policy Act (NEPA); the Council on Environmental Quality (CEQ) Regulations for Implementing NEPA (Title 40 Code of Federal Regulations [CFR] §§ 1500–1508); and the USAF regulations for implementing NEPA (32 CFR § 989, as amended).

1.2 Location and Background

JBSA-BUL is in Bexar County, Texas, approximately 16 miles north of downtown San Antonio (see **Figure 1-1**). The installation occupies more than 28,000 acres northeast of the intersection of Interstate (I)-10 and Loop 1604. JBSA-BUL is one of four primary JBSA sites along with JBSA-Sam Houston, JBSA-Lackland, and JBSA-Randolph, and the installation is under the command of the USAF 502 ABW. The purpose of the installation is to provide training space for various military units including the U.S. Army, Army Reserve, Texas Army National Guard, and USAF. The installation is predominantly used for medical, small arms, and vehicle maneuverability training exercises. Military personnel from the various JBSA sites as well as other regional military installations use the training facilities at JBSA-BUL (City of San Antonio 2009, TSHA 2010).

Maintenance and storage of tactical equipment and vehicles assigned to JBSA-BUL is accomplished at the installation's Army Medical Department Center and School vehicle maintenance shop, which is immediately northwest of the intersection of Camp Bullis Road and Northwest (NW) Military Highway. This facility does not meet the Unified Facilities Criteria (UFC) standards for a TEMF but is used for such functions. It includes Building 6104 (approximately 21,600 square feet [ft^2]), Building 6106 (approximately 2,460 ft^2), various portable buildings and shipping containers, and approximately 200,000 ft^2 of parking areas. The existing TEMF is used to perform field and sustainment level maintenance for approximately 176 wheeled tactical vehicles (including trailers) and equipment assigned to the 32nd Medical Brigade (USACE 2016, USAF 2016a).

Building 6104 is the primary maintenance facility. This building was originally constructed in 1945 as a horse barn. It is undersized; lacks standard shop components such as an overhead crane and interior maintenance pits; does not have heating, cooling, and ventilation systems; and does not have sufficient functional space or an appropriate layout to accommodate modern and larger tactical vehicles. The lack of appropriate storage areas requires engines and transmissions to be stored in breezeways and corridors. The building also has peeling



Data Sources: Basemap (ESRI Streetmap 2010); Camp Bullis Installation Boundary (Camp Bullis GIS 2016).

Figure 1-1. JBSA-BUL relative to the Greater San Antonio Region

lead-based paint (LBP) and asbestos-containing materials (ACM) in the roof and window glazing. Walls throughout the building have rotting wood and potentially structurally unsound siding that warps and peels. The bay areas, classrooms, and office and break areas are energy inefficient, and condensation also appears on the shop floor during summer, which creates slick, hazardous working conditions for personnel (USACE 2016, USAF 2016a).

1.3 Purpose of the Proposed Action

The purpose of the Proposed Action is to provide JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage requirements of JBSA-BUL and complies with all applicable UFC.

1.4 Need for the Proposed Action

The Proposed Action is needed because the existing TEMF at JBSA-BUL is outdated and undersized and lacks standard shop components and sufficient functional space. These deficiencies do not allow for efficient and appropriate tactical equipment maintenance and storage or for compliance with applicable UFC. As a result, personnel work in substandard conditions that scarcely meet customer needs; present safety concerns; and impair productivity, morale, and mission training.

1.5 NEPA Compliance Requirements

NEPA is a federal law requiring the analysis of potential environmental impacts associated with proposed federal actions before the actions are taken. The intent of NEPA is to make decisions informed by potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the CEQ, which is responsible for ensuring federal agency compliance with NEPA. CEQ NEPA regulations specify that an EA be prepared to determine whether to prepare a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS) is required. An EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

CEQ regulations mandate all federal agencies to use a prescribed approach to environmental impact analysis. The approach includes an evaluation of the potential environmental consequences associated with a proposed action and considers alternative courses of action.

Because JBSA-BUL is under the command of USAF, USAF-propagated regulations are applicable for this Proposed Action. USAF NEPA regulations under 32 CFR § 989 provide procedures for environmental impact analysis to comply with NEPA and CEQ regulations. Air Force Policy Directive 32-70, *Environmental Quality*, states USAF will comply with applicable federal, state, and local environmental laws and regulations, including NEPA. If significant impacts from a proposed action are predicted under NEPA, USAF would decide whether to conduct mitigation to reduce impacts below the level of significance, prepare an EIS, or abandon the proposed action. This EA would also be used to guide USAF in implementing the Proposed Action in a manner consistent with USAF standards for environmental stewardship should the Proposed Action be approved for implementation.

USAF regulations require that a Finding of No Practicable Alternative (FONPA) accompany a FONSI for actions that involve construction in a wetland or action in a floodplain. The FONPA provides a discussion for why no practicable alternatives exist for avoiding impacts on these resources. A FONPA is approved by the applicable USAF major command. A FONPA is necessary for this Proposed Action because a portion of the project area is in a floodplain (see **Section 3.8**).

1.6 Agency and Native American Tribal Coordination and Consultation

1.6.1 Interagency and Intergovernmental Coordination and Consultation

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

The Description of the Proposed Action and Alternatives (i.e., **Sections 1** and **2** of this EA) was made available to the federal, state, and local government agencies listed in **Appendix A** for a 30-day comment period beginning on March 6, 2017, to develop the scope for this EA. A signed example copy of the USAF distribution letter and all comments received are provided in **Appendix A**. The comments received from the various agencies were considered during preparation of the Draft EA.

This Draft EA and a Draft FONSI/FONPA were made available to the federal, state, and local government agencies listed in **Appendix A** for a 30-day review period beginning on September 15, 2017. Signed example copies of the USAF distribution letters are provided in **Appendix A**. Government agency comments will be considered in the development of the Final EA and prior to a decision being made on whether or not to sign the FONSI/FONPA. Comments from the government agency review of this Draft EA and the Draft FONSI/FONPA will be included in **Appendix A** of the Final EA.

1.6.2 Government to Government Coordination and Consultation

EO 13175, *Consultation and Coordination with Indian Tribal Governments*, directs federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with that EO, Department of Defense Instruction 4710.02, *Interactions with Federally-Recognized Tribes*, and Air Force Instruction (AFI) 90-2002, *Air Force Interaction with Federally-Recognized Tribes*, federally recognized tribes that are historically affiliated with the JBSA-BUL geographic region will be invited to consult on all proposed undertakings that potentially affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process,

and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Native American tribal governments that were coordinated with regarding the Proposed Action are listed in **Appendix A** along with all USAF correspondence and any comments that were received.

1.7 Public Involvement

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

A Notice for Early Public Review of the Proposed Action was published in the *San Antonio Express-News* on Sunday, March 12, 2017, because a portion of the project area is within the 100-year floodplain. The notice, as it appeared in the newspaper, is provided in **Appendix A**. No public comments were received from the Notice for Early Public Review.

A notice of availability (NOA) was published in the *San Antonio Express-News* on Sunday, September 17, 2017, announcing this Draft EA and a Draft FONSI/FONPA were made available to the public for a 30-day review period. A copy of the NOA is provided in **Appendix A**. This Draft EA and the Draft FONSI/FONPA were made available in electronic format on the JBSA Environmental Information webpage at http://www.jbsa.mil/Information/Environmental/ and in hardcopy format at the San Antonio Public Library, 600 Soledad Street, San Antonio, Texas, 78205. The NOA was issued to solicit comments on the Proposed Action and involve the public in the decision-making process. Public comments received on this Draft EA and the Draft FONSI/FONPA will be considered in the development of the Final EA and prior to a decision being made on whether or not to sign the FONSI/FONPA. Any comments received will be provided in **Appendix A** of the Final EA.

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2 Description of the Proposed Action and Alternatives

As discussed in **Section 1.5**, the NEPA process evaluates potential environmental consequences associated with a proposed action and considers alternative courses of action. This section describes the Proposed Action and alternatives, including the No Action Alternative.

2.1 Proposed Action

The Proposed Action is to replace the TEMF at JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage needs of the installation and complies with all applicable UFC. The Proposed Action also includes the following connected actions: constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF. The following subsections describe in detail the construction, demolition, and operational components of the Proposed Action.

2.1.1 Construction and Demolition

2.1.1.1 TEMF

The proposed TEMF would be designed and constructed as a small standard TEMF in accordance with UFC 4-214-02, *TEMF Standard Design*. The facility would include the TEMF building with a 35-ton overhead crane, concrete hardstand for parking tactical equipment, privately owned vehicle (POV) parking, three storage buildings, and supporting infrastructure. It would be constructed on an open field approximately 350 feet southeast of the intersection of Camp Bullis Road and Wilderness Trail (see **Figure 2-1**). This site is immediately southeast of the Leader Reaction Course building, and a separate action to construct a Defense Logistics Agency fuel dispensing facility has been proposed immediately to the north. This site is mostly flat with maintained and unmaintained grass and scrub vegetation. The site gradually slopes downward toward the south and southeast. Vehicle access would be provided from Wilderness Trail (USACE 2016, USAF 2016a).

TEMF Building. The proposed TEMF building would measure approximately 18,800 ft^2 and, while smaller than the primary maintenance shop at the existing TEMF (i.e., Building 6104), functional space would increase as a result of the modern design. The proposed TEMF building would include work bays, storage, office, and support space. A 35-ton overhead crane would allow Stryker and similar vehicles to be lifted onto jack stands for maintenance purposes. The proposed building would also include administration and shop control areas; training room; consolidated work bench; tool room and tool box storage; combat spares; latrine; showers; and break, training, and conference rooms. Special foundations, building information systems, fire protection and alarm systems, intrusion detection systems, energy monitoring control systems, and sustainability and energy enhancement measures would be incorporated into the design.

Data Sources: Bing Maps Aerial; Camp Bullis GIS

Figure 2-1. Layout for the Proposed TEMF, Vehicle Wash Facility, and Road Improvements

Eye wash fountains and water deluge showers would be provided as emergency safety equipment for personnel (USACE 2016, USAF 2016a).

Concrete Hardstand and POV Parking. Approximately 176,300 ft^2 of 8-inch-thick concrete hardstand would be constructed primarily to the northeast of the proposed TEMF building, and an approximately 13,940 ft^2 asphalt-paved POV parking lot would be constructed between Wilderness Trail and the proposed TEMF building (see **Figure 2-1**). The concrete hardstand would be used as a secure parking area for up to 200 tactical vehicles and equipment such as Stryker and other multipurpose armored vehicles and generators. It would be designed to support tracked vehicles and those weighing up to 90,000 pounds. The POV parking lot would be outside of the security fence encompassing the TEMF and would provide approximately 39 parking spaces for staff and visitors (USACE 2016, USAF 2016a).

Storage Buildings. Three small storage buildings would be constructed at the southern corner of the TEMF (see **Figure 2-1**). The largest of these buildings would measure approximately 1,000 ft^2 and would be used for organization storage. The remaining two buildings would each measure approximately 840 ft^2 and would be used for petroleum, oils, and lubricants (POL) and hazardous wastes storage, respectively (USACE 2016, USAF 2016a).

Supporting Infrastructure. Infrastructure supporting the proposed TEMF would include utility service; exterior lighting designed to minimize light pollution; walkways, curbs, and gutters; stormwater drainage; landscaping; security control; and signage. Electricity and telecommunication would be extended from existing services along Camp Bullis Road. An existing water line already extends through the southern portion of the proposed TEMF site and would be used to provide water service. Propane would be supplied by commercial deliveries and stored in an approximately 1,000-gallon underground storage tank (UST) on the site. A new sanitary sewer connector would convey sewage and wastewater to an existing sanitary sewer main to the north of Camp Bullis Road. An oil-water separator (OWS) would treat the wastewater discharges from the maintenance operations before they are conveyed into the installation's sanitary sewer system, and spill prevention infrastructure would guard against incidental releases of POL and hazardous wastes during maintenance activities. Stormwater runoff would be managed via curb inlets and gutters and directed to a stormwater detention pond southeast of the concrete hardstand. The stormwater detention pond would discharge through a 12-inch pipe into Salado Creek. A 10-foot-tall chain-link security fence would be constructed around the perimeter of the TEMF to control access. Two 20-foot rolling gates would be placed at the vehicle entrances from Wilderness Trail (see **Figure 2-1**) (USACE 2016, USAF 2016a).

2.1.1.2 CONNECTED ACTIONS

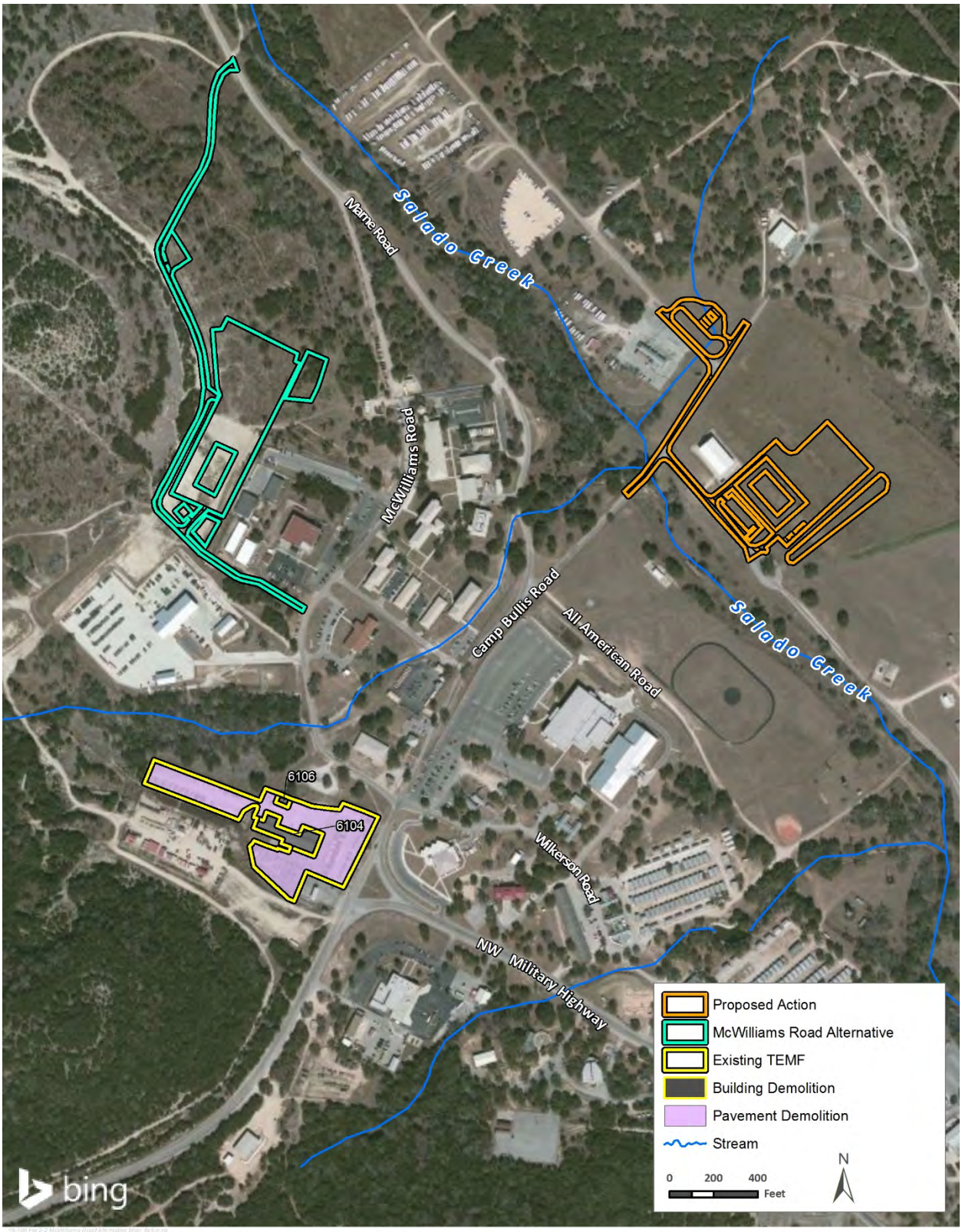
Vehicle Wash Facility. The proposed four-bay vehicle wash facility would be constructed north of the intersection of Camp Bullis Road and New Lewis Valley Road and approximately 800 feet northwest of the proposed TEMF (see **Figure 2-1**). This site has similar topography and vegetation as the proposed TEMF site but gradually slopes from the northwest to southeast. An intermittent tributary of Salado Creek transects the site. Access to the vehicle wash facility would be provided via Camp Bullis Road and New Lewis Valley Road (USACE 2016, USAF 2016a).

The proposed vehicle wash facility would measure approximately 3,000 ft^2 with a 2,800 ft^2 four-bay vehicle wash and 200 ft^2 washer building. Approximately 22,500 ft^2 of 8-inch-thick concrete hardstand would be constructed to connect the facility with Camp Bullis Road and New Lewis Valley Road. Electricity and sanitary sewer are already available to this site. Water would be extended from an existing water line on the north side of Camp Bullis Road. Impervious surfaces would be sloped to collect waste wash water produced from washings. Collected waste wash water would be processed by a water reclamation unit that includes an OWS and recycled as wash water. Unused effluent would be directed back into the existing sanitary sewer system (USACE 2016, USAF 2016a).

Road Improvements. Improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road would be required to support the increased traffic and vehicle weights from the proposed TEMF and vehicle wash facility. Camp Bullis Road would be improved for approximately 850 feet from the Salado Creek crossing to the eastern access drive for the proposed vehicle wash facility. Wilderness Trail would be improved for approximately 600 feet from the intersection of Camp Bullis Road to the southern access drive for the proposed TEMF. New Lewis Valley Road would be improved for a distance of approximately 350 feet from the intersection with Camp Bullis Road to the northern access drive for the proposed vehicle wash facility (see **Figure 2-1**). Road improvement would entail removing the existing asphalt pavement and replacing with new asphalt pavement or 8-inch-thick concrete, where necessary. The stormwater culvert beneath Wilderness Trail immediately southeast of the intersection with Camp Bullis Road (see **Figure 2-1**) would be repaired as part of the proposed road improvements. Repairs to the culvert would include cleaning, stabilization, and selective reconstruction, as needed. The intersection at Camp Bullis Road and New Lewis Valley Road would be redesigned to accommodate the larger turning radii of vehicles accessing the proposed vehicle wash facility. During the road improvements, temporary access roads or alternative routing would ensure access is provided to other areas of JBSA-BUL (USACE 2016, USAF 2016a).

Low Water Crossing Replacement. The low water crossing on Camp Bullis Road at Salado Creek would be replaced with a culvert system (see **Figure 2-1**). Replacement would entail removing the existing crossing, which consists of three 24-inch-diameter metal pipes, and constructing three 3 × 3-foot concrete box culverts. The Salado Creek channel would also be cleared of debris 50 feet upstream and 100 feet downstream of the crossing. The proposed culverts would substantially increase the volume of water that could pass under Camp Bullis Road and is intended to reduce the frequency of water overtopping the road (USACE 2016, USAF 2016a).

Demolish Existing TEMF. The Proposed Action includes demolition of the existing TEMF at JBSA-BUL, which is immediately northwest of the intersection of Camp Bullis Road and NW Military Highway (see **Figure 2-2**). Demolition would include Building 6104 (approximately 21,600 ft^2), Building 6106 (approximately 2,460 ft^2), the portable buildings and shipping containers on the premise, all paved tactical equipment parking areas (approximately 200,000 ft^2), and associated utilities (e.g., water and sanitary sewer lines, fire hydrants, a 1,000-gallon propane tank, a stormwater culvert, an OWS). A 161-foot-long, 3-foot-tall concrete retaining wall and security fencing would also be removed during demolition. All hazardous materials and



Data Sources: Bing Maps Aerial; Camp Bullis GIS

Figure 2-2. Locations of the Proposed TEMF and Connected Actions and McWilliams Road Alternative

wastes at the existing TEMF would be removed prior to demolition, with hazardous wastes being disposed of per applicable federal, state, and local regulations (USACE 2016, USAF 2016a).

After demolition is complete, the site would be cut and filled and graded to match adjacent contours. Demolition would occur after construction of the proposed TEMF is complete and the unit has relocated (USACE 2016, USAF 2016a).

2.1.1.3 CONSTRUCTION AND DEMOLITION SUMMARY

All new building construction would meet Department of Defense (DoD) Minimum Antiterrorism Standards for Buildings, the American with Disabilities Act of 1990, and Architectural Barriers Act of 1968. Construction would begin in March 2018 and conclude by November 2019 (USACE 2016, USAF 2016a).

Figures 2-1 and **2-2** shows the proposed layout for the TEMF and connected actions, and **Table 2-1** summarizes the major construction and demolition elements of the Proposed Action and their corresponding dimensions. Because the final design has not yet been determined, the boundaries and sizes for these elements might differ slightly. In total, the Proposed Action would disturb approximately 537,220 ft^2 (12.3 acres) of which approximately 270,890 ft^2 (6.2 acres) are currently undeveloped grassland and the remainder is existing roadways, buildings, and hardstand. The Proposed Action would result in an approximate 13,160 ft^2 (0.3-acre) net increase in impervious surface.

Table 2-1. Major Construction and Demolition Elements of the Proposed Action

Element	Area of Disturbance (ft^2)	Change in Impervious Surface (ft^2)
TEMF		
Construct TEMF Building	18,800	+18,800
Construct Concrete Hardstand for Tactical Equipment Parking	176,300	+176,300
Construct Asphalt-paved POV Parking	13,940	+13,940
Construct Organizational Storage Building	1,000	+1,000
Construct POL Storage Building	840	+840
Construct Hazardous Wastes Storage Building	840	+840
Construct Detention Pond	33,670	0
Connected Actions		
Construct Four-bay Vehicle Wash Facility	3,000	+3,000
Construct Concrete Hardstand for Vehicle Wash Facility	22,500	+22,500
Improve Camp Bullis Road (850 feet)	17,000	0
Improve Wilderness Trail (600 feet) including culvert repairs	12,000	0
Improve New Lewis Valley Road (350 feet)	7,000	0
Replace Low Water Crossing on Camp Bullis Road	2,520	0
Clear Debris from Salado Creek (150 feet)	3,750	0
Demolish Building 6104	21,600	-21,600
Demolish Building 6106	2,460	-2,460
Demolish Paved Tactical Equipment Parking Areas	200,000	-200,000

2.1.2 Operation

After completing construction in late 2019, all personnel currently assigned to the existing TEMF would transfer to the proposed TEMF. No change in the number of personnel assigned to JBSA-BUL would occur, and personnel would continue to work similar hours as they do at the existing TEMF. In addition, no change in the number of tactical equipment assigned to JBSA-BUL would occur, and the process for how tactical equipment maintenance and storage activities are performed would not change (USACE 2016, USAF 2016a).

2.2 Alternatives

Guidance for complying with NEPA requires an assessment of potentially effective and reasonably feasible alternatives for implementing the Proposed Action. Consideration of alternatives helps avoid unnecessary impacts and allows for an analysis of reasonable ways to achieve a purpose.

2.2.1 Alternative Evaluation Criteria

CEQ requires that all reasonable alternatives to an action be examined. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint using common sense rather than simply desirable from the standpoint of the applicant. To be considered reasonable, an alternative must meet the purpose of and need for the action, be feasible and able to be implemented, and be suitable for consideration by decision makers.

In evaluating alternatives for this Proposed Action, an alternative must also meet the following selection standards to warrant evaluation in this EA:

A. Offer enough contiguous, constructible land to site all components of the proposed TEMF and vehicle wash facility as described in **Section 2.1.1**.

B. Be located on JBSA-BUL.

C. Avoid interference with other JBSA-BUL missions.

D. Meet the operational efficiency needs for a TEMF.

E. Provide the necessary security measures for storage of tactical equipment.

2.2.2 Alternatives Considered for this Proposed Action

Seven alternatives to the Proposed Action were evaluated against the selection standards described in **Section 2.2.1**. The evaluation determined that only the Proposed Action and none of the seven alternatives met all of the selection standards (see **Table 2-2**); therefore, none of the seven alternatives are analyzed in detail in this EA. The corresponding explanation for why these alternatives have been eliminated from further analysis in this EA is provided in **Section 2.2.4**.

2.2.3 No Action Alternative

The Environmental Impact Analysis Process (32 CFR § 989.8[d]) requires consideration of the No Action Alternative, which provides a baseline against which the Proposed Action and other potential action alternatives can be compared. In addition, CEQ NEPA guidance recommends inclusion of the No Action

Table 2-2. Evaluation of Alternatives Based on Satisfaction of Selection Standards

Alternatives	Selection Standards				
	A	B	C	D	E
	Enough Area for All Components of a TEMF and Vehicle Wash Facility	Located on JBSA-BUL	Avoid Interference with Other JBSA-BUL Missions	Meet Operational Efficiency Needs	Provide Security Measures for Storage of Tactical Equipment
Proposed Action	Yes	Yes	Yes	Yes	Yes
McWilliams Road	Yes	Yes	No	Yes	Yes
Renovate Existing TEMF	No	Yes	Yes	No	Yes
Renovation and New Construction at Existing TEMF	No	Yes	Yes	Yes	Yes
Use of Other Facilities on JBSA-BUL	Yes	Yes	No	Yes	Yes
Use Other DoD or Federal Agency Facilities	Yes	No	Yes	No	Yes
Lease Off-installation Facilities	Yes	No	Yes	No	No
Contract Maintenance Services	Yes	No	Yes	No	No

Alternative in an EA to assess any environmental consequences that may occur if the Proposed Action is not implemented. Therefore, the No Action Alternative is carried forward for detailed analysis in this EA even though it does not meet all of the selection standards listed in **Section 2.2.1**.

The No Action Alternative is the continuation of current practices in that the existing TEMF would continue to operate and no construction or demolition would occur. Tactical equipment maintenance and storage at JBSA-BUL would continue to be performed at the existing TEMF, which is outdated and undersized and lacks standard shop components and sufficient functional space. Personnel would continue to work in substandard conditions that scarcely meet customer needs; present safety concerns; and impair productivity, morale, and mission training. The connected actions associated with the proposed TEMF would also not occur. The proposed vehicle wash facility would not be constructed, and no road improvements would transpire. The low water crossing on Camp Bullis Road would not be replaced.

2.2.4 Alternatives Eliminated from Further Consideration

The following alternatives were initially considered but have been eliminated from further consideration in this EA based on the results of the evaluation against the selection standards in **Section 2.2.2**. CEQ NEPA regulations recommend that alternatives eliminated from detailed

study be presented along with a brief discussion explaining why they were eliminated (40 CFR 1502.14[a]).

2.2.4.1 MCWILLIAMS ROAD ALTERNATIVE

The McWilliams Road Alternative would site the proposed TEMF to the northwest of Building 6120 on a gravel-covered lot, and the proposed vehicle wash facility farther to the northwest on a lightly vegetated parcel. This site would be accessible from McWilliams Road. This alternative was determined not to warrant detailed analysis in this EA because it would only meet four of the five selection standards presented in **Section 2.2.1**. It would offer enough contiguous area to support the proposed TEMF and vehicle wash facility, be located on JBSA-BUL, meet operational efficiency needs, and provide security measures for tactical equipment storage. It would not, however, avoid interference with other JBSA-BUL missions because an antenna tower is present on this site and would require relocation prior to the start of construction. Relocation of this antenna tower is discouraged because it is already sited at an optional location and relocation could impact reception. Based on this constraint, this alternative does not meet the selection standards and was dismissed from further analysis in this EA. **Figure 2-2** shows an outline of the proposed disturbance areas under the McWilliams Road Alternative.

2.2.4.2 RENOVATE EXISTING TEMF ALTERNATIVE

This alternative would entail renovating the existing TEMF at JBSA-BUL to comply with all applicable UFC. This alternative was determined not to warrant detailed analysis in this EA because it would only meet three of the five selection standards presented in **Section 2.2.1**. It would be located on JBSA-BUL, avoid interference with other JBSA-BUL missions, and provide security measures for tactical equipment storage. It would not, however, provide enough contiguous area to support the proposed TEMF and vehicle wash facility or meet operational efficiency needs. As noted in **Section 1.4**, the existing TEMF is outdated and undersized and lacks standard shop components and sufficient functional space. The lack of available space and structural limitations of the existing TEMF does not allow for an overhead crane, interior maintenance pits, or a layout capable of accommodating modern and larger tactical vehicles. As such, renovation would not fully address these deficiencies, and the existing TEMF would still not comply with all applicable UFC. For these reasons, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.2.4.3 RENOVATION AND NEW CONSTRUCTION AT EXISTING TEMF ALTERNATIVE

This alternative would be a combination of renovating the existing TEMF and constructing a vehicle wash facility and a small maintenance building with an overhead crane, interior maintenance pits, and a layout capable of accommodating modern and larger tactical vehicles at the existing TEMF site. This alternative was determined not to warrant detailed analysis in this EA because it would only meet four of the five selection standards presented in **Section 2.2.1**. It would be located on JBSA-BUL, avoid interference with other JBSA-BUL missions, meet operational efficiency needs, and provide security measures for tactical equipment storage. It would not, however, address the lack of available space because the existing TEMF does not leave sufficient space for new construction. For this reason, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.2.4.4 USE OTHER FACILITIES ON JBSA-BUL ALTERNATIVE

This alternative would place the proposed TEMF and vehicle wash facility in other undetermined facilities on JBSA-BUL. It could entail construction of new buildings or reuse of existing buildings currently used for other purposes. This alternative was determined not to warrant detailed analysis in this EA because it would only meet four of the five selection standards presented in **Section 2.2.1**. It would provide space for all components of the proposed TEMF and vehicle wash facility, be located on JBSA-BUL, meet operational efficiency needs, and provide security measures for tactical equipment storage. It would not, however, avoid interference with other JBSA-BUL missions because there are no other spaces or facilities on JBSA-BUL that are vacant or have the capacity to take on the TEMF mission. For this reason, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.2.4.5 USE OTHER DOD OR FEDERAL AGENCY FACILITIES ALTERNATIVE

This alternative would utilize space at other DoD or federal agency facilities to conduct all tactical equipment maintenance activities. Tactical equipment storage would remain on JBSA-BUL. JBSA-Sam Houston is the nearest such facility to JBSA-BUL, at approximately 20 miles distance, that could support the TEMF mission (see **Figure 1-1**). This alternative was determined not to warrant detailed analysis in this EA because it would only meet three of the five selection standards presented in **Section 2.2.1**. It would provide space for all components of the proposed TEMF and vehicle wash facility, avoid interference with other JBSA-BUL missions, and provide security measures for tactical equipment storage. It would not, however, be located on JBSA-BUL, so all equipment would need to be transported at least 20 miles each direction, which would not meet operational efficiency needs by increasing wear on equipment and the amount of time equipment is out of service for maintenance. For this reason, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.2.4.6 LEASE OFF-INSTALLATION FACILITIES ALTERNATIVE

Under this alternative, the 502 ABW would lease property at an undetermined location off JBSA-BUL to construct the proposed TEMF and vehicle wash facility. Tactical equipment maintenance and storage would occur at this site. This alternative was determined not to warrant detailed analysis in this EA because it would only meet two of the five selection standards presented in **Section 2.2.1**. It would offer enough contiguous area to support the proposed TEMF and vehicle wash facility and avoid interference with other JBSA-BUL missions. It would not, however, be located on JBSA-BUL, so all equipment would need to be transported to JBSA-BUL each time it is needed for mission purposes. This would not meet operational efficiency needs and would incur unnecessary wear on equipment and increase travel times. Additionally, the storage of tactical equipment at leased facilities presents security concerns. For these reasons, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.2.4.7 CONTRACT MAINTENANCE SERVICES ALTERNATIVE

This alternative would have a private contractor conduct all tactical equipment maintenance activities at an undetermined location off JBSA-BUL. Tactical equipment storage would remain on JBSA-BUL. This alternative was determined not to warrant detailed analysis in this EA

because it would only meet two of the five selection standards presented in **Section 2.2.1**. The contractor's maintenance facility is assumed to offer enough contiguous area to support the proposed TEMF and vehicle wash facility and avoid interference with other JBSA-BUL missions. It would not, however, be located on JBSA-BUL, so all equipment would need to be transported off-installation, incurring unnecessary wear on equipment, increasing the amount of time equipment would be out of service for maintenance, and presenting security concerns. For these reasons, this alternative does not meet the selection standards and was dismissed from further analysis in this EA.

2.3 Identification of the Preferred Alternative

The Preferred Alternative is the alternative that the 502 ABW believes best satisfies the purpose and need and would fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical, and other factors. The 502 ABW has identified the Proposed Action, which meets all of the selection standards, as the Preferred Alternative.

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3 Affected Environment and Environmental Consequences

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

All environmental resources were initially considered in this EA. In compliance with NEPA, CEQ, and USAF Environmental Impact Analysis Process regulations and guidelines, the following discussion of the affected environment and environmental consequences focuses only on those environmental resources considered potentially subject to impacts or with potentially significant environmental issues. These environmental resources are air quality, biological resources, cultural resources, geological resources, hazardous materials and wastes, noise, safety, and water resources. The environmental resources not analyzed in detail in this EA because clearly insignificant or no impacts would occur are infrastructure and transportation, land use, socioeconomics and environmental justice, and visual and aesthetic resources. The following paragraphs explain why these environmental resources were dismissed from detailed analysis in this EA.

Infrastructure and Transportation. The Proposed Action would have insignificant impacts on infrastructure and transportation. Electricity, water, wastewater, and communications services are already available to the vicinity of the proposed TEMF and vehicle wash facility; therefore, only minor extensions of these utilities would be necessary to service the proposed facilities. Construction and demolition would require minimal amounts of electricity, water, and wastewater service, and this added demand would be within JBSA-BUL's utility infrastructure capacity. Operation of the proposed TEMF and vehicle wash facility would not appreciably increase the long-term demand for electricity, water, sanitary sewer, propane, and communications services because the increases in the demand for these utilities would be mostly offset by the elimination of utility demand from no longer operating the existing TEMF. Sustainability features would be incorporated into the proposed construction to further limit the increased demand on energy and water resources. For example, the proposed vehicle wash facility would use water recycling infrastructure to limit the increased demand for water and wastewater services.

Construction and demolition would slightly increase the amount of local traffic from the delivery of equipment and construction materials, removal debris, and daily commuting of contractors. This additional traffic would be experienced mainly on Camp Bullis Road from NW Military Highway to New Lewis Valley Road and on NW Military Highway from Loop 1604 to Camp Bullis Road. Construction traffic would be a small fraction of the existing traffic on these roads and would be expected to occur during daytime, normal working hours (i.e., between 7 a.m. and 5 p.m.).

Temporary traffic detours and lane closures on Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road would occur during the proposed road improvements. Each of these roads would be closed for short periods as pavement is removed and replaced and the low-water crossing over Salado Creek is replaced with a culvert system. Impacts would remain insignificant because temporary access roads and alternative routing would ensure access is provided to others areas of the installation, and impacts from these measures would be insignificant because traffic levels on these roads are relatively low.

Operation of the proposed TEMF and vehicle wash facility would have negligible impacts on JBSA-BUL's overall transportation patterns. The Proposed Action would not add additional tactical equipment to JBSA-BUL or increase the number of vehicle movements on installation. Tactical equipment would be stored, maintained, fueled, and washed near the intersection of Camp Bullis Road and New Lewis Valley Road. This centralized location would lessen the need for tactical equipment to transit installation roads during maintenance activities. The proposed TEMF would be sited approximately 0.5 miles from the existing TEMF; therefore, tactical equipment would not travel appreciably greater distances to access the TEMF. Additionally, most tactical equipment would no longer need to travel through the busy intersection of Camp Bullis Road and NW Military Highway to access the TEMF. The replacement of the low water crossing at Salado Creek with a culvert system would lessen the frequency that Camp Bullis Road floods and becomes impassable to traffic.

Land Use. The Proposed Action would have no impacts on land use. The proposed TEMF and vehicle wash facility would be sited adjacent to the cantonment area of JBSA-BUL where similar industrial-type functions already occur. As such, the Proposed Action would be consistent with existing land uses. All exterior lighting at the proposed facilities would comply with regional dark sky initiatives to minimize light pollution. Land use controls (LUC) addressing a Military Munitions Response Program (MMRP) site are applicable at the site of the proposed TEMF and vehicle wash facility. These LUCs are evaluated in **Section 3.5**.

Socioeconomics and Environmental Justice. The Proposed Action would have insignificant impacts on socioeconomics and would not disproportionally impact environmental justice populations. No new personnel would be added to JBSA-BUL because of the Proposed Action. As such, there would be no change to the area population or demand for housing and public/social services. Construction and demolition would negligibly increase the regional demand for building materials and labor, but the regional availability of building materials and labor would not be noticeably affected because of the limited scope of these actions, and beneficial impacts on the local economy would occur from the sale and distribution of construction materials and employment of construction and demolition workers. Lastly, the region of impact for the Proposed Action is mainly the southwestern portion of JBSA-BUL and the areas immediately surrounding the southern and western boundaries of the installation. The region of impact does not contain a minority, low income, or child population that would be disproportionately affected by the Proposed Action.

Visual and Aesthetic Resources. No impacts on visual and aesthetic resources would occur from the Proposed Action. The proposed TEMF and connected actions would have a relatively low profile and would appear similar to the existing buildings and infrastructure in the

southwestern portion of the installation. Demolition of the existing TEMF would not appreciably change the visual and aesthetic character of the installation.

3.1 Air Quality

3.1.1 Definition of the Resource

Air quality is defined by the concentration of various pollutants in the atmosphere at a given location. The six principal pollutants defining air quality, called "criteria pollutants," include carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide, ozone, suspended particulate matter (measured less than or equal to 10 microns in diameter [PM_{10}] and less than or equal to 2.5 microns in diameter [$PM_{2.5}$]), and lead. CO, SO_2, lead, and some particulates are emitted directly into the atmosphere from emissions sources. Ozone, nitrogen dioxide, and some particulates are formed through atmospheric chemical reactions that are influenced by weather, ultraviolet light, and other atmospheric processes. Volatile Organic Compounds (VOC) and nitrogen oxides (NO_x) emissions are used to represent ozone generation because they are precursors of ozone.

Under the Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has established National Ambient Air Quality Standards (NAAQS) (40 CFR § 50) for criteria pollutants. NAAQS are classified as primary or secondary. Primary standards protect against adverse health effects; secondary standards protect against welfare effects, such as damage to farm crops and vegetation and damage to buildings. Some pollutants have short-term and long-term standards. Short-term standards are designed to protect against acute, or short-term, health effects, while long-term standards were established to protect against chronic health effects.

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

The USEPA General Conformity Rule applies to federal actions occurring in nonattainment or maintenance areas when the total direct and indirect emissions of nonattainment pollutants (or their precursors) exceed specified thresholds. The emissions thresholds that trigger requirements for a conformity analysis are called *de minimis* levels. *De minimis* levels (in tons per year [tpy]) vary by pollutant and also depend on the severity of the nonattainment status for the air quality management area in question.

The Texas Commission on Environmental Quality (TCEQ) oversees programs for permitting the construction and operation of new or modified stationary source air emissions in Texas. TCEQ air permitting is required for many industries and facilities that emit regulated pollutants, and these requirements include, but are not limited to, Title V permitting of major sources, New Source Review, Prevention of Significant Deterioration, New Source Performance Standards for selected categories of industrial sources, and the National Emission Standards for Hazardous Air Pollutants. Based on the size of the emission units and type of pollutants, TCEQ sets permit rules and standards for emissions sources.

Climate Change and Greenhouse Gases. Global climate change refers to long-term fluctuations in temperature, precipitation, wind, sea level, and other elements of Earth's climate system. Ways in which the Earth's climate system may be influenced by changes in the concentration of various gases in the atmosphere have been discussed worldwide. Of particular interest, greenhouse gases (GHGs) are gas emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Scientific evidence indicates a trend of increasing global temperature over the past century because of an increase in GHG emissions from human activities. The climate change associated with this global warming is predicted to produce negative economic and social consequences across the globe.

3.1.2 Affected Environment

JBSA-BUL is located in Bexar County, Texas, which is within the Metropolitan San Antonio Intrastate Air Quality Control Region (AQCR) 217. All counties of the Metropolitan San Antonio Intrastate AQCR, including Bexar County, are designated by USEPA as unclassified/attainment for all criteria pollutants (USEPA 2017a).

JBSA-BUL is a true minor source of emissions. JBSA-BUL does not require a Title V permit because potential emissions from all sources are well below 100 tpy for each criteria pollutant. **Table 3-1** summarizes the potential air emissions for JBSA-BUL. Air emissions from stationary sources are produced primarily from abrasive blasting operations, external/internal combustion equipment, storage tanks and refueling operations, solvent use, welding operations, woodworking operations, small arms firing, and the wastewater treatment plant (USAF 2016b).

Table 3-1. Potential Air Emissions from JBSA-BUL

	Installation Air Emissions (tpy)					
	CO	NO_x	Particulate Matter	Lead	SO_2	VOC
Potential to Emit	18.44	20.18	5.31	0.03	0.40	2.70

Source: USAF 2016b

Within the project area, the only air emission sources are two degreasers and propane-fueled comfort heating infrastructure at the existing TEMF (USAF 2016b).

Climate Change and Greenhouse Gases. Ongoing global climate change has the potential to increase average temperatures, create more intense heavy precipitation events, and increase the frequency of droughts in central Texas (Shafer et al. 2014). As a result, global climate change could alter the volume of water in Salado Creek and increase the severity of flooding during heavy precipitation events. These impacts could also adversely affect regional water availability for consumption, agricultural, and industrial purposes.

3.1.3 Environmental Consequences

Potential impacts on air quality would be considered significant if the Proposed Action were to exceed the General Conformity Rule *de minimis* thresholds. Because AQCR 217 is in attainment for the NAAQS and the General Conformity Rule doesn't apply, the 100 tpy *de minimis* threshold has been used as a surrogate to determine the level of impacts under NEPA.

Significant impacts on air quality would also occur if the Proposed Action meaningfully contributed to the potential effects of global climate change.

3.1.3.1 PROPOSED ACTION

Short-term, minor, adverse impacts on air quality would occur from the emission of criteria pollutants and GHGs during construction and demolition. Air emissions from construction and demolition would be temporary and brief in duration. Although construction and demolition would likely not occur within the same time period, for the purposes of this air quality analysis, all construction and demolition is conservatively assumed to occur during 2019.

Criteria pollutant and GHG air emissions would be produced from the combustion of fuels in heavy equipment. Particulate matter air emissions, such as fugitive dust, would be produced from ground-disturbing activities and from the combustion of fuels in heavy equipment. Fugitive dust air emissions would be greatest during the initial site grading and excavation and vary day to day depending on the work phase, level of activity, and prevailing weather conditions. The quantity of uncontrolled fugitive dust emissions from a construction site is proportional to the area of land being worked and the level of activity. Construction and demolition would incorporate best management practices (BMPs) and environmental control measures (e.g., wetting the ground surface) to minimize fugitive particulate matter air emissions. Additionally, work vehicles are assumed to be well maintained and use diesel particulate filters to reduce particulate matter air emissions. Construction workers commuting daily to and from the job sites in their personal vehicles and heavy duty diesel vehicles hauling construction materials and debris to and from the job sites would also result in criteria pollutant and GHG air emissions.

No new long-term impacts on air quality would occur. New air emissions generated from the operation of propane-fueled comfort heating infrastructure at the proposed TEMF would be offset by the elimination of air emissions currently generated from similar infrastructure at the existing TEMF. Additionally, air emissions produced from tactical equipment maintenance activities (e.g., operation of the two degreasers) at the existing TEMF would relocate to the proposed TEMF, resulting in no net change in air emissions. Relocation of the TEMF would not appreciably change the number of miles tactical equipment are driven each year because the existing TEMF and proposed TEMF are only approximately 0.5 mile apart; therefore, the Proposed Action would not appreciably change air emissions generated from operation of the tactical equipment.

Table 3-2 summarizes all criteria pollutant and GHG air emissions resulting from the Proposed Action as well as applicable significance criteria. Criteria pollutant emissions would be below the *de minimis* threshold surrogate of 100 tpy of each pollutant; therefore, the level of impacts would not be significant. Detailed emissions calculations are provided in **Appendix B**.

The federal General Conformity Rule does not apply to the Proposed Action because AQCR 217 is unclassified/attainment for all criteria pollutants. Therefore, neither an applicability determination nor a conformity analysis is required. The Proposed Action does not involve the construction or modification of any stationary sources of air emissions; therefore, air permitting regulations are not applicable.

Table 3-2. Estimated Air Emissions from the Proposed Action

Emissions Source	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	GHGs (tpy)
Combustion	3.547	0.668	2.581	0.009	0.158	0.158	773.543
Fugitive Dust	NA	NA	NA	NA	15.626	1.563	NA
Haul Truck On-Road	0.487	0.047	0.175	0.001	0.019	0.017	150.514
Construction Commuter	0.144	0.132	1.713	0.001	0.003	0.002	150.998
Total	***4.205***	***0.848***	***4.469***	***0.011***	***15.805***	***1.740***	***1,075.055***
Significance Criteria	100	100	100	100	100	100	NA

Key: NA = Not Applicable

Notes: Lead emissions are not included as they are negligible for the types of emission sources under this Proposed Action.

Climate Change and Greenhouse Gases. The Proposed Action would emit approximately 1,075 tons of carbon dioxide equivalent from construction and demolition during the construction year (i.e., 2019). For comparison, 1,075 tons of carbon dioxide equivalent is approximately the GHG footprint of 52 single family houses with two cars per home (USEPA 2017b). As such, these limited annual emissions of GHGs would not meaningfully contribute to the potential effects of global climate change (e.g., increases in atmospheric temperature, sea level, storm activity, accelerated coastal erosion, hydrological changes and flooding, and vegetation and wildlife changes).

Ongoing changes to regional climate patterns could increase average temperatures, create more intense precipitation events, and increase the frequency of droughts, which in turn could affect water availability for consumption, agricultural, and industrial purposes (Shafer et al. 2014). Even under severe drought conditions, or periods of increased precipitation, these impacts are unlikely to impair implementation of the Proposed Action or prevent the proposed TEMF from fulfilling its mission.

3.1.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and air quality conditions would remain the same as described in **Section 3.1.2**. No new air emissions would be generated, and air emissions from existing sources would continue to be generated. No impacts on air quality would occur.

3.2 Biological Resources

3.2.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., wetlands, forests, grasslands) in which they exist. Protected and sensitive biological resources include federally listed (endangered or threatened) species, federally proposed species, and designated or proposed critical habitat; species of concern managed under conservation agreements or management plans; and state listed species.

The Endangered Species Act (ESA) (16 United States Code [USC] § 1536) requires federal agencies, in consultation with the U.S. Fish and Wildlife Service (USFWS), to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The ESA also generally prohibits any action that causes a "take" of any listed species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Not all take is prohibited. Where appropriate, incidental take permits can be provided that allow take of threatened or endangered species that is incidental to otherwise legal activities.

An "endangered species" is any species in danger of extinction throughout all or a significant portion of its range. A "threatened species" is any species likely to become an endangered species in the foreseeable future. Although candidate species receive no statutory protection under the ESA, these species are at risk and might warrant future protection under the ESA. The Integrated Natural Resources Management Plan Update for JBSA (USAF 2014) addresses candidate species occurring at JBSA-BUL. Federal species of concern are not protected by law; however, these species could become listed and are therefore given consideration when addressing impacts from a proposed action. Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on federal land.

State-listed threatened and endangered wildlife species are protected under Chapters 67 and 68 of the Texas Parks and Wildlife Code and Sections 65.171 through 65.176 of Title 31 of the Texas Administrative Code. Under these protections it is illegal to capture, trap, take, kill, possess, propagate, import, export, sell, or offer for sale, or ship any species of fish or wildlife listed as threatened or endangered. The Texas Parks and Wildlife Department (TPWD) maintains the list of state designated endangered and threatened species.

The Migratory Bird Treaty Act (MBTA) of 1918 is the primary legislation in the United States established to conserve migratory birds. The MBTA prohibits the intentional and unintentional taking, killing, or possessing of migratory birds unless permitted by regulation. EO 13186, *Responsibilities of Federal Agencies to Protect Birds*, provides a specific framework for the federal government's compliance with its MBTA obligations and aids in incorporating national planning for bird conservation into agency programs. A Memorandum of Understanding between DoD and USFWS promotes the conservation of migratory birds in compliance with EO 13186.

The Bald and Golden Eagle Protection Act provides protection to bald and golden eagles. This act prohibits anyone, without a permit issued by the Secretary of the Interior, from taking bald and golden eagles, including their parts, nests, or eggs. The act defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, or disturb."

3.2.2 Affected Environment

Vegetation. JBSA-BUL is situated along the edge of the Edwards Plateau of the Southwest Plateau and Plains Dry Steppe and Shrub Province. The project area is located within the Balcones Canyonlands subregion of the Edwards Plateau (U.S. Army 2007). The Edwards Plateau was uplifted during the Miocene epoch, separating central Texas from the coastal plain.

As a result, the Balcones Canyonlands subregion is highly dissected through erosion and solution of springs, streams, and rivers moving above and below the surface. The Balcones Canyonlands supports many endemic plant species and has a higher representation of deciduous woodlands than anywhere else within the Edwards Plateau ecoregion (Griffith et al. 2004).

The project area is located on disturbed grassland savannas adjacent to existing roads and infrastructure. Primary grass species on JBSA-BUL grassland savannas include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardi*), switchgrass (*Panicum virgatum*), sideoats grama (*Bouteloua curtipendula*), plains lovegrass (*Eragrostis intermedia*), vine-mesquite (*Panicum obtusum*), Lindheimer muhly (*Muhlenbergia lindheimeri*), silver bluestem (*Bothriochloa saccharoides*), green sprangletop (*Leptochloa dubia*), tall dropseed (*Sporobolus compositus*), and Texas cupgrass (*Eriochloa sericea*) (U.S. Army 2007). The low-water crossing replacement on Salado Creek would be conducted in an area that contains some live oak (*Quercus virginiana*) trees.

Wildlife. Abundant and diverse populations of wildlife occur throughout the majority of the 28,000 acres of undeveloped woodlands and savannas at JBSA-BUL. Because of the proximity to existing roads, the developed cantonment area, and the southern boundary of JBSA-BUL, the project area has low habitat value for wildlife relative to the majority of JBSA-BUL. The following paragraphs present wildlife species that are known, or thought, to occur on JBSA-BUL and therefore have the potential to occur in or near the project area.

Approximately 57 species of mammals are known, or thought, to occur on JBSA-BUL. Intermediate to large mammals include the bobcat (*Lynx rufus*), coyote (*Canis latrans*), gray fox (*Urocyon cinereoargenteus*), mountain lion (*Felis concolor*), white-tailed deer (*Odocoileus virginianus*), axis deer (*Axis axis*), Feral Hog (*Sus scrofa*), and Catalina Goat (*Capra* sp.). The axis deer is an exotic species while the feral hog and Catalina goat are ranch escapees. Common small mammals include the fox squirrels (*Sciurus niger*), black-tailed jackrabbit (*Lepus californicus*), eastern cottontail (*Sylvilagus floridanus*), opossum (*Didelphis virginiana*), armadillo (*Dasypus novemcinctus*), ringtail cat (*Bassariscus astutus*), striped skunk (*Mephitis mephitis*), and eastern and western spotted skunks (*Spilogale putorius* and *S. gracilis*, respectively). Common rodents include the Mexican ground squirrel (*Spermophilus mexicanus*), six mouse species, and two rat species. Three bats are known to occur at JBSA-BUL. The cave myotis (*Myotis velifer*) and eastern pipistrelle (*Pipistrellus subflavus*) have been documented throughout the installation, including roosting in caves. The Mexican free-tailed bat (*Tadarida brasiliensis mexicana*) has been documented hunting; however, known caves at JBSA-BUL are not large enough to support Mexican free-tailed bats, which typically roost in large colonies (U.S. Army 2007).

Over 200 species of birds have been documented on JBSA-BUL. Some of the common birds include the northern mockingbird (*Mimus polyglottos*), northern cardinal (*Cardinalis cardinalis*), eastern phoebe *(Sayornis phoebe*), eastern bluebird (*Sialia sialis*), Carolina chickadee (*Poecile carolinensis*), black-crested titmouse (*Baeolophus atricristatus*), house finch (*Haemorphus mexicanus*), lesser goldfinch (*Spinus psaltria*), white-eyed vireo (*Vireo griseus*), killdeer (*Charadrius vosiferus*), green kingfisher (*Chloroceryle americana*), black-headed oriole (*Icterus*

graduacauda), and several species of sparrows and warblers. Approximately 100 species are known to nest or have the potential to nest on JBSA-BUL, while the remaining species are mostly migrants (U.S. Army 2007). Common breeding birds include the northern cardinal, black-crested titmouse, yellow-billed cuckoo (*Coccyzus americanus*), painted bunting (*Passerina ciris*), western scrub-jay (*Aphelocoma californica*), Bewick's wren (*Thyomanes bewickii*), and mourning dove (*Zenaida asiatica*). Raptors that are known to nest on JBSA-BUL include the red-tailed hawk (*Buteo jamaicensis*), eastern screech owl (*Megascops asio*), and red-shouldered hawk (*Buteo lineatus*) (U.S. Army 2007 and USAF 2014). Bird species protected under the ESA and MBTA are further discussed in the Migratory Birds subsection.

Approximately 92 species of reptiles and amphibians have been reported in the vicinity of JBSA-BUL, including 6 species of salamanders, 19 species of toads and frogs, 7 species of turtles, 21 species of lizards, and 38 species of snakes (U.S. Army 2007).

The project area is in the Salado Creek watershed and drainage from these sites ultimately contributes to Salado Creek, which is characterized as an intermittent stream (TCEQ 2017) and was dry during a site survey on October 20, 2016. Fish populations are limited at JBSA-BUL because of the limited amount of perennial surface water. In total, 14 fish species have been documented at the installation with 11 species recorded in Cibolo Creek and 8 species occurring in Salado Creek. The eight species that occur in Salado Creek include the black bullhead (*Ictalurus melas*), mosquitofish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), bluegill (*Lepomis macrochirus*), largemouth bass (*Micropterus salmoides*), warmouth (*Lepomis gulosus*), Rio Grande perch (*Cichlasoma cyanoguttatum*), and the Mozambique tilapia (*Tilapia mossambica*) (U.S. Army 2007).

Studies conducted on JBSA-BUL have documented 111 caves and 1,494 karst features. However, no known karst features occur on the project area; therefore, it is unlikely that karst fauna would occur at the project area.

Federal Protected Species. USFWS identifies 26 species in Bexar County, Texas, that are federally listed under the ESA. This list includes 19 endangered species, 3 threatened species, and 4 candidate species (USFWS 2017a). Of these 26 federally listed species, five species are known to occur at JBSA-BUL: the black-capped vireo (*Vireo atricapilla*); golden-cheeked warbler (*Setophaga chrysoparia*); Madla's Cave meshweaver (*Cicurina madla*), a karst invertebrate found in local caves; and two beetles (*Rhadine exilis* and *Rhadine infernalis*), which are also karst invertebrates. These five species, their habitats, their occurrence at JBSA-BUL relative to the location of the Proposed Action, and JBSA-BUL conservation measures are further discussed in **Table 3-3** and in the following paragraphs. The 21 federally listed species that do not have the potential to occur at the project area are not further discussed in this EA.

In 2005, USFWS issued a programmatic Biological Opinion (BO) for the proposed implementation of the *Military Mission and Associated Land Management Practices and Endangered Species Management Plan for the U.S. Army's Camp Bullis in Bexar County, Texas* (2005 BO) (USFWS 2005). The 2005 BO addressed projects and activities with potential effects on the five federally endangered species occurring on the installation and their habitats. The 2005 BO included an Incidental Take Statement with required Reasonable and Prudent Measures and associated Terms and Conditions, and also provided conservation measures to

Table 3-3. Federally-Listed and State-Listed Species on JBSA-BUL

Common Name	Scientific Name	Designated Status		Habitat Preference/ Occurrence at JBSA-BUL	Habitat Present at Project Area
		Federal	State		
Arachnids					
Madla's Cave meshweaver	*Cicurina madla*	E	--	Karst limestone caves and mesocaverns in north and northwestern Bexar County. Known resident on JBSA-BUL.	No
Birds					
Black-capped vireo	*Vireo atricapilla*	E	E	Nest in oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grass spaces with foliage reaching to ground level for nesting cover. Known migrant and previous resident on JBSA-BUL.	No
Golden-cheeked warbler	*Setophaga chrysoparia*	E	E	Nest in juniper-oak woodlands; dependent on Ashe juniper for long fine bark strips from mature trees for nest construction; presence of broad-leaved trees and shrubs. Known resident on JBSA-BUL.	No
Peregrine falcon	*Falco peregrinus*	DL	T	Migrant across state. Found in a variety of habitats during migration, including urban areas. Preferred stopover is landscape edges such as lake shores, coastlines, and barrier islands. Known migrant through JBSA-BUL.	Yes
Zone-tailed hawk	Buteo albonotatus	--	T	Arid open country, including open deciduous or pine-oak woodland often near watercourses, and wooded canyons and tree-lined rivers. Possible transient across JBSA-BUL.	Yes
Insects					
Beetle	*Rhadine exilis*	E	--	Karst limestone caves and mesocaverns in north and northwestern Bexar County. Known resident on JBSA-BUL.	No
Beetle	*Rhadine infernalis*	E	--	Karst limestone caves and mesocaverns in north and northwestern Bexar County. Known resident on JBSA-BUL.	No
Reptiles					
Texas horned lizard	*Phrynosoma cornutum*	--	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees. Known resident on JBSA-BUL.	Yes
Texas indigo snake	*Drymarchon melanurus erebennus*	--	T	South of the Guadalupe River and Balcones Escarpment in thornbush-chaparral woodlands, in particular dense riparian corridors. Known resident on JBSA-BUL.	Yes

Common Name	Scientific Name	Designated Status		Habitat Preference/ Occurrence at JBSA-BUL	Habitat Present at Project Area
		Federal	State		
Reptiles (continued)					
Texas tortoise	*Gopherus berlandieri*	--	T	Prefer open brush with a grass understory, avoiding open grass and bare ground. Known resident on JBSA-BUL.	Yes

Key: T = threatened, E = endangered, DL = delisted
Sources: USAF 2014, TPWD 2017a, USFWS 2017a

avoid or offset potential adverse effects to these federally listed species. This programmatic BO expired on July 28, 2015 (USFWS 2005).

In January 2015, JBSA initiated the programmatic *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* (2015 Informal Consultation) (USAF 2015a). The intent of the 2015 Informal Consultation was to evaluate the effects of military operations and sustainment/enhancement activities on the five federally endangered species on the installation. In the 2015 Informal Consultation document, JBSA-BUL determined that the proposed activity may affect, but is not likely to adversely affect the five endangered species. JBSA-BUL also proposed conservation measures to avoid or minimize adverse effects to these federally listed species (USAF 2015a). The conservation measures for the black-capped vireo, golden-cheeked warbler, and karst species are discussed in detail in the subsequent paragraphs.

In addition, the 2015 Informal Consultation identified five potential transient federally listed species on JBSA-BUL and ten federally listed species known to occur in Bexar and Comal counties, but not known to occur on JBSA-BUL. Migratory birds and incidental federally listed species can occur on JBSA-BUL, but their presence is anticipated to be rare and transitory. The 2015 Informal Consultation determined the current military and non-military land use activities are expected to have no effect on these species. However, if any of these species are observed on JBSA-BUL, efforts would be made to ensure they are not affected (USAF 2015a). On March 22, 2016, USFWS concurred with the determinations and conservation measures set forth in the 2015 Informal Consultation (USFWS 2016).

Black-capped vireo. The preferred nesting habitat of the black-capped vireo is rangelands with scattered clumps of shrubs of irregular height and distribution separated by open grasslands. This type of vegetation occurs most frequently on rocky substrates with shallow soils, in rocky gullies, on edges of ravines, and on eroded slopes (TPWD 2017b, USFWS 1991).

JBSA-BUL historically contained approximately 153 acres of designated black-capped vireo habitat, which was mostly limited to the training areas where wildfires were more frequent (USAF 2015b). For safety and accessibility reasons, wildfires have been suppressed in these areas, leading to vegetation growth beyond the early stage of succession preferred by the black-capped vireo. It is suspected that the increase of Ashe juniper, which is typically a low breeding location preference for the species, as well as the location of JBSA-BUL southeast of the main migration corridor for the species, contributes to the low numbers of black-capped

vireos at JBSA-BUL (USAF 2014). Because of the successional advancement near and around the historically designated black-capped vireo habitat, all designated black-capped vireo habitat was removed from the habitat map in 2010 as a result of an informal meeting with USFWS (USAF 2015b). Currently, there is no designated black-capped vireo habitat at JBSA-BUL (USAF 2014).

Black-capped vireo surveys occur on an annual basis from April 10 to July 1 in all potential and historical black-capped vireo habitat. Upon observation, black-capped vireo movement is documented in order to determine possible territory size. These black-capped vireo territories are updated at the conclusion of each survey season (USAF 2014).

Nesting habitat for the black-capped vireo does not occur within the project area; however, potential habitat does occur at a minimum of 150 feet north of the proposed vehicle wash facility. Additionally, potential habitat occurs to the north and west of the proposed TEMF and immediately adjacent to the existing TEMF. However, black-capped vireos have not been detected in the area associated with the Proposed Action and the nearest sighting was approximately 5 miles to the north.

Golden-cheeked warbler. The preferred nesting habitat of the golden-cheeked warbler is tall, closed canopy, dense, mature stands of Ashe juniper mixed with trees such as Texas red oak (*Quercus buckleyi*), shin oak (*Quercus sinuata*), live oak, Lacey oak (*Quercus laceyi*), post oak (*Quercus stellata*), Texas ash (*Fraxinus texensis*), cedar elm (*Ulmus crassifolia*), hackberry, bigtooth maple (*Acer grandidentatum*), sycamore (*Platanus occidentalis*), Texas black walnut (*Juglans microcarpa*), and escarpment cherry (*Prunus serotina* var. *eximia*). These woodlands typically grow in relatively moist areas such as steep-sided canyons, slopes, and adjacent uplands. Golden-cheeked warblers can also be found in drier upland juniper-oak woodlands over flat topography. The essential element for nesting habitat is that Ashe juniper trees have a shredding bark that the golden-cheeked warbler uses for nest construction (USFWS 2017b).

Golden-cheeked warbler surveys have occurred on an annual basis from March 15 to June 1 in designated habitat throughout JBSA-BUL since 1991. Golden-cheeked warbler designated habitat is habitat, based on vegetation criteria, that has not been occupied for the last three years, or has never been documented to be occupied. These annual surveys identify golden-cheeked warbler observations, incidental sightings, and territories. At the conclusion of each survey season, core habitat is mapped and updated for the golden-cheeked warbler. Core habitats are based on species detections in the last three years and are defined by a 10-acre circle around the bird detection location. Additionally, a 300-foot protection buffer is designated around all core habitats identified for the species. Golden-cheeked warbler territories are areas in which breeding pairs have been documented (USAF 2014). In accordance with the conservation measures proposed in the 2015 consultation, JBSA-BUL would seek consultation with USFWS if new projects were proposed in designated golden-cheeked warbler habitat (USAF 2015a).

Nesting habitat for the golden-cheeked warbler does not occur within the project area; however, designated habitat and core habitat occur approximately 1,400 feet north of the proposed TEMF and vehicle wash facility and the nearest known territory is approximately 3,800 feet to the northeast. Designated habitat and core habitat occur approximately 400 feet south and west of

the existing TEMF. The closest known golden-cheeked warbler territory is approximately 1,500 feet southwest of the existing TEMF. Designated habitat, core habitat, and territories occurring in the vicinity of the Proposed Action are displayed in **Figure 3-1**.

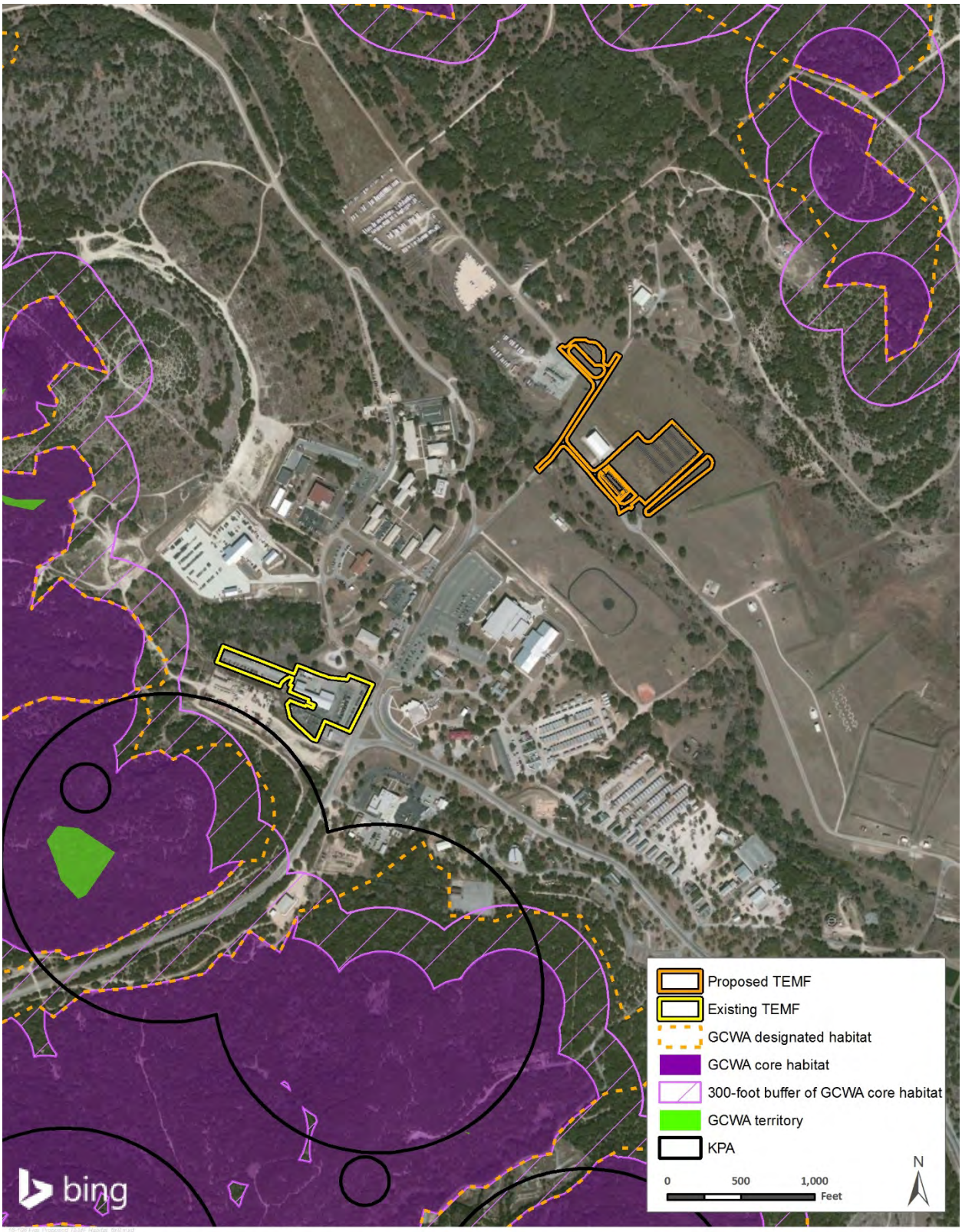
Federally listed karst invertebrates. Madla's Cave meshweaver and the beetles, *Rhadine exilis* and *Rhadine infernalis,* are known residents at JBSA-BUL. All three species are troglobites, spending their entire lives underground within karst landforms of Bexar County. Physical factors in caves that influence these species include absence of sunlight, low nutrient flow, and a stable environment with uniform temperatures and high humidity (USFWS 2011). Madla's Cave meshweaver is a small, eyeless or essentially eyeless spider that is known to occur at 23 caves; one of which, Headquarters Cave, occurs on JBSA-BUL. *Rhadine exilis* and *Rhadine infernalis* are small, essentially eyeless ground beetles. *Rhadine exilis* has been documented in 24 caves on JBSA-BUL as well as several other caves in north and northwest Bexar County. *Rhadine infernalis* is known to occur in approximately 26 caves, six of which occur on JBSA-BUL (USAF 2015a).

Nearly all of JBSA-BUL has been surveyed for cave and karst features, with each of these subsequently surveyed for biological inhabitants. Karst Protection Areas (KPA) have been established around all of the caves that contain federally listed invertebrates and these caves are surveyed on an annual basis. The KPAs encompass a 90-acre buffer around cave entrances. Various activity restrictions and conservation measures are observed within the KPAs. Construction and maintenance conservation measures included in the 2015 Informal Consultation with USFWS state that new construction projects will avoid KPAs (USAF 2015a).

No known karst features or KPAs occur at the project area. The closest KPA occurs approximately 2,500 feet southwest of the proposed TEMF and approximately 150 feet southwest of the existing TEMF (see **Figure 3-1**).

State Protected Species. TPWD lists 21 species in Bexar County that are state-listed as endangered or threatened species (TPWD 2017a). Of the 21 state-listed species, five have the potential to occur in or near the locations associated with the Proposed Action: peregrine falcon (*Falco peregrinus*); zone-tailed hawk (*Buteo albonotatus*); Texas horned lizard (*Phrynosoma cornutum*); Texas indigo snake (*Drymarchon melanurus erebennus*); and Texas tortoise (*Gopherus berlandieri*). These five species, their habitats, and management recommendations are further discussed in **Table 3-3** and the paragraphs that follow. The 16 state-listed species that do not have the potential to occur in or near the project area are not further discussed in this EA.

State-listed birds. The peregrine falcon is a known migrant through JBSA-BUL that utilizes a variety of habitats during migration. The preferred stopover habitat is landscape edges such as lake shores, coastlines, and barrier islands. The zone-tailed hawk is a possible transient across JBSA-BUL that occurs in arid open country, including open deciduous or pine-oak woodlands often near watercourse, and wooded canyons and tree-lined rivers. Potential stopover habitat is located on undeveloped areas of JBSA-BUL (USAF 2014). Potential stopover habitat for both species occurs at the project area.



Data Sources: Bing Maps Aerial; Camp Bullis GIS

Key: GCWA = Golden-cheeked warbler

Figure 3-1. Golden-cheeked Warbler Habitat and KPAs relative to the Proposed Action

State-listed reptiles. The Texas horned lizard is found in arid and semiarid habitats in open areas with sparse plant cover, typically with loose sand and loamy soils (TPWD 2017c). The Texas indigo snake prefers dense riparian corridors, and requires moist microhabitats. The Texas tortoise prefers open brush with a grass understory but avoids open grass and bare ground (USAF 2014). All of these reptiles are known to occur on JBSA-BUL and potential, although marginal, habitat occurs at the project area. As previously discussed, the vegetation at the project area mostly consists of dense grasslands, which is not the preferred habitat for any of these species. The Texas indigo snake does prefer dense vegetation; however, the riparian corridor along Salado Creek is likely rarely moist because of the intermittent nature of Salado Creek. Additionally, the project area has low habitat value for wildlife because of its proximity to the developed cantonment area of the installation.

Migratory Birds. The vast majority of bird species found at JBSA-BUL are afforded regulatory protection under the federal MBTA. Over 200 migratory birds have been documented to occur at JBSA-BUL. USFWS lists 29 Birds of Conservation Concern, which are species, subspecies, and populations of migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA in Bexar County, Texas (see **Table 3-4**) (USFWS 2017a). Of these 29 bird species, 13 species have been documented and are known to occur at JBSA-BUL (USAF 2014) and therefore have the potential to occur in or near the project area as a stopover on their migratory route, during the breeding season, or could occur year-round.

3.2.3 Environmental Consequences

Demolition, construction, operation, and associated noise could potentially result in adverse impacts on biological resources. Impacts are evaluated by identifying the types and locations of potential ground-disturbing activities relative to important biological resources. To evaluate the impacts of noise, considerations were given to the number of individuals or critical species involved, type of stressors involved, and magnitude of the impacts.

Potential impacts on biological resources would be considered significant if a proposed action failed to comply with applicable federal laws and regulations such as the ESA, MBTA, and Bald and Golden Eagle Protection Act. Impacts associated with the Proposed Action also would be significant if any of the following occurred as a result of the impact:

- Take of a threatened or endangered species, critical habitat, migratory bird, or bald or golden eagle
- Change of legal status (e.g., reductions in population size or distribution of a species)
- Impingement on a buffer zone established in the Integrated Natural Resources Management Plan to protect a sensitive species.

3.2.3.1 PROPOSED ACTION

Vegetation. Short- and long-term, minor, adverse impacts on vegetation would occur. Approximately 6.2 acres of previously disturbed grasslands would be permanently impacted and converted to facilities, pavement, and a detention pond. The impacts would be minor because the existing vegetation is common locally and the Proposed Action would only remove a small percentage of similar habitats available on the installation. Vegetation removal and earthwork

Table 3-4. Migratory Birds of Conservation Concern in Bexar County, Texas

Common Name	Scientific Name	Seasonal Occurrence	Known to Occur on JBSA-BUL
Audobon's oriole	*Icterus graduacauda*	Year-round	Yes
Bald eagle	*Haliaeetus leucocephalus*	Year-round	No
Bell's vireo	*Vireo bellii*	Breeding	Yes
Burrowing owl	*Athene cunicularia*	Wintering	No
Cassin's sparrow	*Peucaea cassinii*	Year-round	Yes
Chestnut-collared longspur	*Calcarius ornatus*	Wintering	No
Curve-billed thrasher	*Toxostoma curvirostre*	Year-round	Yes
Dickcissel	*Spiza americana*	Breeding	Yes
Fox sparrow	*Passerella iliaca*	Wintering	No
Harris's hawk	*Parabuteo unicinctus*	Year-round	No
Harris's sparrow	*Zonotrichia querula*	Wintering	No
Hudsonian godwit	*Limosa haemastica*	Migrating	No
Lark bunting	*Calamospiza melanocorys*	Wintering	No
Le Conte's sparrow	*Ammodramus leconteii*	Wintering	Yes
Least bittern	*Ixobrychus exilis*	Breeding	No
Lesser yellowlegs	*Tringa flavipes*	Wintering	No
Lewis's woodpecker	*Melanerpes lewis*	Wintering	No
Little blue heron	*Egretta caerulea*	Breeding	Yes
Loggerhead shrike	*Lanius ludovicianus*	Year-round	Yes
Orchard oriole	*Icterus spurius*	Breeding	Yes
Painted bunting	*Passerina ciris*	Breeding	No
Peregrine falcon	*Falco peregrinus*	Wintering	Yes
Red-headed woodpecker	*Melanerpes erythrocephalus*	Wintering	No
Rufous-crowned sparrow	*Aimophila ruficeps*	Year-round	Yes
Scissor-tailed flycatcher	*Tyrannus forficatus*	Breeding	Yes
Short-eared owl	*Asio flammeus*	Wintering	No
Sprague's pipit	*Anthus spragueii*	Wintering	No
Summer tanager	*Piranga rubra*	Breeding	Yes
Verdin	*Auriparus flaviceps*	Year-round	No

Source: USFWS 2017a

during the construction phase could increase the establishment of nonnative and invasive species and erosion and sedimentation because of ground disturbance. BMPs would be implemented to minimize potential adverse impacts associated with the spread of nonnative vegetation.

Wildlife. Short- and long-term, minor, adverse impacts on wildlife could occur as a result of the construction and the modification of approximately 6.2 acres of potential habitat. The impacts would be minor because of the relatively small size, and proximity to the existing cantonment area. Wildlife in the vicinity could be disturbed or displaced from noise, habitat alteration, and direct physical impact. During construction, demolition, and operations, mobile wildlife species that might use the project area would use similar adjacent habitats. Injury or mortality of small,

less-mobile terrestrial species (e.g., reptiles, rodents, small mammals) could occur from direct physical impact (e.g., vehicular traffic, construction and demolition equipment); however, wildlife would generally avoid the area and personnel would be instructed to avoid direct physical impacts, by allowing wildlife to leave the project area, where possible. Furthermore, because of the proximity of the project area to the cantonment area, wildlife in the area is likely habituated to increased noise levels and vehicular traffic. As a result, population-level impacts would not occur.

Short-term, minor adverse impacts on aquatic species could occur as a result of sedimentation from culvert installation in Salado Creek for the Camp Bullis Road improvement. Aquatic species could be directly physically impacted as a result of the culvert installation; however, in order to minimize impacts on aquatic species all work within Salado Creek would be conducted while the channel is dry. Erosion control sediment fencing would be installed on the downslope boundaries of ground disturbance in order to minimize sedimentation in Salado Creek and associated tributaries (see **Sections 3.4.3.1** and **3.8.3.1** for further information on erosion and sedimentation impacts).

Federal and State Protected Species

Black-capped vireo and Golden-cheeked warbler. The Proposed Action is consistent with the conservation measures outlined in the 2015 Informal Consultation; therefore, this action would have no impact on the black-capped vireo and golden-cheeked warbler. The project area is not within designated habitat, core habitat, or known territories for the golden-cheeked warbler or potential habitat for the black-capped vireo. To avoid impacts on the golden-cheeked warbler, all personnel would be informed of nearby environmentally sensitive area boundaries and would not be permitted to enter these areas. In the unlikely event that black-capped vireo or golden-cheeked warbler individuals entered the construction or demolition site, they would be allowed to move away on their own.

Federally listed karst invertebrates. The Proposed Action is consistent with the conservation measures outlined in the 2015 Informal Consultation; therefore, this action would have no impact on the Madla's Cave meshweaver, *Rhadine exilis*, and *Rhadine infernalis*. Karst surveys have occurred on nearly all of JBSA-BUL, and no known karst features occur in the project area. In the unlikely event that a karst feature is discovered during vegetation clearing, grading, or other construction activities, the feature would be inspected by a qualified individual following the instructions provided by USFWS (2015) for determining the presence or absence of endangered karst fauna. If karst fauna are present, USFWS would be consulted.

State-listed birds. Short- and long-term, negligible, adverse impacts on state-listed migrant and transient birds could occur as a result of the construction and the modification of approximately 6.2 acres of potential stopover habitat. Two state-listed birds (i.e., peregrine falcon and zone-tailed hawk) have the potential to occur in or near the project area as transients or migrants. However, because these species would only occur at JBSA-BUL as transients or migrants, if these mobile species were to occur in the project area, they would likely vacate the area during construction and not return once construction is complete. During the construction and demolition phase, the potential noise and direct physical impacts on state-listed migrant and transient birds would be similar to those discussed previously for wildlife. Steps to prevent

direct impacts to state-listed migratory and transient birds include conducting all vegetation removal and earthwork outside of the migratory season (March 15 through September 15). Should vegetation removal be required during the migratory season, a nest survey would be conducted by qualified personnel and active nests would be avoided until all young have fledged and the nest is no longer occupied. Long-term impacts could occur as a result of the loss of habitat; however, the existing vegetation is locally common and the Proposed Action would only remove a small percentage of similar habitats available on the installation; therefore, impacts would be negligible.

State-listed reptiles. Short- and long-term, negligible to minor, adverse impacts on state-listed reptile species could occur as a result of the construction and the modification of approximately 6.2 acres of potential marginal habitat. Three state-listed reptile species (i.e., Texas horned lizard, Texas indigo snake, and the Texas tortoise) have the potential to occur at the project area. However, because the project area is located adjacent to the developed cantonment area, the likelihood of these state-listed species utilizing the area is low. During the construction and demolition phase, the potential noise and direct physical impacts on state-listed reptiles would be similar to those discussed previously for wildlife. Steps to prevent direct impacts to state-listed reptiles include conducting pre-construction surveys on the project area to confirm the absence of these species in order to minimize potential impacts. Should state-listed species be discovered during these surveys, JBSA-BUL would consult with TPWD prior to construction or ground-disturbing activities. Long-term impacts could occur as a result of the loss of habitat; however, as previously mentioned the existing vegetation is locally common and the Proposed Action would only remove a small percentage of similar habitats available on the installation; therefore, impacts would be negligible to minor.

Migratory Birds. Short- and long-term, minor, adverse impacts on migratory birds could occur as a result of the construction and the modification of approximately 6.2 acres of potential habitat. During the construction and demolition phase the potential noise and direct physical impacts on migratory birds would be similar to those discussed previously for wildlife. Steps to prevent direct impacts to migratory nesting birds include conducting all vegetation removal and earthwork outside of the migratory season (March 15 through September 15). Should vegetation removal need to occur during the migratory season, a nest survey would be conducted by qualified personnel and active nests would be avoided until all young have fledged and the nest is no longer occupied. The loss of approximately 6.2 acres of previously disturbed grasslands would result in the long-term, minor, adverse impacts on migratory birds. However, as discussed previously for vegetation, the existing habitat is locally common and the Proposed Action would only remove a small percentage of this habitat. Migratory birds that might use the project area would be able to use similar adjacent habitats. As a result, population-level impacts would not occur.

3.2.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and biological resources conditions would remain the same as described in **Section 3.2.2**. No impacts on vegetation, wildlife, protected species, or migratory birds would occur.

3.3 Cultural Resources

3.3.1 Definition of the Resource

Cultural resources is an umbrella term for many heritage-related resources defined in several federal laws and EOs including the National Historic Preservation Act (NHPA) (1966), the Archeological and Historic Preservation Act (1974), the American Indian Religious Freedom Act (1978), the Archaeological Resources Protection Act (1979), and the Native American Graves Protection and Repatriation Act (1990).

The NHPA focuses on cultural resources such as prehistoric and historic sites, buildings and structures, districts, or other physical evidence of human activity considered important to a culture, a subculture, or a community for scientific, traditional, religious, or other reason. Such resources might provide insight into the cultural practices of previous civilizations or they might retain cultural and religious significance to modern groups. Resources found significant under criteria established in the NHPA are considered eligible for listing in the National Register of Historic Places (NRHP). These are termed "historic properties" and are protected under the NHPA. Under Section 106 of the NHPA, federal agencies must take into account the effect of their undertakings on historic properties and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Under this process, the federal agency evaluates the NRHP eligibility of resources within the proposed undertaking's area of potential effect and assesses the possible effects of the proposed undertaking on historic properties in consultation with the State Historical Preservation Officer and other parties.

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

3.3.2 Affected Environment

The area of potential effects (APE) for the Proposed Action is the maximum disturbance area of all Proposed Action activities, which include construction of the proposed TEMF; construction of the four-bay vehicle wash facility, roadway improvements including the repair of the stormwater culvert beneath Wilderness Trail, the replacement of a low water crossing (see **Figure 2-1**); and demolition of the existing TEMF at JBSA-BUL (see **Figure 2-2**).

There are four known historic properties located within the APE for the Proposed Action. These historic properties include the low water crossing on Camp Bullis Road that is proposed for replacement, the stormwater culvert beneath Wilderness Trail that is proposed for repair, and

Camp Bullis Road itself, which is proposed for improvement. These three historic properties are contributing resources to the Camp Bullis Cantonment Historic District, which is the fourth historic property within the APE. The Camp Bullis Cantonment Historic District has been determined eligible for listing in the NRHP by the Texas Historical Commission, which serves as the State Historical Preservation Officer. The district contains 135 buildings, sites, structures, and objects and encompasses 375 acres (Freeman 1998).

The district is significant under National Register Criteria A and C. Under Criterion A, the district is significant for its association with military planning, tactics, and public works projects. The facility plan reflects distinctive and innovative military planning and contains properties that exemplify military architecture of the 1930s and 1940s. The facility is also significant for the role it played in developing military tactics and training military personnel. In addition, facility growth required the development of public works projects completed by the Civilian Conservation Corps and Works Progress Administration between the 1930s and 1940s that retain a high degree of integrity (Freeman 1998).

Under Criterion C, the district is significant for embodying the distinctive characteristics of military facility planning and architecture from 1929 to 1945 and is a rare surviving example of a complete concentration of administrative, residential, recreational, service, warehouse, and training properties at a military camp. The facility plan is characterized by its meandering streets that are responsive to local topography; one-story wood and stone housing; mess halls, kitchens, hospitals, and other auxiliary buildings with stone foundations and monitor roofs; corrugated metal utilitarian structures; and the use of local, uncoursed masonry in infrastructural elements such as bridges and culverts (Freeman 1998).

Construction activities would occur within an area that has no known archaeological deposits. Two buildings within the APE are proposed for demolition: Buildings 6104 and 6106 of the existing TEMF. Both buildings have been determined not eligible for listing in the NRHP and, therefore, are not considered historic properties (Kalina 2017). No cemeteries or resources of traditional, religious, or cultural significance are within the APE.

3.3.3 Environmental Consequences

Adverse effects on cultural resources can include physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; or introducing visual or audible elements that are out of character with the property or that alter its setting. Additionally, neglecting the resource to the extent that it deteriorates or is destroyed or the sale, transfer, or lease of the property out of agency ownership (or control) without adequate legally enforceable restrictions or conditions to ensure preservation of the property's historic significance would constitute adverse effects.

3.3.3.1 PROPOSED ACTION

The Proposed Action would entail demolition of the low water crossing on Camp Bullis Road at Salado Creek and replacement with a culvert system. This action would constitute an adverse impact on this historic property. The Proposed Action also entails improvements to Camp Bullis Road in the form of road resurfacing and repairs to a historic stormwater culvert beneath Wilderness Trail. Repairs to the culvert would include cleaning, stabilization, and selective

reconstruction, as needed. These actions could result in adverse impacts on Camp Bullis Road and the culvert; however, they would also improve the condition of these historic properties and prolong their integrity. The Camp Bullis Cantonment Historic District could also experience an adverse impact through the alteration of three of its contributing resources.

USAF has initiated consultation with the Texas Historical Commission regarding the Proposed Action's impacts on these historical properties. ***[[Preparer's Note: This paragraph will be expanded upon and updated once the consultation with the Texas Historical Commission is complete.]]***

Ground-disturbing activities associated with the Proposed Action would have the potential to impact previously undocumented cultural resources such as buried archaeological sites. Should undocumented archaeological deposits or unexpected discoveries of Native American graves, lost historic cemeteries, or human remains be discovered during any construction activity, the activity would be immediately halted and JBSA-BUL would follow the provisions for unanticipated discoveries specified in the installation's Integrated Cultural Resources Management Plan.

3.3.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and cultural resources conditions would remain the same as described in **Section 3.3.2**. No direct impacts on historic properties would occur because none of the historic properties within the APE would be disturbed. However, because no improvements to Camp Bullis Road or repairs to the stormwater culvert beneath Wilderness Trail would occur, these historic properties would continue to gradually decline in integrity and could ultimately lead to demolition by neglect.

3.4 Geological Resources

3.4.1 Definition of the Resource

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

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

Topography. Topography pertains to the general shape and arrangement of a land surface, including its height and the position of its natural features and man-made alterations of landforms.

Soils. Soils are a matrix of mineral and organic matter overlying bedrock or other parent material. Soils are typically described in terms of their complex type, slope, and physical characteristics. Differences among soil types in terms of their structure, elasticity, strength, shrink-swell potential, and erosion potential affect their abilities to support certain applications or

uses. In appropriate cases, soil properties must be examined for their compatibility with particular construction activities or types of land use.

Farmland. Farmland is protected under the Farmland Protection Policy Act of 1981. Farmland includes prime and unique farmland and farmland of statewide and local importance. The intent of the Farmland Protection Policy Act is to minimize the extent that federal programs contribute to the unnecessary conversion of farmland to nonagricultural uses.

Geologic Hazards. Geologic hazards are natural geologic events that can endanger human lives and threaten property. Examples of geologic hazards in Texas include karst topography, including sinkholes, and earthquakes.

3.4.2 Affected Environment

Geology. JBSA-BUL is located in Bexar County, which overlaps three physiographic provinces of Texas: the Edwards Plateau in the northern portion of the county, the Blackland Prairie in the central portion, and the Interior Coastal Plains physiographic province to the south. Most of JBSA-BUL, including the project area, are located on the Edwards Plateau, which primarily contains geologic formations of Cretaceous, Tertiary, and Quaternary age. The plateau is an uplift area that is mostly underlain by limestone beds that dip slightly toward the southeast. Much of the Edwards Plateau is underlain by a thick crust of metamorphosed igneous and sedimentary rocks of the continental craton. The plateau is drained by the Cibolo and Balcones creeks and by the headwaters of southeastward-flowing Culebra, Leon, and Salado creeks. See **Section 3.8.2** for additional information on surface waters. The Edwards Plateau is bound by the Balcones fault zone toward the east and southeast. The Balcones fault zone is characterized by a series of parallel northeast-trending faults that are described as normal, high-angle faults with the downward side to the southeast (Arnow 1963, Ferring 2007).

Topography. Topography at the proposed TEMF and vehicle wash facility site is approximately 1,050 feet above mean sea level with a slight downward slope toward the south and southeast. Topography at the existing TEMF is approximately 1,125 feet above mean sea level with a slight downward slope toward the northeast (USGS 2016).

Soils. Approximately 99 percent of the soils at the proposed TEMF site are Tinn clay, 0 to 1 percent slopes, occasionally flooded. The typical profile of this soil type is clay through the top 80 inches. The natural drainage class is moderately well drained, and it has a medium runoff class. The depth to the water table is more than 80 inches. There is occasional frequency of ponding, and flooding is infrequent. The remaining soils (1 percent) at this site are identified as Eckrant cobbly clay, 1 to 8 percent slopes (NRCS 2017). The natural drainage class is well drained, and it has a medium runoff class. The depth to the water table is more than 80 inches. There is infrequent ponding or flooding (NRCS 2017).

The majority of the soils (79 percent) at the disturbance areas on Camp Bullis Road, New Lewis Valley Road, and Wilderness Trail are Tinn clay, 0 to 1 percent slopes, occasionally flooded. The remaining soils (21 percent) underlying these roadways as well as the soils underlying the proposed vehicle wash facility are Eckrant cobbly clay, 1 to 8 percent slopes. Soils at the existing TEMF also are Eckrant cobbly clay, 1 to 8 percent slopes (NRCS 2017).

None of the soils that occur within any of the disturbance areas for the Proposed Action are considered farmland according to the Natural Resources Conservation Service (NRCS 2017).

Geologic Hazards. Bexar County and central Texas are subject to geologic hazards including karst topography, sinkholes, and earthquakes. Karst features and sinkholes are common in central Texas and can appear suddenly and may result in property damage or casualty (AACG 2012).

The U.S. Geological Survey identified central Texas as having one of the lowest hazards from earthquakes with a peak acceleration of 0.02 percent gravity. As a result, central Texas is unlikely to experience earthquake hazards (USGS 2014).

3.4.3 Environmental Consequences

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

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

3.4.3.1 PROPOSED ACTION

Geology. Short-term, negligible, adverse impacts on geology would occur. Although disturbance of surficial bedrock and other geological features could occur, the proposed construction and demolition would not be substantial or deep enough to alter lithology, stratigraphy, or the geological structures that control the distribution of aquifers and confining beds.

Topography. Long-term, negligible, adverse impacts on topography would occur. The area proposed for the TEMF and vehicle wash facility slightly slopes downward toward the south and southeast; therefore, minor grading would be required to level the grade to support construction. Minor grading would occur at the existing TEMF following demolition to restore natural topography.

Soils. Short- and long-term, minor, adverse impacts on soils would occur. Construction of the proposed TEMF and associated roadway construction would primarily occur in one soil type, Tinn clay, 0 to 1 percent slopes, occasionally flooded. Construction of the proposed vehicle wash facility would occur in Eckrant cobbly clay, 1 to 8 percent slopes.

Site preparation and earthmoving associated with construction would excavate soils and expose rock materials, temporarily removing vegetation in some areas and potentially exposing soils to erosion. Soil productivity, which is the capacity of the soil to produce vegetative biomass, would decline in disturbed areas and be eliminated in areas within the footprint of roadways or

structures. Impacts would be minimized by restricting construction traffic to specific areas of travel where possible. In general, accelerated soil erosion would be minimized by designing facilities while considering any soil limitations, employing construction and stabilization techniques appropriate for the soil and climate, and implementing temporary and permanent erosion control measures. BMPs include installing silt fencing and sediment traps, applying water to disturbed soil, and revegetating disturbed areas as soon as possible after the disturbance, as appropriate. Additionally, because the total disturbance area for the Proposed Action is greater than one acre, a General Permit to Discharge under the Texas Pollutant Discharge Elimination System would be obtained (see **Section 3.8.3.1** for additional information on this permit). Therefore, impacts on soils would be minor and localized to the construction area.

Soils (i.e., Eckrant cobbly clay, 1 to 8 percent slopes) could be exposed to erosion during demolition of the existing TEMF; however, impacts would be negligible because only surficial soils would be disturbed. Erosion and sediment controls, as described above would also be implemented during demolition. Upon completion of demolition, the area of the existing TEMF would be allowed to return to a natural state, which would improve its ability to produce biomass.

Long-term, minor, adverse impacts on soils would occur from an approximately 13,160 ft^2 net increase of impervious surfaces. This increase in impervious surface would reduce the amount of area for stormwater to infiltrate soil and increase stormwater runoff. See **Section 3.8.3** for additional information regarding stormwater runoff impacts from the Proposed Action.

Geologic Hazards. No impacts from geological hazards would occur. Unexpected karst features and sinkholes are unlikely to be discovered during construction because geotechnical and siting analysis during future stages of project design would be expected to identify and account for any immediate subsurface hazards that could be encountered. No impacts would occur from earthquakes because the likelihood of an earthquake occurring that could endanger property and lead to casualty is very low in central Texas.

3.4.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and geological resources conditions would remain the same as described in **Section 3.4.2**. No impacts on geology, topography, soils, and geological hazards would occur.

3.5 Hazardous Materials and Wastes

3.5.1 Definition of the Resource

Hazardous Materials, Hazardous Wastes, and Petroleum Products. Hazardous materials are defined by 49 CFR § 171.8 as hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR § 172.101), and materials that meet the defining criteria for hazard classes and divisions in 49 CFR § 173. Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 USC § 6903(5), as amended by the Hazardous and Solid Waste Amendments, as “a solid waste, or combination of solid wastes, which because of its quantity,

concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed."

Petroleum products include crude oil or any derivative thereof, such as gasoline, diesel, or propane. They are considered hazardous materials because they present health hazards to users in the event of incidental releases or extended exposure to their vapors.

Evaluation of hazardous materials and wastes focuses on the storage, transportation, handling, and use of hazardous materials, as well as the generation, storage, transportation, handling, and disposal of hazardous wastes. In addition to being a threat to humans, the improper release or storage of hazardous materials, hazardous wastes, and petroleum products can threaten the health and well-being of wildlife species, habitats, soil systems, and water resources.

Special Hazards. Special hazards are substances that might pose a risk to human health and are addressed separately from hazardous materials and hazardous wastes. Special hazards include ACM, LBP, and polychlorinated biphenyls (PCBs), all of which are typically found in buildings and utilities infrastructure.

Asbestos was used in building materials because of its high tensile strength, flexibility, and resistance to heat, chemicals, and electricity (OSHA 2002). Asbestos is commonly found in buildings constructed prior to 1980 in roofing materials, joint compound, wallboard, thermal system insulation, and boiler gaskets. The federal government banned the use of most LBP in 1978; therefore, all buildings constructed prior to 1978 are assumed to contain LBP. PCBs are man-made organic chemicals that were widely used in construction materials and electrical products prior to 1979 because of their non-flammability, chemical stability, high boiling point, and electrical insulating properties (USEPA 2017c).

Environmental Contamination. Environmental contamination sites are also considered during the evaluation of hazardous materials and wastes. The Environmental Restoration Program (ERP) is a DoD program that identifies, characterizes, and remediates environmental contamination from past activities at DoD installations. Two ERP programs are active on JBSA-BUL, the Installation Restoration Program (IRP) and the MMRP (USACE and AFCEE 2010). IRP sites potentially require or have required environmental cleanup or intensive investigations. MMRP sites address nonoperational military ranges and other sites that are suspected or known to contain discarded military munitions (i.e., munitions and explosives of concern [MEC]) or munitions constituents (i.e., munitions debris [MD]). Unexploded ordnance (UXO), as defined in 10 USC § 101 (e)(5), is a category of MEC that has been primed, fused, armed, or otherwise prepared for action; has been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard to operations, installation, personnel, or material; and remains unexploded either by malfunction, design, or any other cause (BLM 2006). TCEQ is the primary regulatory agency with authority for approving all cleanup actions at JBSA-BUL (AFCEC 2016).

Radon. Radon is a naturally occurring odorless and colorless radioactive gas found in soils and rocks that can lead to the development of lung cancer. Radon tends to accumulate in enclosed spaces, usually those that are below ground and poorly ventilated (e.g., basements). USEPA established a guidance radon level of 4 picocuries per liter (pCi/L) in indoor air for residences, and radon levels above this amount are considered a health risk to occupants (USEPA 2016).

3.5.2 Affected Environment

Hazardous Materials, Hazardous Wastes, and Petroleum Products. JBSA-BUL handles hazardous materials in accordance with AFI 32-7086, *Hazardous Materials Management*. Hazardous wastes are handled in accordance with AFI 32-7042, *Waste Management,* and the JBSA *Hazardous Waste Management Plan*. All hazardous waste management activities must be coordinated through and approved by the JBSA-BUL 502 Civil Engineer Squadron Installation Management Flight, Environmental Management Section (UFGS undated). JBSA-BUL follows the hazardous materials and wastes management guidelines in Unified Facilities Guide Specifications (UFGS) 01-35-35, *Environmental Protection* (UFGS undated), which replaced JBSA-BUL's *Hazardous Materials Management Plan* (Diaz 2017). In addition, JBSA-BUL's Spill Prevention Control and Countermeasures (SPCC) Plan identifies specific procedures and responsibilities for responding to hazardous material and petroleum product spills. The 502nd Civil Engineer Squadron Installation Management Flight, Environmental Management Section maintains the SPCC Plan, manages the hazardous waste personnel, and coordinates spill responders/contractors (USAF 2016c).

Activities on JBSA-BUL that require the use of hazardous materials and petroleum products include vehicle operation and maintenance (general and tactical), infrastructure and equipment maintenance, pesticide applications, demolition, and construction. Hazardous wastes are generated from similar activities. JBSA-BUL is permitted under RCRA as a small quantity hazardous waste generator (USEPA ID No. TX4210020133) (USEPA 2017d). Various fuels and wastes are stored in aboveground storage tanks and USTs installation-wide (USAF 2016c).

Activities requiring the use of hazardous materials and petroleum products at the existing TEMF include maintenance of vehicles, equipment, and infrastructure and occasional pesticide applications. Therefore, there are various types of hazardous materials, petroleum products, and hazardous wastes at the existing TEMF. The existing TEMF also includes an OWS and a 1,000-gallon propane storage tank. No other aboveground storage tanks or USTs are at the existing TEMF; however, there are two 10,000-gallon USTs approximately 130 feet south of Building 6104 at the liquid fuel dispensing facility. The USTs contain Jet A fuel and gasoline (USAF 2016c).

There are no existing hazardous materials, petroleum products, hazardous wastes, storage tanks, or OWSs at the site of the proposed TEMF and vehicle wash facility.

Special Hazards. Asbestos, LBP, and PCBs are regulated by USEPA. USAF manages asbestos in accordance with AFI 32-1052, *Facility Asbestos Management*. PCBs are regulated in accordance with the Toxic Substances Control Act of 1976. USAF manages PCBs in accordance with AFI 32-7042, *Waste Management*.

Building 6104 was constructed in 1945 and contains peeling LBP and ACMs in the roof and window glazing. Because of the construction date of Building 6104, PCBs could be present within building equipment as well. The construction date of Building 6106 is unknown; therefore, it is assumed to contain LBP and ACMs and could contain PCBs (USACE 2016, Vogel 2017).

Environmental Contamination. In accordance with AFI 32-7020, *Environmental Restoration Policy*, all ERP sites on JBSA-BUL are managed in accordance with RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act. There are six IRP sites and four MMRP sites on JBSA-BUL. Five of the IRP sites and two of the MMRP sites require no further action and do not warrant further discussion in this EA. The active IRP site, Site 08/Landfill 8, is approximately 3 miles from the project area and also does not warrant further discussion in this EA. The two active MMRP sites are the Stokes Mortar (FR001) and 75mm Munitions (FR004) response sites, which are described as follows.

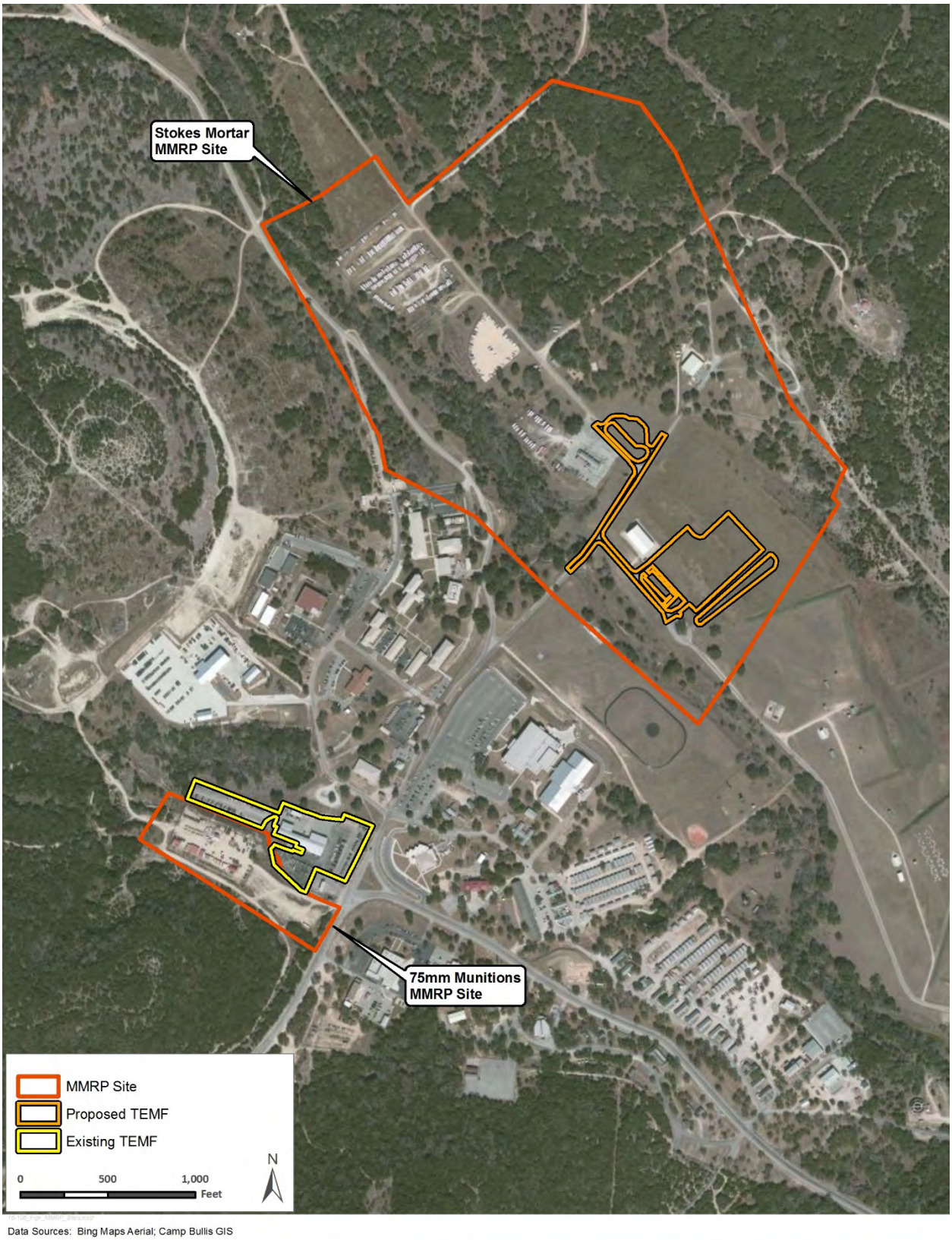
The proposed TEMF and vehicle wash facility are within the eastern portion of the 148.4-acre Stokes Mortar MMRP Site (see **Figure 3-2**). MEC or MD was found at 33 locations throughout the Stokes Mortar MMRP Site during a RCRA Facility Investigation in 2011. Of the MEC items discovered, 19 were found both on the surface and in the subsurface to a depth of 12 inches. Twenty-five of the 33 findings occurred within the northwestern portion of the site, which is outside of the project area (AFCEC 2016).

The 75mm Munitions MMRP Site is an 8.9-acre area immediately adjacent to the existing TEMF (see **Figure 3-2**). During a RCRA Facility Investigation of the 75mm Munitions MMRP Site conducted in 2011, two MECs were found below the surface (AFCEC 2016).

MEC, MD, range-related debris, and general debris were removed from both MMRP sites by 2014. However, MEC, MD, and range-related debris could still be present within the MMRP sites. Therefore, both MMRP sites are subject to LUCs and monitoring, as follows:

- The MMRP sites are limited to industrial and commercial land uses. Use restrictions and LUCs will remain in place until it is demonstrated to TCEQ that the MEC no longer presents a threat to residential use.
- TCEQ must be notified 60 days prior to a change to residential land use within the MMRP sites. This change could warrant additional response actions.
- Intrusive activities with disturbance deeper than 12 inches below ground surface within the removal footprint requires a dig permit and requires UXO avoidance supervision during intrusive activities.
- JBSA Range Operations/Control must be contacted if any MEC is observed (USAF 2017a, USAF 2017b).

Radon. Bexar County is within Radon Zone 3, which has predicted indoor radon screening levels of less than 2 pCi/L (USEPA 2016). Because of the low probability of exceeding USEPA's radon guidance level of 4 pCi/L, radon is not discussed further.



Note: Corrective action footprints shown for both MMRP sites.

Figure 3-2. MMRP Sites Proximate to the Proposed Action

3.5.3 Environmental Consequences

Impacts on hazardous materials and wastes would be considered significant if a proposed action would result in noncompliance with applicable federal or state regulations, or increase the amounts generated or procured beyond current JBSA-BUL waste management procedures, permits, and capacities. Impacts on contaminated sites would be considered significant if a proposed action would disturb or create contaminated sites resulting in negative effects on human health or the environment, or if a proposed action would make it substantially more difficult or costly to remediate existing contaminated sites.

3.5.3.1 PROPOSED ACTION

Hazardous Materials, Hazardous Wastes, and Petroleum Products. Short-term, minor, adverse impacts would occur during construction and demolition from the use of hazardous materials and petroleum products and the generation of hazardous wastes. Hazardous materials that could be used include paints, welding gases, solvents, preservatives, and sealants. Additionally, hydraulic fluids and petroleum products, such as diesel and gasoline, would be used in construction vehicles and equipment. Construction and demolition would generate negligible quantities of hazardous wastes, and these quantities would not exceed the capacities of the existing permitted hazardous waste disposal streams. Contractors would be responsible for the disposal of hazardous wastes in accordance with federal and state laws.

All hazardous materials, petroleum products, and hazardous wastes used or generated during construction and demolition would be contained and stored appropriately (e.g., secondary containment, inspections, spill kits) in accordance with UFGS 01-35-35, the JBSA Hazardous Waste Management Plan, the JBSA-BUL SPCC, and other applicable regulations to minimize the potential for releases. Construction and other contractors with temporary operations at JBSA-BUL would be required to develop and implement their own SPCC Plans if oil storage capacity were to exceed SPCC thresholds (USAF 2016c). All construction and demolition equipment would be maintained according to the manufacturer's specifications.

As stated in **Section 2.1.1.2**, all hazardous materials and wastes at the existing TEMF would be removed prior to demolition and would be disposed of per applicable federal, state, and local regulations (USACE 2016, USAF 2016a). The 1,000-gallon propane tank and OWS within the existing TEMF would be inspected for integrity prior to removal, which would be conducted in accordance with all applicable regulations. The two USTs at the adjacent liquid fuel dispensing facility would remain in place and would continue to be maintained in accordance with all applicable regulations.

Long-term, negligible, adverse impacts from hazardous materials, hazardous wastes, and petroleum products would occur during the operation of the proposed TEMF and vehicle wash facility. Tactical equipment and vehicle maintenance could result in the accidental release of hazardous materials or petroleum products and the generation of hazardous wastes. However, spill prevention infrastructure would guard against incidental releases during maintenance activities. Propane would be stored in an approximately 1,000-gallon, on-site UST and an OWS would treat the wastewater discharges from the maintenance operations before they are conveyed into the installation's sanitary sewer system. Both the UST and OWS would be inspected regularly to ensure they are operating properly and meet all applicable regulatory

standards. Long-term, minor, beneficial impacts would occur from the inclusion of spill prevention infrastructure at the proposed TEMF that is not present at the existing TEMF.

Operation and maintenance activities at the proposed TEMF would not change from those conducted at the existing TEMF. Similar types and amounts of hazardous materials and petroleum products would be used and the level of hazardous wastes generated would be similar to that of the existing TEMF. The operation of the proposed vehicle wash facility would not require the use of hazardous materials and POLs and would not result in the generation of hazardous wastes. Used wash water from the facility would be processed by a water reclamation unit that includes an OWS and recycled as wash water (USACE 2016, USAF 2016a). These measures and compliance with the SPCC would prevent incidental releases of hazardous materials and petroleum products associated with vehicles. Additionally, management of hazardous materials and wastes at the TEMF would continue to comply with UFGS 01-35-35. The proposed POL and hazardous waste storage buildings would be built to applicable UFC standards and all hazardous wastes and POLs would be stored according to JBSA-BUL standards outlined in the SPCC to avoid spills or releases.

Special Hazards. Short-term, negligible, adverse impacts from special hazards would occur during demolition. Surveys would be conducted prior to demolition of Buildings 6104 and 6106 and any ACM, LBP, and PCBs identified would require evaluation for removal and disposal or abatement. Evaluation by a certified demolition contractor prior to demolition would ensure that appropriate measures are taken during demolition to reduce potential exposure to, and release of, these special hazards. Demolition contractors would wear appropriate personal protective equipment and would be required to adhere to all federal, state, and local regulations. Copies of all surveys and notifications for abatement activities would be submitted to the Texas Department of State Health Services (Vogel 2017). Disposal of wastes generated from demolition containing ACMs, LBP, and PCBs would be conducted following approved hazardous waste disposal procedures.

Long-term, minor, beneficial impacts would occur from reducing the potential for future human exposure to special hazards and reducing the amount ACMs, LBP, and PCBs at JBSA-BUL. No impacts from special hazards would occur during construction because federal policy prohibits the use of ACMs for new construction when asbestos-free materials exist, and federal law prohibits LBP and PCBs in new construction.

Environmental Contamination. Short-term, negligible, adverse impacts from construction within the Stokes Mortar MMRP Site would occur. Although MEC, MD, range-related debris, and general debris have been removed, there is still potential for uncovering these items during ground-disturbing activities. Therefore, all ground-disturbing activities within the Stokes Mortar MMRP Site must be authorized by range management. In accordance with existing LUCs, UXO avoidance supervision would be provided whenever digging within the MMRP site would exceed 12 inches below ground surface. Should potential MEC be encountered during any activities, personnel would be required to immediately stop activities, report the discovery to JBSA Range Operations/Control, and implement appropriate safety measures (USAF 2017a, USAF 2017b). Commencement of activities would not continue in that area until the issue was resolved. Additionally, existing LUCs discussed in **Section 3.5.2** would remain in place. The proposed

TEMF is an industrial/commercial land use type and would be permitted under the TCEQ deed restrictions. The existing TEMF is outside but adjacent to the 75mm Munitions MMRP Site; therefore, MEC precautions would be taken for all TEMF demolition work. Long-term, minor, beneficial impacts could occur if additional MEC, UXO, MD, or debris is removed during ground-disturbing activities, further reducing the contamination present on the MMRP sites.

3.5.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and hazardous materials and wastes conditions would remain the same as described in **Section 3.5.2**. No new impacts from hazardous materials and wastes would occur. Long-term, negligible, adverse impacts would continue to occur from the continued potential for future human exposure to special hazards in Buildings 6104 and 6106. Additionally, MEC, MD, or debris that could be removed because of ground-disturbing activities associated with construction of the proposed TEMF and vehicle wash facility would continue to remain onsite.

3.6 Noise

3.6.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Affected receptors are specific (e.g., schools, churches, hospitals) or broad (e.g., nature preserves, designated districts) areas in which occasional or persistent sensitivity to noise above ambient levels exists.

Sound Metrics. Sound varies by both intensity and frequency. Sound pressure level, described in decibels (dB), is used to quantify sound intensity. The dB is a logarithmic unit that expresses the ratio of a sound pressure level to a standard reference level. Hertz are used to quantify sound frequency. The human ear responds differently to different frequencies. "A-weighing," measured in A-weighted decibels (dBA), approximates a frequency response expressing the perception of sound by humans. Sounds encountered in daily life and their dBA levels are provided in **Table 3-5**.

Ambient Sound Levels. Ambient sound is defined as the all-encompassing sound associated with a given environment, being usually a composite of sounds from many sources, near and far. Noise level is dependent upon the surrounding environment (e.g., nearby airports, heavy traffic, open space) and the density of individuals. The noise level in a normal suburban area is approximately 55 dBA, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (USEPA 1974). Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis.

Table 3-5. Common Sounds and Their Levels

Outdoor	Sound Level dBA	Indoor
Motorcycle	100	Subway train
Tractor	90	Garbage disposal
Noisy restaurant	85	Blender
Downtown (large city)	80	Vacuum cleaner
Freeway traffic	70	TV audio
Normal conversation	60	Sewing machine
Rainfall	50	Refrigerator
Quiet residential area	40	Library

Source: Harris 1998

Construction Sound Levels. Building construction and demolition can cause an increase in sound that is well above the ambient level. A variety of sounds are emitted from loaders, trucks, pavers, and other work equipment. **Table 3-6** presents a list of construction and demolition equipment that could be used to support the Proposed Action and their corresponding noise levels. Construction and demolition equipment usually exceeds the ambient sound levels by 20 to 25 dBA in an urban environment, and up to 30 to 35 dBA in a quiet suburban area.

Table 3-6. Noise Level Ranges of Typical Construction and Demolition Equipment

Equipment	Noise Levels in dBA at 50 feet
Trucks	82–95
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Saws	72–-82
Pneumatic Impact Equipment	83–88
Jackhammer	81–98
Pumps	68–72
Generators	71–83
Compressors	75–87
Concrete Mixers	75–88
Concrete Pumps	81–85
Front Loader	73–86
Back Hoe	73–95
Pile Driving (peaks)	95–107
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

Source: USEPA 1971

Note: Equipment equipped with noise control devices (e.g., mufflers) and use of sound barriers are expected to result in lower noise levels than shown in this table. The presence of dense trees, buildings, and hilly terrain would be expected to increase effectiveness of noise attenuation with distance from the generating source(s) (USDA 2008).

Sound Attenuation. In an area without trees or buildings, noise generally attenuates by 6 dBA with each doubling of distance to a receptor from a point source such as concrete mixers or generators, or by 3 dBA with each doubling of distance from a line source, such as construction-related truck traffic. Any additional reduction in noise is referred to as "excess attenuation" and is typically associated with the presence of trees, hills, or buildings. Specifically, early research showed that excess attenuation within a forest was 6 dB per 100 feet of forested land (Herrington and Brock 1977). More recent analysis showed that noise could be reduced by more than 20 dB per 100 feet of forest, but the actual levels of reduction would depend upon tree species, tree and canopy density, trunk diameters, and soil composition (USACE 2004, USDA 2008, Maleki and Hosseini 2011). Additionally, presence of hilly terrain, or buildings with height of at least 12 feet, could reduce noise levels by almost twice that achieved by relatively flat forested land, alone (USDA 2008).

Federal Regulations. The federal government established noise guidelines and regulations for the purpose of protecting citizens from potential hearing damage and from various other adverse physiological, psychological, and social effects associated with noise. According to the U.S. Army, Federal Aviation Administration, and U.S. Department of Housing and Urban Development criteria, residential units and other noise-sensitive land uses are "clearly unacceptable" in areas where noise exposure exceeds 75 dBA, "normally unacceptable" in regions exposed to noise between 65 and 75 dBA, and "normally acceptable" in areas exposed to noise of 65 dBA or less. For outdoor activities, USEPA recommends 55 dBA as the sound level below which there is no reason to suspect that the general population would be at risk from any of the effects of noise (USEPA 1974).

State Regulations. The State of Texas issues general nuisance regulations that restrict noise generating activities to weekdays and business hours. Noise regulations are more specifically driven by city authorities. San Antonio Code of Ordinance Chapter 21, Article III, Division 1, Sections 21-52, *Noise Nuisance Enumeration*, restricts noise generation to daylight hours, during weekdays, and prohibits noise generation that exceeds 80 dB at or across any real property boundary. Several exceptions to these restrictions include activities generating sound to alert of an emergency, sound produced by moving vehicles in a public right-of-way, sound produced by any governmental body in the performance of a governmental function, stadium events, election campaigns, or sound produced by heating, ventilation, or air conditioning units on residential properties.

3.6.2 Affected Environment

Noise Environment. The ambient sound environment on JBSA-BUL is comprised of noise from fixed-wing (e.g., C-130) and rotary-wing (i.e., helicopter) aircraft operations, live-fire weapons training ranges, and explosives training ranges. Approach and landing for fixed-wing aircraft is positioned on the northern end of the installation while helicopter flight routes follow the perimeter of the installation. Fixed- and rotary-wing aircraft primarily generate noise at the drop zones and helicopter landing sites located along the southern boundary of JBSA-BUL. Twenty live-fire ranges on the installation support weapons training on small and large caliber weapons, grenades, and explosive demolitions. The small and large caliber weapons training range is located in the southern portion of JBSA-BUL and covers approximately 6,000 acres. In these areas, nuisance level noise (e.g., greater than 75 dB) from weapons training activities

may be experienced up to approximately 490 feet beyond the southern boundary of the installation. Noise vibrations generated from aircraft operations, activities on the firing ranges, and explosions associated with ordnance disposal are also experienced on the installation. Ground-based vibration on the installation is generally associated with noise generated during weapons, grenade, and demolitions training operations (City of San Antonio 2009).

The project area is in the southwest corner of the installation where noise from vehicular traffic, industrial activities, aircraft operations, and military training are common.

Noise-Sensitive Receptors (NSRs). No NSRs are located on JBSA-BUL. Eisenhower Park is the nearest NSR to the project area. This park was formerly part of the installation, but was relinquished back to the State of Texas for use as a public recreational area. It is located along the southern border of JBSA-BUL between Old Camp Bullis Road and NW Military Highway and encompasses approximately 320 forested acres. Jogging trails and picnicking areas are provided for public enjoyment. The northern boundary of the park is located approximately 4,300 feet (0.8 miles) south of the existing TEMF and 6,000 feet (1.1 miles) south of the proposed TEMF. The area between Eisenhower Park and the proposed and existing TEMF is mostly forested with intervening topography and contains many buildings.

Other nearby NSRs include the Texas Military Institute—The Episcopal School of Texas (TMI) and off-installation residential housing. TMI is located approximately 5,600 feet (1.1 mile) west of the existing TEMF and 8,000 feet (1.5 mile) southwest of the proposed TEMF. Off-installation residential housing is sparse in the vicinity of JBSA-BUL. Only a few residences are interspersed in the forested land south and west of the installation, with the nearest home located approximately 3,500 feet (0.7 mile) southwest of the existing TEMF and 5,700 feet (1.1 mile) southwest of the proposed TEMF. The areas between the project area and these NSRs is mostly forested with intervening topography and contains some JBSA-BUL buildings.

3.6.3 Environmental Consequences

An analysis of the potential effects associated with noise typically evaluates potential changes to the existing acoustical environment that would result from implementation of a proposed action. Potential changes in the acoustical environment can be beneficial (i.e., they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level), negligible (i.e., the total number of sensitive receptors to unacceptable noise levels is essentially unchanged), or adverse (i.e., they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level). Effects would be considered significant if noise levels were to be unacceptable to multiple sound receptors or violate noise regulations.

The main issues concerning noise effects on humans are physiological effects (e.g., hearing loss and non-auditory effects), behavioral effects (e.g., speech or sleep interference and performance effects), and subjective effects such as annoyance. This noise analysis considers potential effects on the identified NSRs located near the Proposed Action. The major sources of noise, their contribution to the overall noise environment, and maximum sound level were estimated for comparison to local noise-control standards.

3.6.3.1 PROPOSED ACTION

On-installation Noise Impacts. Short-term, minor, adverse impacts on the JBSA-BUL ambient noise environment would occur from operation of construction equipment as well as the increase in construction vehicle traffic noise along NW Military Highway, Camp Bullis Road, and other installation roads. Impacts would be temporary and last only for the duration of construction and demolition. Mufflers on construction vehicles and temporarily placed noise dampening barriers (e.g., sound screens) could be used to reduce adverse noise impacts immediately proximal to the construction and demolition sites. Noise levels from construction and demolition would vary depending on the types of equipment being used on a given day, the topography of the area where the project would occur, the distance of the receptor from the generating source, and the presence of trees or buildings. Because JBSA-BUL is an active military installation that supports aircraft, live-fire weapons, and explosives training the temporary increases in construction noise would be a fraction of the noise generated routinely on the installation. Additionally, all construction and demolition would occur in the southwest corner of the installation where noise from vehicular traffic, industrial activities, aircraft operations, and military training are common.

No long-term impacts on the ambient noise environment of JBSA-BUL would occur from operation of the proposed TEMF and vehicle wash facility. Operational functions at the proposed TEMF and vehicle wash facility would not be appreciably louder than operational functions at the existing TEMF.

Off-installation Noise Impacts. Short-term, negligible, adverse noise impacts on areas beyond the installation's boundaries would occur from sound propagation from the construction and demolition sites. Because construction usually involves simultaneous use of several pieces of equipment (e.g., saws and haul trucks), additive construction noise during the busiest day was estimated to determine the total effect of noise at a given distance. Because construction and demolition of multiple facilities and roadway redevelopment would occur concurrently, construction and jackhammer noise levels were estimated using distances measured from the nearest portion of the project area to each of the identified NSRs. **Table 3-7** summarizes the estimated noise levels at the NSRs. Although conservative construction and demolition noise levels could sometimes exceed 65 dBA at the NSRs, these noise levels would only occur intermittently during the day and would not result in significant impacts. This analysis conservatively assumes all construction processes occur concurrently at the nearest portion of the project area and does not consider use of noise dampening equipment (e.g., mufflers) or the presence of forested land, intervening topography, and buildings that would attenuate noise from the generating source.

Noise from construction vehicle traffic would also adversely affect off-installation areas. Because all traffic accesses JBSA-BUL via NW Military Highway, noise impacts from construction vehicle traffic would mainly be experienced on populations adjacent to NW Military Highway between the installation and Loop 1604. Construction vehicle traffic would include tractor-trailers transporting supplies and heavy equipment and dump trucks transporting demolition debris. These vehicles would only be traveling to and from the construction and demolition areas using established roadways. These vehicles might drive by NSRs (e.g., Eisenhower Park) and other residences; however, this increased construction and

Table 3-7. Predicted Construction and Demolition Noise Levels at NSRs

NSR	Distance from Nearest Source to NSR (feet)	Estimated Cumulative Construction and Demolition dB range at NSR[1]	Estimated dB range for Jackhammer noise at NSR[2]
Nearest Residence	3,500	60–72	44–61
Eisenhower Park	4,300	58–70	42–59
TMI	5,600	56–68	40–57

Notes:

1 – Cumulative noise levels were estimated using the SengpielAudio (2017) calculator that employs the Occupational Safety and Health Administration's (OSHA) logarithmic equation for combining noise levels (OSHA 2013). USEPA (1971) published noise levels for construction and demolition equipment and processes were used to determine a representative cumulative noise level range for an accurate and conservative analysis. The estimated cumulative range for noise levels at the source used in the equation was 97 to 109 dB.

2 – Estimated using USEPA (1971) established dB range for jackhammer activities at the source (i.e., 81 to 98 dB).

demolition traffic would be temporary and only occur during the period of construction and demolition. Construction traffic would be a fraction of the existing traffic, and would likely cause negligible increases in noise levels on noise-sensitive populations. Construction vehicle noise would be expected to occur during daytime, normal working hours (i.e., between 7 a.m. and 5 p.m.) and peak levels would be expected at the beginning and end of each work day. Examples of peak noise levels of heavy trucks are provided in **Table 3-6**.

No long-term noise impacts beyond the installation's boundaries would occur. NSRs and off-installation properties would not experience long-term noise impacts from the operation of the proposed TEMF and vehicle wash facility because operational functions at the proposed TEMF and vehicle wash facility would not be appreciably louder than operational functions at the existing TEMF. Additionally, the proposed TEMF and vehicle wash facility would be located approximately 0.8 mile from the nearest boundary of JBSA-BUL and noise would be expected to attenuate over this distance.

3.6.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and noise conditions would remain the same as described in **Section 3.6.2**. No impacts on the ambient noise environment of JBSA-BUL or the nearby NSRs would occur.

3.7 Safety

3.7.1 Definition of the Resource

A safe environment is one in which there is no, or an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Potentially unsafe situations or environments exist when a hazard is exposed to a potentially susceptible population. The degree of exposure depends on the proximity of the hazard to the population. This section addresses the well-being, safety, and health of members of the public, contractors, and USAF personnel during aspects of the Proposed Action.

3.7.2 Affected Environment

Safety is largely a matter of adherence to regulatory requirements imposed for the benefit of people and implementation of operational practices that reduce risks of illness, injury, death, and property damage. The health and safety of onsite military and civilian workers are safeguarded by numerous DoD and USAF regulations designed to comply with standards issued by OSHA and USEPA. These standards specify the amount and type of training required for workers, the use of personal protective equipment and clothing, engineering controls, and maximum exposure limits for workplace stressors. All personnel working on the installation are required to follow these regulations to ensure the safety of themselves and others.

UFC 4-214-02, *TEMF Standard Design*, specifies the requirements for optimal performance of a TEMF, including design, layout, and life safety standards. As noted in **Section 1.2**, JBSA-BUL's existing TEMF does not fully meet the requirements of this UFC because the building was not constructed for such function. The inadequacies of the existing TEMF include lack of standard shop components, proper ventilation systems, and functional spaces. These inadequacies present safety hazards to the personnel working at the existing TEMF. The low water crossing on Camp Bullis Road at Salado Creek also presents a safety hazard to installation personnel because drivers could misjudge the water depth and velocity during flooding and be swept downstream.

3.7.3 Environmental Consequences

Any increase in safety hazards would be considered an adverse impact on safety. An impact would be considered significant if a proposed action met one or more of the following criteria:

- Substantially increase risks associated with the safety of construction and demolition personnel, contractors, military personnel, or the local community.
- Hinder the ability to respond to an emergency.
- Introduce a new health or safety risk for which the installation is not prepared or does not have adequate management and response plans in place.

3.7.3.1 PROPOSED ACTION

Short-term, minor, adverse and long-term, minor, beneficial impacts on safety would occur during construction and demolition. Construction and demolition pose an inherent risk of accidents to workers, but this level of risk would be managed by adherence to established OSHA, USEPA, DoD, and USAF safety regulations. Construction and demolition contractors would establish and maintain health and safety programs for their workers. Construction workers would be required to wear personal protective equipment such as ear protection, steel-toed boots, hard hats, gloves, and other appropriate safety gear. Work areas would be fenced and appropriately marked with signs to prevent trespassing.

Long-term, minor, beneficial impacts on safety would occur from the use of the proposed TEMF. The proposed TEMF would comply with UFC 4-214-02; therefore, personnel working at the proposed TEMF would no longer be exposed to the inadequacies and associated safety hazards of the existing TEMF. Personnel working at the proposed TEMF and vehicle wash

facility would continue to follow all appropriate OSHA, USEPA, DoD, and USAF safety regulations for a safe working environment. The proposed replacement of the low water crossing on Camp Bullis Road with a culvert system would also result in long-term, minor, beneficial impacts on safety by reducing the hazard potential for vehicles to drive through a flooded roadway.

3.7.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and safety conditions would remain the same as described in **Section 3.7.2**. No new impacts on safety would occur; however, the inadequacies and associated safety hazards of the existing TEMF would remain. Additionally, the low water crossing on Camp Bullis Road would remain and drivers would continue to be exposed to safety hazards when driving through a flooded roadway.

3.8 Water Resources

3.8.1 Definition of the Resource

Water resources include groundwater, surface water, wetlands, and floodplains, and their relationship to the Proposed Action. It also considers water quality programs that are enforced as part of water resources protection regulations. Evaluation of water resources examines the quantity and quality of the resource and its demand for various purposes.

Groundwater. Groundwater is water that collects or flows beneath the Earth's surface, filling the porous spaces in soil, sediment, and rocks. Groundwater originates from precipitation and is an essential resource often used for potable water consumption, agricultural irrigation, and industrial applications. Groundwater typically can be described in terms of its depth from the surface, aquifer or well capacity, water quality, surrounding geologic composition, and recharge rate.

Surface Water. Surface water includes natural, modified, and constructed water confinement and conveyance features above groundwater that may have a defined channel and discernable water flows, as well as associated flora, fauna, and habitats. These features are generally classified as streams, springs, wetlands, natural and artificial impoundments (e.g., ponds, lakes), and constructed drainage canals and ditches.

Stormwater is an important component of surface water systems because of its potential to introduce sediments and other contaminants that could degrade lakes, rivers, and streams. Stormwater flows, which can be exacerbated by high proportions of impervious surfaces associated with buildings, roads, and parking lots, are important to the management of surface water. Stormwater management systems provide the benefit of reducing sediments and other contaminants that would otherwise flow directly into surface waters.

The Clean Water Act (CWA) (33 USC §1251 et. seq., as amended) establishes federal limits, through the National Pollutant Discharge Elimination System (NPDES), on the amounts of specific pollutants that are discharged to surface waters to restore and maintain the chemical, physical, and biological integrity of the water. In Texas, the NPDES is administered by TCEQ under the Texas Pollution Discharge Elimination System. All NPDES stormwater permits issued

by USEPA or states must incorporate requirements established in the Final Rule for the CWA that went into effect starting in 2010. All new construction sites are required to meet the non-numeric effluent limitations and to design, install, and maintain effective erosion and sedimentation controls. In addition, construction sites that disturb 1 or more acres of land are required to obtain an NPDES general permit for construction.

Section 438 of the Energy Independence and Security Act (EISA) (42 USC § 17094) establishes stormwater design requirements for federal construction projects that disturb a footprint greater than 5,000 ft^2. Additional guidance is provided in the USEPA *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act*. DoD UFC 3-210-10, *Low Impact Development*, presents criteria for compliance with Section 438 of the EISA.

Water quality standards at the installation are also regulated by USEPA under the Safe Drinking Water Act (42 USC § 201, 300 et seq.) and the CWA. Section 303(d) of the CWA requires states to identify and develop a list of impaired water bodies where technology based and other required controls have not provided attainment of water quality standards. Section 305(b) of the CWA requires states to assess and report the quality of their water bodies. The State of Texas Water Quality Standards are codified in Title 30, Chapter 307 of the Texas Administrative Code under the authority of the CWA and the Texas Water Code. The state has combined their Section 303(d) and 305(b) lists into one report referred to as the Integrated Report. The Integrated Report identifies those water bodies that are impaired and do not meet designated uses, and it establishes total maximum daily loads for the pollutants of concern.

Wetlands. Wetlands are an important natural system and habitat because of the diverse biologic and hydrologic functions they perform. These functions include water quality improvement, groundwater recharge and discharge, pollution mitigation, nutrient cycling, wildlife habitat provision, and erosion protection.

Wetlands are protected as a subset of the waters of the United States under Section 404 of the CWA. The term “waters of the United States” has a broad meaning under the CWA and incorporates deepwater aquatic habitats and special aquatic habitats (including wetlands). The discharge of dredged or fill materials into such features requires a permit. The U.S. Army Corps of Engineers (USACE) defines wetlands as “those areas that are inundated or saturated with ground or surface water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas” (33 CFR § 328).

EO 11990, *Protection of Wetlands*, requires that federal agencies provide leadership and take actions to minimize or avoid the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands. Federal agencies are to avoid new construction in wetlands, unless the agency finds there is no practicable alternative to construction in the wetland, and the proposed construction incorporates all possible measures to limit harm to the wetland.

Floodplains. Floodplains are areas of low-level ground along rivers, stream channels, large wetlands, or coastal waters. Such lands might be subject to periodic or infrequent inundation because of rain or melting snow. Floodplain ecosystem functions include natural moderation of floods, flood storage and conveyance, groundwater recharge, and nutrient cycling. Floodplains also help to maintain water quality and are often home to a diverse array of plants and animals. In their natural vegetated state, floodplains slow the rate at which the incoming overland flow reaches the main water body.

Flooding potential is evaluated by the Federal Emergency Management Agency (FEMA), which defines 100-year floodplains as areas having a 1 percent chance of inundation by a flood event in a given year, and 500-year floodplains as areas having a 0.2 percent chance of inundation in a given year. EO 11988, *Floodplain Management*, requires federal agencies to determine whether a proposed action would occur within a floodplain and directs federal agencies to avoid floodplains to the maximum extent possible wherever there is a practicable alternative.

3.8.2 Affected Environment

Groundwater. Two aquifers underlie JBSA-BUL: the Edwards Aquifer (shallow) and the Trinity Aquifer (deep). The Edwards Aquifer is approximately 160 miles in length, varies in width from 5 to 40 miles, and varies in thickness from approximately 300 to 700 feet. Approximately 24,000 acres of JBSA-BUL fall within the Edwards Aquifer Contributing Zone, which is the area or watershed where runoff from precipitation flows to the Edwards Aquifer Recharge Zone. The remaining 4,000 acres of JBSA-BUL, mostly along the northern, southern, and southeastern boundaries of the installation, are within the Edwards Aquifer Recharge Zone. The majority of recharge to the Edwards Aquifer occurs in the recharge zone where rivers and creeks cross the highly faulted and fractured Edwards limestone outcrop, which allows large quantities of water to flow into the aquifer. Excess water that does not recharge into the aquifer flows down the stream channels during flood events and periods of high rainfall (USAF 2014).

TCEQ regulates construction activities in the Edwards Aquifer contributing and recharge zones by requiring the development and implementation of an Edwards Aquifer Protection Plan (EAPP) prior to ground disturbance. The existing TEMF, proposed TEMF, and all connected actions are located within the Edwards Aquifer Contributing Zone, and at its nearest, the Edwards Aquifer Recharge Zone is approximately 1 mile to the southeast of the proposed TEMF. Because the Proposed Action would occur in the Edwards Aquifer Contributing Zone and would affect an area greater than 5 acres, the EAPP required for this Proposed Action is an Edwards Aquifer Contributing Zone Plan (CZP). The CZP provides additional information on the location and infrastructure associated with the project and outlines BMPs that would be implemented and maintained both during and after construction activities.

The Trinity Aquifer extends from central Texas north to the Red River Valley, covering all or parts of 20 Texas counties. The Trinity Aquifer is made up of several smaller aquifers contained within the Trinity Group, which is divided into three water-bearing units based on hydraulic continuity. The upper, middle, and lower Trinity Aquifer all occur under JBSA-BUL. Saturated thickness of the Trinity Aquifer in central Texas is approximately 1,900 feet (TWDB 2017). The Trinity Aquifer is the primary source for potable water at JBSA-BUL (USAF 2014).

Surface Water. JBSA-BUL is in the San Antonio River basin, which drains approximately 4,180 square miles and contributes to the Guadalupe River that ultimately drains into the San Antonio Bay on the Gulf of Mexico (TCEQ 2017). Surface water at JBSA-BUL consists of six intermittent creeks, five of which have headwaters within JBSA-BUL. Conveyance of water within these creeks is limited to stormwater during flood events and periods of high rainfall (USAF 2014).

Salado Creek is a major surface water feature associated with the Proposed Action. Salado Creek originates west of JBSA-BUL on Camp Stanley and flows in a southeasterly direction. Salado Creek is an intermittent tributary of the San Antonio River and its watershed drains approximately 218 square miles. Approximately 30 miles downstream of JBSA-BUL, a section of Salado Creek, from the confluence of the San Antonio River to the confluence of Beitel Creek, is listed as an impaired stream segment based on macrobenthic invertebrates under Sections 303(d) and 305 (b) of the CWA (TCEQ 2017).

The proposed TEMF, including the TEMF building, concrete hardstand, POV parking lot, storage buildings, and detention pond, would be sited approximately 200 feet northeast of Salado Creek. Camp Bullis Road crosses Salado Creek as a low water crossing, which would be replaced with a culvert system under the Proposed Action. The proposed vehicle wash facility would be sited on an intermittent tributary of Salado Creek. A separate intermittent tributary of Salado Creek is approximately 200 feet to the north of the existing TEMF (see **Figure 3-3**).

Wetlands. Wetlands at JBSA-BUL were surveyed and mapped in spring 2016. These surveys identified 84 wetlands on the installation, including lacustrine, palustrine, and riverine wetlands, totaling approximately 83 acres. There are no wetlands within the project area (**Figure 3-3**). The nearest documented wetland is a riverine wetland along Salado Creek located approximately 2,300 feet to the southeast of the project area (AFCEC and JBSA 2016).

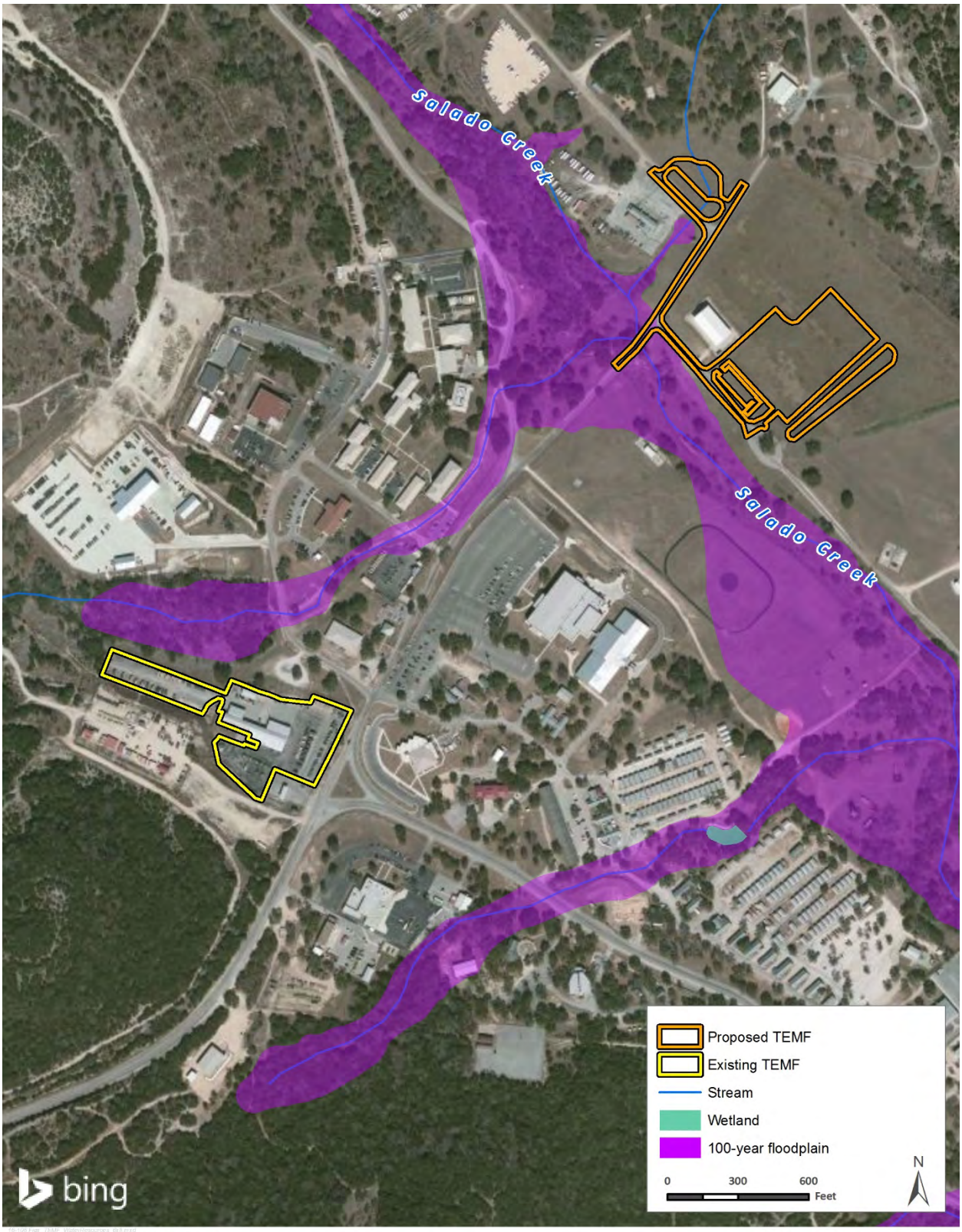
Floodplains. According to FEMA, approximately 250 feet of Camp Bullis Road within the project area where it intersects with Salado Creek is within the 100-year floodplain. The remainder of the project area, including the proposed TEMF and vehicle wash facility, are adjacent to, but outside of, the 100-year floodplain (**Figure 3-3**). The existing TEMF is not within the 100-year floodplain. FEMA has not delineated the 500-year floodplain in the vicinity of the Proposed Action (FEMA 2010).

3.8.3 Environmental Consequences

A proposed action could have significant impacts on water resources if it were to substantially affect water quality, reduce water availability, or reduce supply to existing users; endanger public health or safety by creating or worsening flood hazard conditions; threaten or damage unique hydrologic characteristics; overdraft groundwater basins; exceed the safe annual yield of water supply sources; or violate applicable laws or regulations that protect water resources.

3.8.3.1 PROPOSED ACTION

Groundwater and Surface Water. Short- and long-term, minor, adverse impacts on groundwater and surface water resources would occur. JBSA-BUL obtains the majority of its potable water from on-installation groundwater wells that draw from the Trinity Aquifer



Data Sources: Bing Maps Aerial; Camp Bullis GIS

Figure 3-3. Water Resources Proximate to the Proposed Action

(USAF 2014). Water for construction and demolition as well as for the operation of the proposed TEMF and vehicle wash facility would be obtained from the installation's existing water supply infrastructure, and no new groundwater wells would be constructed. A potential future and separate action of USAF is to connect JBSA-BUL to the San Antonio Water System via a water line along Camp Bullis Road. Should this action occur, water for the proposed TEMF, as well as most of JBSA-BUL, could be obtained from off-installation groundwater sources such as the Edwards Aquifer.

There would be a slight increase in the demand for groundwater from construction and demolition as well as the operation of the proposed TEMF and vehicle wash facility. The long-term increase in groundwater demand would be minor because there would be a corresponding reduction in groundwater demand from no longer operating the existing TEMF. Additionally, sustainability features would be incorporated into the proposed facilities, which would further limit the increased demand on groundwater resources. For example, the proposed vehicle wash facility would be designed with sloped impervious surface to collect waste wash water. The collected waste wash water would be processed by a water reclamation unit, which would include an OWS, and recycled as wash water. Unused effluent would be directed into the existing sanitary sewer system rather than into nearby surface water features. Additionally, if determined practicable, the proposed TEMF could incorporate rainwater collection into its design to reduce water demand. The captured rainwater could be filtered for potable water or unfiltered and used for landscaping around the new facilities.

The hydrologic characteristics of localized runoff would be altered as a result of the increase in impervious surface (i.e., approximately 13,160 ft^2). However, construction would comply with DoD UFC 3-210-10 and Section 438 of the EISA because the footprint of disturbance would be greater than 5,000 ft^2. Low Impact Development standards and techniques for stormwater management require that predevelopment hydrology is maintained to prevent any net increase in stormwater runoff. Stormwater runoff from the TEMF building, concrete hardstand, POV parking lot, and storage buildings would be managed via curb inlets and gutters and directed to a stormwater detention pond, which would be constructed southeast of the concrete hardstand (see **Figure 2-1**). The stormwater detention pond would discharge through a 12-inch pipe into Salado Creek.

Short-term, minor, adverse impacts on Salado Creek would occur from the Camp Bullis Road low water crossing replacement. Replacement would entail removing the existing crossing, which consists of three 24-inch-diameter metal pipes, and constructing three 3 × 3-foot concrete box culverts. Additionally, the channel would be cleared of debris 50 feet upstream and 100 feet downstream of the crossing. Earthwork and debris clearing would temporarily increase sedimentation and suspended solid levels downstream of the culvert replacement; however, sediment fences will be installed on sloped banks adjacent to Salado Creek and debris clearing would be done by hand and on foot to minimize impacts to existing vegetation and soils. Long-term, minor, beneficial impacts on Salado Creek would occur by allowing greater volumes of water in Salado Creek to pass Camp Bullis Road without obstruction.

The proposed vehicle wash facility would be sited on an intermittent tributary of Salado Creek, and construction would require the diversion of or discharge of fill into potential waters of the

United States. USAF has not yet determined how the intermittent tributary would be rerouted. It could be diverted through a culvert under the proposed facility or diverted into other culverts possibly discharging into the proposed detention pond southeast of proposed TEMF. USAF would seek a jurisdictional determination from USACE, and, if necessary, submit a CWA Section 404 permit application. USAF would also implement other measures identified as part of the CWA Section 404 permitting process, as determined necessary by USACE and TCEQ.

Construction and demolition would have the potential to impact groundwater and surface water quality. JBSA-BUL would manage impacts on groundwater and surface water quality through the implementation of a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP would include erosion and sediment controls, interim and permanent stabilization controls, and a description of any structural controls that would divert flows away from exposed soils. Silt fences, vegetation buffers, or equivalent sediment controls would be implemented on downslope project boundaries. In addition to the SWPPP, a general discharge permit (NPDES Permit TXR150000) would be developed and submitted to TCEQ and implemented during construction and demolition because ground disturbance would be greater than 1 acre. This permit includes the schedule of activities, prohibitions of practices, maintenance procedures, structural controls, local ordinances, and other management practices to prevent or reduce the discharge of pollutants (e.g., BMPs for construction site runoff, spills or leaks, waste disposal, or drainage from raw material storage areas). Furthermore, because the Proposed Action occurs within the Edwards Aquifer Contributing Zone and would affect an area greater than 5 acres, an Edwards Aquifer CZP would be prepared and submitted to TCEQ prior to ground disturbance. The CZP would outline BMPs that would be implemented and maintained both during and after construction and demolition. The BMPs from the NPDES, SWPPP, and CZP would prevent surface water runoff from causing soil erosion and siltation in streams, creeks, and groundwater features. Therefore, through implementation of these BMPs, short- and long-term adverse impacts to groundwater and surface water quality would be minor.

Wetlands. No direct impacts on wetlands would occur because no identified wetlands are within the project area. Wetlands located downslope of the project area could be slightly impacted by the increase in impervious surface; however, these impacts on wetlands would be minimized by implementation of Low Impact Development techniques and following UFC 3-210-10 and Section 438 of the EISA. The Proposed Action would comply with EO 11990.

Floodplains. Short- and long-term, minor, adverse impacts on the 100-year floodplain would occur. Approximately 250 feet of Camp Bullis Road within the project area is within the 100-year floodplain of Salado Creek, and the proposed improvements to Camp Bullis Road, including replacing the low water crossing with a culvert system, would occur within the 100-year floodplain. The direct impacts from construction within the 100-year floodplain are unavoidable, and there is no practicable alternative to improve Camp Bullis Road or cross Salado Creek without encroaching in the 100-year floodplain. No habitable structures would be constructed within the 100-year floodplain. The proposed TEMF and vehicle wash facility would not be constructed within the 100-year floodplain but adjacent to it. Therefore, these facilities would experience no direct impacts from the 100-year floodplain. Floodplains located downslope of the project area could be indirectly impacted by the increase in impervious surface; however, indirect impacts on floodplains would be minimized by implementation of Low

Impact Development techniques and following UFC 3-210-10 and Section 438 of the EISA. The Proposed Action would comply with EO 11988, and USAF would coordinate with the Floodplain Administrator of Bexar County for any permit requirements.

3.8.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Proposed Action would not be implemented and water resources conditions would remain the same as described in **Section 3.8.2**. No impacts on groundwater, surface water, wetlands or floodplains would occur.

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4 Cumulative Impacts

Federal regulations implementing NEPA (40 CFR §§ 1500–1508) require that the cumulative impacts of a proposed action be assessed. CEQ regulations implementing the procedural provisions of NEPA define cumulative impacts as follows (40 CFR § 1508.7):

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

Cumulative impacts can be additive (i.e., the net adverse cumulative impacts are strengthened by the sum of individual impacts), countervailing (i.e., the net adverse cumulative impacts are less because of the interaction between beneficial and adverse individual impacts), or synergistic (i.e., the net adverse cumulative impacts are greater than the sum of the individual impacts). Cumulative impacts could result from individually minor, but collectively significant, actions that take place over time. Accordingly, a cumulative impacts analysis identifies and defines the scope of other actions and their interrelationship with a proposed action if there is an overlap in space and time.

Cumulative impacts may occur when there is a relationship between a proposed action and other actions expected to occur in a similar location (i.e., overlapping geographic location) or during a similar time period (i.e., coincidental or sequential timing of events). This relationship may or may not be obvious. The impacts may then be incremental and may result in cumulative impacts. Actions overlapping with or in close proximity to a proposed action can reasonably be expected to have more potential for cumulative impacts on "shared resources" than actions that may be geographically separated. Similarly, actions that coincide in the same timeframe tend to offer a higher potential for cumulative impacts.

This section discusses the potential for cumulative impacts caused by implementation of the Proposed Action when combined with other past, present, and reasonably foreseeable actions.

4.1 Projects Considered for Potential Cumulative Impacts

Past Actions. Past actions are those actions, and their associated impacts, that occurred within the geographical extent of cumulative impacts that have shaped the current environmental conditions of the project area and surrounding areas. The relevant past actions associated with the impacts of the Proposed Action include continued use of JBSA-BUL for military training and ongoing development occurring throughout the northern portion of Bexar County. CEQ regulations do not require identification of the individual impacts of all past actions to determine the present impacts of past actions. The impacts of past actions are now part of the existing environment and are included in the affected environment described in **Sections 3.1** through **3.8**. However, recent past actions with ongoing impacts germane to this cumulative impacts analysis are discussed with present and reasonably foreseeable future actions.

Present and Reasonably Foreseeable Future Actions. Projects considered for cumulative impacts with the Proposed Action include the construction and operation of new facilities and infrastructure at JBSA-BUL, continued private sector development throughout northern Bexar County, and off-installation road improvements. A brief discussion of these types of projects is as follows:

Construction and operation of new facilities and infrastructure at JBSA-BUL. The 502 ABW proposes to construct and operate various new facilities and infrastructure at JBSA-BUL. Examples of such projects include constructing a new dining facility; constructing a new Defense Logistics Agency fuel dispensing facility immediately north of the proposed TEMF site; performing renovations to numerous existing buildings elsewhere on JBSA-BUL; repairing and repaving numerous roads including Camp Bullis Road, Wilderness Trail, and others; constructing a modern installation entry control point; and constructing a water line along Camp Bullis Road (USAF 2017c). Each of these projects is anticipated to occur during future years, and none of these projects would require permanent additional personnel at JBSA-BUL.

Continued private sector development. Numerous commercial, industrial, and residential development projects are proposed throughout northern Bexar County over the coming years. Examples of present and reasonably foreseeable projects near JBSA-BUL include the construction of Cornerstone Christian School on the east side of NW Military Highway between JBSA-BUL and Loop 1604, Emerus Baptist Emergency Hospital at the northwest corner of Loop 1604 and NW Military Highway, and North Rim Auto Mall at the southeast corner of I-10 and Camp Bullis Road (HDR 2017). These projects would increase the population of northern Bexar County and increase traffic on roadways adjacent to JBSA-BUL.

Off-installation road improvements. Texas Department of Transportation (TxDOT) has identified several road improvement projects in the vicinity of JBSA-BUL. These projects include the following:

- *I-10 Expansion.* TxDOT has begun construction on the expansion of I-10 from a four- to eight-lane expressway between La Cantera and Ralph Fair roads southwest of JBSA-BUL. This project would add two new general purpose lanes and two new high-occupancy vehicle lanes to accommodate growing traffic needs in the area. The project began in the summer of 2017 and will take up to 4 years to complete.
- *Loop 1604 Expansion.* TxDOT plans to add four new managed lanes to Loop 1604 from State Highway 16 to US Highway 281 south of JBSA-BUL. Construction is expected to begin in 2020. A turnaround is proposed for Loop 1604 at NW Military Highway and is tentatively scheduled for 2027.
- *NW Military Highway Improvements.* Traffic signal improvements, lane reconfigurations and extensions, and installation of safety lighting are proposed to begin in September 2018 at the interchange of NW Military Highway and Loop 1604. A two-way left turn lane, bike lanes, and sidewalks would be constructed on NW Military Highway from south of Loop 1604 to Huebner Road. Construction of this project is expected to begin in November 2019. Finally, NW Military Highway would be expanded from two to four lanes with raised medians or center turn lanes, bike lanes, and sidewalks from 1 mile

north of Loop 1604 to Loop 1604. Construction of this project is expected to begin in November 2020 (HDR 2017).

4.2 Cumulative Impacts on Resources

The following analysis examines the cumulative impacts on the environment that would result from the incremental impacts of the Proposed Action in addition to other past, present, and reasonably foreseeable future actions. This analysis assesses the potential for an overlap of impacts with respect to project schedules or affected areas. This section presents a qualitative analysis of the cumulative impacts.

Air Quality. Short-term, minor, adverse cumulative impacts on air quality would occur from the activities associated with the Proposed Action when combined with the cumulative projects. Criteria pollutant and GHG emissions during project construction would occur. Air emissions from the Proposed Action would be below the *de minimis* threshold surrogate of 100 tpy of each pollutant. Based on the relative sizes of the projects, criteria pollutant emissions generated from the cumulative projects would also not be expected to exceed criteria thresholds. The limited annual emission of GHGs from the Proposed Action and cumulative projects would not meaningfully contribute to the potential effects of global climate change. Therefore, no significant cumulative impacts on air quality would occur.

Biological Resources. Short- and long-term, minor, adverse cumulative impacts would occur on vegetation, wildlife, state-listed protected species, migratory birds, and the associated habitats from construction, demolition, and operations associated with the Proposed Action when combined with cumulative projects. Construction would result in the permanent removal of existing vegetation; however, the Proposed Action and cumulative projects would be expected to remove only a small percentage of similar habitats in the region. Construction would also result in temporary noise that would cause short-term, cumulative impacts on wildlife, including state-listed protected species and migratory birds; however, wildlife are likely habituated to noise because of the projects' proximity to existing roads. Long-term cumulative impacts on wildlife would occur from the permanent loss of habitat; however, wildlife would be able to use adjacent habitat that is readily available. Additionally, injury or mortality of small, less-mobile terrestrial species (e.g., reptiles, rodents, small mammals) could occur from direct physical impact (e.g., vehicular traffic, construction and demolition equipment), particularly because of the expansion of roadways; although wildlife in the area are likely habituated to vehicular traffic. As a result, population-level impacts would not occur. No impacts on federally listed species would occur from the Proposed Action, but the cumulative projects could have negligible to minor, adverse impacts on federally listed species depending on the siting of facilities.

Cultural Resources. Ground-disturbing activities associated with Proposed Action and cumulative projects would have the potential to impact undocumented cultural resources such as buried archaeological sites, potentially resulting in short-term, negligible, adverse cumulative impacts. Should undocumented archaeological deposits, Native American graves, lost historic cemeteries, or human remains be discovered during any activity, the activity would be immediately halted and consultation with the appropriate preservation officer would occur. If the

unexpected discovery were to occur on JBSA-BUL, the installation would follow the provisions for unanticipated discoveries specified in the Integrated Cultural Resources Management Plan.

Geological Resources. Short- and long-term, minor, adverse cumulative impacts on geological resources would occur from ground-disturbing activities associated with the Proposed Action when combined with cumulative projects. Site preparation and earthmoving associated with construction and demolition would excavate soils and expose rock materials, temporarily removing vegetation in some areas and potentially exposing soils to erosion. Soil productivity would decline in disturbed areas and be eliminated in areas within the footprint of roadways or structures. An increase in impervious surfaces would reduce the amount of area for stormwater to infiltrate soil and increase stormwater runoff. In general, accelerated soil erosion would be minimized by designing facilities while considering any soil limitations, employing construction and stabilization techniques appropriate for the soil and climate, and implementing temporary and permanent erosion control measures. BMPs could include installing silt fencing and sediment traps, applying water to disturbed soil, and revegetating disturbed areas as soon as possible after the disturbance, as appropriate. Therefore, impacts on soils would be minor and localized to the construction area.

Hazardous Materials and Wastes. Short-term, minor, adverse cumulative impacts from the use of hazardous materials and the generation of hazardous wastes would occur during construction associated with the Proposed Action when combined with cumulative projects. All hazardous materials, petroleum products, and hazardous wastes supporting construction would be contained and stored appropriately in accordance with the applicable regulations (e.g., JBSA Hazardous Waste Management Plan, state and local requirements) to minimize the potential for releases. The cumulative projects are not expected to have significant impacts on special hazards or any impact on existing environmental contamination sites. Therefore, no significant cumulative adverse impacts from hazardous materials and wastes would occur.

Noise. Short-term, minor, adverse cumulative impacts on the ambient noise environment would occur from construction associated with the Proposed Action when combined with cumulative projects. Noise from construction equipment and traffic would be temporary and last only for the duration of construction. Additionally, because JBSA-BUL is an active military installation that supports aircraft, live-fire weapons, and explosives training, the temporary increases in construction noise would be a fraction of the noise experienced routinely on and near the installation.

Noise generated from the cumulative projects would be additive to the noise generated from the Proposed Action as well as the existing noise environment. This cumulative noise has the potential to periodically annoy nearby residents, resulting in minor cumulative impacts. The added noise levels would not violate applicable federal, state, or local noise regulations or create appreciable areas of incompatible land use off-installation; therefore, the Proposed Action and the cumulative projects would not be expected to result in significant cumulative impacts on noise.

Safety. Short-term, minor, adverse cumulative impacts on safety would occur during construction associated with the Proposed Action when combined with cumulative projects. Construction poses an inherent risk of accidents to workers, but this level of risk would be

managed by adherence to established OSHA, USEPA, DoD, and USAF safety regulations, as applicable. Construction contractors would establish and maintain health and safety programs for their workers. Construction workers would be required to wear personal protective equipment such as ear protection, steel-toed boots, hard hats, gloves, and other appropriate safety gear. Work areas would be fenced and appropriately marked with signs to prevent trespassing.

Long-term, minor, beneficial cumulative impacts on safety would occur from the use of the proposed TEMF and cumulative projects. The cumulative projects, such as the proposed entry control point, would comply with the latest UFCs; therefore, personnel currently working in outdated facilities would no longer be exposed to the inadequacies and associated safety hazards of the existing structures. Personnel would continue to follow all appropriate OSHA, USEPA, DoD, and USAF safety regulations for a safe working environment. Additionally, improved traffic flow on the regional highways from the cumulative projects would create a safer environment by reducing the potential for automobile accidents. Therefore, no significant cumulative adverse impacts on safety would occur.

Water Resources. Short- and long-term, minor, adverse cumulative impacts on water resources would occur from the Proposed Action when combined with the cumulative projects. The cumulative increase in impervious surfaces from the Proposed Action and cumulative projects would be considered a minor contribution in the context of the whole watershed, but could be noticeable on a more localized level. Increased impervious surfaces could result in a reduction of groundwater recharge rates and an increase in stormwater runoff volumes. BMPs, including erosion and stormwater controls, would be implemented to reduce the potential for erosion and the volume of stormwater. Furthermore, the Proposed Action and cumulative projects would occur within the Edwards Aquifer contributing and recharge zones; therefore, depending on the amount of ground disturbance, each project could require EAPP documentation to be prepared and submitted to TCEQ. The EAPP would outline BMPs that would be implemented and maintained both during and after construction. Therefore, no significant cumulative adverse impacts on water resources would occur.

4.3 Irreversible and Irretrievable Commitment of Resources

NEPA requires the identification of any irreversible and irretrievable commitment of resources that would be involved in the implementation of the Proposed Action. Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that the uses of these resources could have on future generations. Irreversible impacts primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable timeframe. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the Proposed Action (e.g., extinction of a threatened or endangered species, disturbance of a cultural site).

Construction associated with the Proposed Action would require consumption of materials typically associated with exterior and interior construction (e.g., concrete, wiring, piping, insulation, windows). Recycled materials would be used to the extent practicable, and the amount of these materials used would not significantly decrease the availability of the

resources. Small amounts of nonrenewable resources would be used; however, these amounts would not be appreciable and would not affect the availability of these resources. The Proposed Action would also require consumption of fuels, including some that would be nonrenewable resources (e.g., petroleum-based fuel products for vehicles and equipment).

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This EA has been prepared by HDR under the direction of USAF personnel. The individuals who contributed to the preparation of this document are as follows.

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A

Agency and Native American Tribal Coordination and Consultation and Public Involvement Materials

Scoping Distribution List and Correspondence

The Description of the Proposed Action and Alternatives (i.e., **Sections 1** and **2** of this EA) was made available to the federal, state, and local government agencies listed below for a 30-day comment period to develop the scope for this EA. The Native American tribes listed below were notified by letter of the Proposed Action and also given 30 days to provide comments. The comment period for the government agencies began on March 6, 2017, and the comment period for the Native American tribes began on June 6, 2017. Signed examples of both distribution letters and all comments received are on the following pages.

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Example Scoping Letter sent to Federal, State, and Local Government Agencies

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

1 March 2017

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Diane Bartlett, P.E.
Floodplain Administrator
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Dear Ms. Bartlett

Joint Base San Antonio (JBSA) has initiated the development of an environmental assessment (EA) to evaluate the potential environmental impacts from replacing the Tactical Equipment Maintenance Facility (TEMF) located at JBSA-Bullis (JBSA-BUL). This project would support the construction of a new TEMF.

The purpose of the Proposed Action is to provide JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage requirements of JBSA-BUL and complies with all applicable Unified Facility Criteria. The Proposed Action is needed because the existing TEMF at JBSA-BUL is outdated and undersized and lacks standard shop components and sufficient functional space. As a result, personnel work in substandard conditions that barely meet customer needs, create safety concerns, and impair productivity, morale, and mission training. The attached Description of the Proposed Action and Alternatives (DOPAA) includes a preferred location and an alternate location for the new TEMF.

In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation and comments on this Proposed Action. Your comments will help develop the breadth and depth of our environmental review in the forthcoming EA. The U.S. Air Force anticipates publishing the Draft EA during early summer 2017 and the Final EA by fall 2017. The Draft EA will be distributed to your office when completed.

Please provide your written questions or comments on the attached DOPAA at your earliest convenience but no later than 30 days from receipt of this document. Address all questions and comments to Mr. Jock Flores, 502 CES/CEIE, 1555 Gott St, JBSA Lackland TX 78236-5645. Comments are encouraged to be sent by email to jock.flores@us.af.mil.

For questions, please email or call Mr. Flores at (210) 671-3944.

Sincerely

Edward L Roberson

Digitally signed by ROBERSON.EDWARD.LEWIS.1129411636
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=ROBERSON.EDWARD.LEWIS.1129411636
Date: 2017.03.02 17:06:42 -06'00'

EDWARD L. ROBERSON, P.E.

Attachment:
Description of Proposed Action and Alternatives Addressing Replacement of the Tactical Maintenance Facility on Joint Base San Antonio – Bullis, January 2017

Example Scoping Letter sent to Native American Tribes

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

Ms. Brenda Roesch, GS-15
Joint Base Civil Engineer
502 CES/CD
1555 Gott Street
JBSA Lackland, TX 78236-5645

Mr. Russell Martin
President
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, Oklahoma 74653-4449

Dear President Martin:

The U.S. Air Force and the 502 Air Base Wing have initiated the development of an environmental assessment (EA), as required by the National Environmental Policy Act, to evaluate the potential environmental and socioeconomic impacts from replacing the tactical equipment maintenance facility (TEMF) and undertaking connected actions at Joint Base San Antonio-Bullis (JBSA-BUL) in Bexar County, Texas (i.e., the Proposed Action).

The purpose of this Proposed Action is to provide JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage requirements of JBSA-BUL and complies with all applicable Unified Facility Criteria (UFC). The Proposed Action is needed because the existing TEMF at JBSA-BUL is outdated and undersized and lacks standard shop components and sufficient functional space. As a result, personnel work in substandard conditions that barely meet customer needs; present safety concerns; and impair productivity, morale, and mission training.

The proposed TEMF would be constructed to the southeast of the intersection of Camp Bullis Road and Wilderness Trail on an empty field. It would include the TEMF building with a 35-ton overhead crane, concrete hardstand for parking tactical equipment, privately owned vehicle parking, three storage buildings, and supporting infrastructure. The Proposed Action also includes connected actions such as constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; and replacing the low water crossing on Camp Bullis Road with a culvert system. **Figure 1** shows the proposed layout for the TEMF and connected actions.

After completing construction in late 2019, all personnel and tactical equipment currently assigned to the existing TEMF would transfer to the proposed TEMF. No change in the number of personnel or tactical equipment assigned to JBSA-BUL would occur. Shortly thereafter, demolition of the existing TEMF would commence and include Building 6104, Building 6106,

the portable buildings and connexes on the premise, all paved tactical equipment parking areas, and associated utilities.

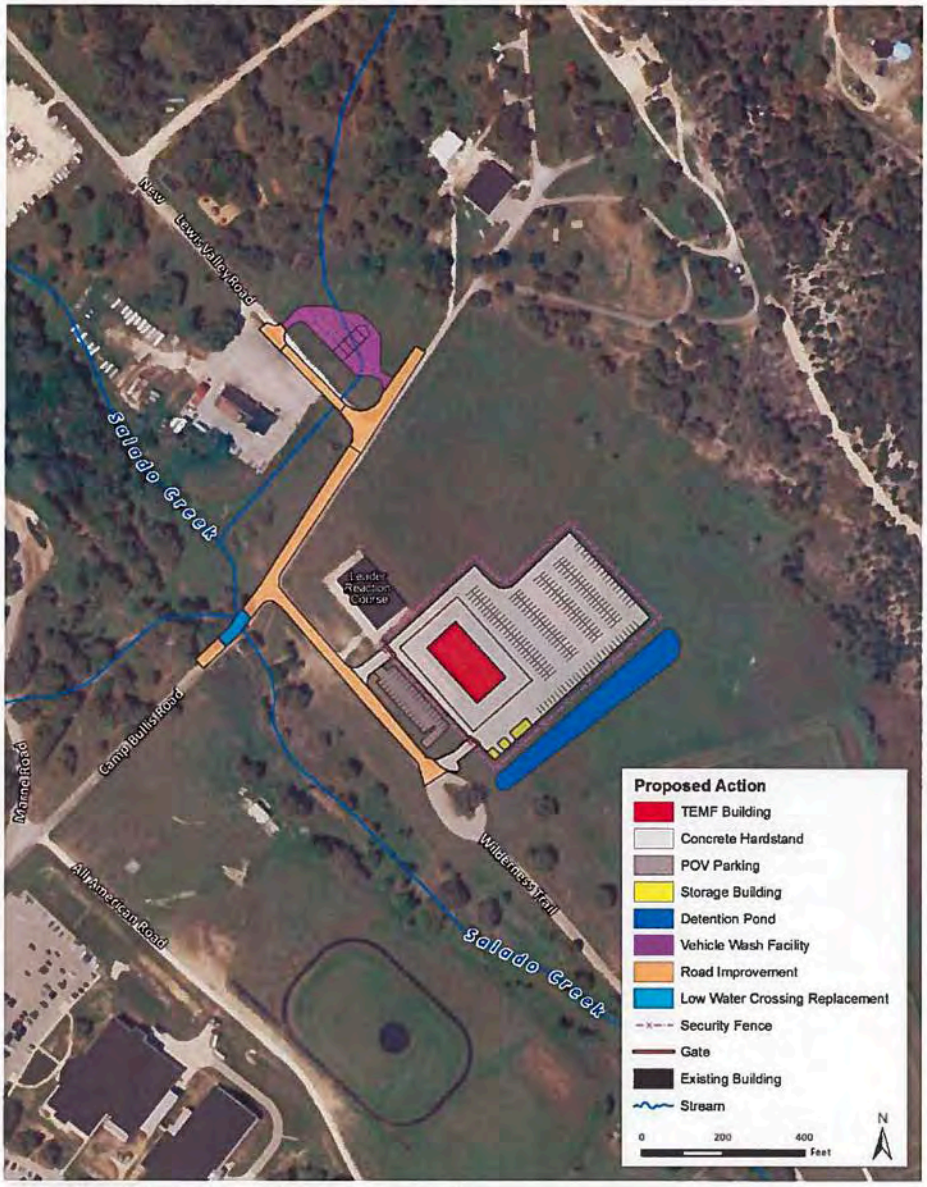
The EA will analyze in detail the Proposed Action and No Action Alternative. The No Action Alternative is the continuation of current practices in that the existing TEMF would continue to operate and no construction or demolition would occur. The connected actions associated with the proposed TEMF would also not occur.

Pursuant to Section 106 of the National Historic Preservation Act, 36 Code of Federal Regulations § 800, and Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments,* we request your participation and comments on this Proposed Action and its alternative. Your comments will help develop the scope of our environmental review in the EA. The U.S. Air Force anticipates publishing the Draft EA during late spring 2017 and the Final EA by fall 2017. The Draft EA will be distributed to your office when completed.

Please provide your written questions or comments at your earliest convenience, but no later than 30 days from the date of this correspondence. Address all questions and comments to Mr. Jock Flores, 502 CES/CENPL, 1555 Gott Street, JBSA-Lackland, Texas, 78236-5645. Comments are encouraged to be sent by email to jock.flores@us.af.mil. Identify any comments as for the TEMF EA. For questions, please email or call Mr. Flores at (210) 671-3944.

Sincerely,

BRENDA ROESCH
Joint Base Civil Engineer



Data Sources: Basemap (ESRI Streetmap 2010); Camp Bullis Installation Boundary (Camp Bullis GIS 2016).

From U.S. Fish and Wildlife Service

United States Department of the Interior

FISH AND WILDLIFE SERVICE
10711 Burnet Road, Suite 200
Austin, Texas 78758
512 490-0057
FAX 490-0974

APR – 5 2017

In Reply Refer to:
02ETAU00-2017-CPA-0003

Mr. Jock Flores
502 CES/CEIE
1555 Gott Street
JBSA Lackland, Texas 78236-5645

Dear Mr. Flores,

This responds to your request dated March 1, 2017 concerning the development of an Environmental Assessment (EA) to evaluate potential impacts from construction of a Tactical Equipment Maintenance Facility (TEMF) at Joint Base San Antonio-Bullis (JBSA-BUL). Thank you for your invitation to comment on the proposed action of construction and replacement of the TEMF at JBSA-BUL and alternatives to the action. The purpose of the proposed action is to provide JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage requirements of JBSA-BUL and complies with all applicable Unified Facility Criteria. We are providing our response in accordance with the National Environmental Policy Act (NEPA).

After reviewing the description of the Proposed Action and Alternatives the U.S. Fish and Wildlife Service (Service) concurs with the proposed action brought forward for review. The Department of the Airforce analyzed seven alternatives to the proposed action; none of which met selection standards and were not brought forward for review. Based on the information presented in the description of the proposed action and alternatives (Figure 2-1) the proposed action would be constructed on mostly flat area with maintained and unmaintained grass and scrub vegetation, thus avoiding the need to remove woody vegetation and avoiding potential destruction of habitat for breeding and nesting birds to include threatened and endangered species. Due to the relative lack of habitat in the proposed action area, the likelihood of significant adverse impacts to threatened or endangered species is unlikely to occur.

The Service has statutory authority and responsibility for enforcing the Migratory Bird Treaty Act (MBTA) (16 U.S.C. 703-712). Therefore, the Department of the Airforce should consider that JBSA-BUL is within a major migratory flyway for migratory birds. Consideration should be given as to when removal of vegetation in the proposed action area should occur. Vegetation removal should be as minimal as possible, and occur outside of the typical bird breeding and nesting season (March 15 – September 15) in order to avoid and minimize impacts to year-round and seasonal migrants.

TAKE PRIDE IN AMERICA

Thank you for the opportunity to comment and your continued efforts to address any impacts the proposed project may have on the human and natural environment.

If you have questions, comments, or need additional information, please contact Jacob Ogdee, at 512-490-0057, ext. 243, or at Jacob_ogdee@fws.gov.

Sincerely,

Adam Zerrenner
Field Supervisor

From Comanche Nation

COMANCHE NATION

Department of the Air Force-502D Air Base Wing-Joint Base San Antonio
Attn: Mr. Jock Flores
1555 Gott Street
Texas 78236-5645

August 23, 2017

Re: 502D Air Base Wing, have Initiated the Development of an Environmental Assessment (EA) to Evaluate from Replacing the Tactical Equipment Maintenance Facility (TEMF)

Dear Mr. Flores :

In response to your request, the above reference project has been reviewed by staff of this office to identify areas that may potentially contain prehistoric or historic archeological materials. The location of your project has been cross referenced with the Comanche Nation site files, where an indication of "***No Properties***" have been identified. (IAW 36 CFR 800.4(d)(1)).

Please contact this office at (580) 595-9960/9618 if you require additional information on this project.

This review is performed in order to identify and preserve the Comanche Nation and State cultural heritage, in conjunction with the State Historic Preservation Office.

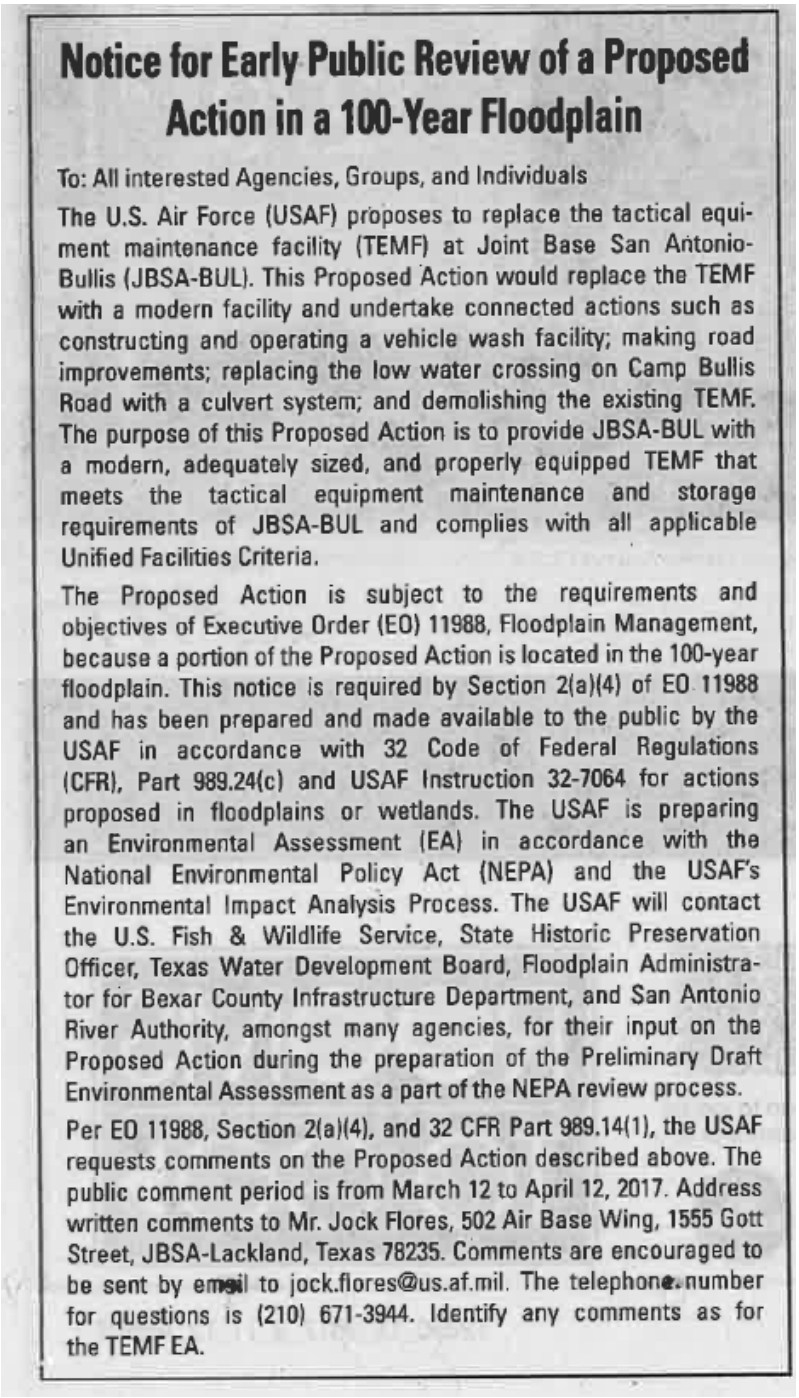
Regards

Comanche Nation Historic Preservation Office
Theodore E. Villicana, Technician
#6 SW "D" Avenue ,Suite C
Lawton, OK. 73502

COMANCHE NATION P.O. BOX 908 / LAWTON, OK 73502
PHONE: 580-492-4988 TOLL FREE:1-877-492-4988

Notice for Early Public Review

A Notice for Early Public Review of the Proposed Action was published in the *San Antonio Express-News* on Sunday, March 12, 2017, because of potential impacts within the 100-year floodplain. The notice, as it appeared in the newspaper, is below. No public comments were received from this notice.



Notice for Early Public Review of a Proposed Action in a 100-Year Floodplain

To: All interested Agencies, Groups, and Individuals

The U.S. Air Force (USAF) proposes to replace the tactical equipment maintenance facility (TEMF) at Joint Base San Antonio-Bullis (JBSA-BUL). This Proposed Action would replace the TEMF with a modern facility and undertake connected actions such as constructing and operating a vehicle wash facility; making road improvements; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF. The purpose of this Proposed Action is to provide JBSA-BUL with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage requirements of JBSA-BUL and complies with all applicable Unified Facilities Criteria.

The Proposed Action is subject to the requirements and objectives of Executive Order (EO) 11988, Floodplain Management, because a portion of the Proposed Action is located in the 100-year floodplain. This notice is required by Section 2(a)(4) of EO 11988 and has been prepared and made available to the public by the USAF in accordance with 32 Code of Federal Regulations (CFR), Part 989.24(c) and USAF Instruction 32-7064 for actions proposed in floodplains or wetlands. The USAF is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) and the USAF's Environmental Impact Analysis Process. The USAF will contact the U.S. Fish & Wildlife Service, State Historic Preservation Officer, Texas Water Development Board, Floodplain Administrator for Bexar County Infrastructure Department, and San Antonio River Authority, amongst many agencies, for their input on the Proposed Action during the preparation of the Preliminary Draft Environmental Assessment as a part of the NEPA review process.

Per EO 11988, Section 2(a)(4), and 32 CFR Part 989.14(1), the USAF requests comments on the Proposed Action described above. The public comment period is from March 12 to April 12, 2017. Address written comments to Mr. Jock Flores, 502 Air Base Wing, 1555 Gott Street, JBSA-Lackland, Texas 78235. Comments are encouraged to be sent by email to jock.flores@us.af.mil. The telephone number for questions is (210) 671-3944. Identify any comments as for the TEMF EA.

Draft EA and Draft FONSI/FONPA Distribution List and Correspondence

This Draft EA and a Draft FONSI/FONPA were made available to the federal, state, and local government agencies and Native American tribes listed below for a 30-day comment period. The comment period for the government agencies began on September 15, 2017, and the comment period for the Native American tribes will begin in the near future. Signed examples of the distribution letters are on the following pages. Comments received will be included on the following pages.

Federal Agencies

Ron Curry, Administrator
USEPA Region 6
1445 Ross Avenue, Suite 1200
Dallas, TX 75202

Adam Zerrenner, Field Supervisor
U.S. Fish and Wildlife Service
10711 Burnet Road, Suite 200
Austin, TX 78758

Stephen Brooks
U.S. Army Corps of Engineers
Regulatory Branch, Permit Section
Attn: CESWF-PER-R
819 Taylor Street, Room 3A37
Fort Worth, TX 76102

Ross Richardson, Chief
Floodplain Management and Insurance Branch
Federal Emergency Management Agency
800 North Loop 288
Denton, TX 76209-3698

State Agencies

Richard A. Hyde, Executive Director
Office of Permitting and Registration
Texas Commission on Environmental Quality
MC 122, P.O. Box 13087
Austin, TX 78711-3087

Julie Wicker, Program Supervisor
Ecosystem/Habitat Assessment Branch
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744-3291

Michael Segner, CFM
NFIP State Coordinator
Texas Water Development Board
1700 Congress Avenue
Austin, TX 78711

NEPA Coordinator
Texas Commission on Environmental Quality
P.O. Box 13087
Austin, TX 78711-3087

Local Agencies

Tiffany Harris
Community Relations Coordinator
Alamo Area Council of Governments
8700 Tesoro Drive, Suite 700
San Antonio, TX 78217

John E. Cantu
Environmental Manager
Municipal Plaza Building
114 W. Commerce, 2nd Floor
P.O. Box 839966
San Antonio, TX 78283-3966

Robert Brach
Bexar County Floodplain Administrator and
Development Services Manager
233 North Pecos-La Trinidad Street
Suite 420
San Antonio, TX 78207

Patrice Melancon
Manager, Watershed Engineering
Department
San Antonio River Authority
100 East Guenther Street
San Antonio, TX 78204

Native American Tribes

Mr. William Nelson Sr., Chairman
Comanche Nation
HC-32, Box 1720
584 NW Bingo Road
Lawton, OK 73502

Mr. Danny H. Breuninger, Sr., President
Mescalero Apache Tribe of the Mescalero
Reservation
P.O. Box 227
Mescalero, NM 88340

Terri Parton, President
Wichita and Affiliated Tribes
P.O. Box 729
Andarko, OK 73005

Mr. Russell Martin, President
Tonkawa Tribe of Indians of Oklahoma
1 Rush Buffalo Road
Tonkawa, OK 74653-4449

Distribution Letter for the Draft EA and Draft FONSI/FONPA sent to the U.S. Fish and Wildlife Service

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

29 August 2017

Mr. Edward L. Roberson, P.E.
Chief, Installation Management Flight
502 CES/CEI
1555 Gott Street
JBSA Lackland TX 78236-5645

Mr. Adam Zerrenner, Field Supervisor
U.S. Fish and Wildlife Service
10711 Burnet Road
Suite 200
Austin, TX 78758

Reference Number: 02ETAU00-2017-CPA-0003

Dear Mr. Zerrenner

U.S. Air Force (USAF) has prepared a Draft Environmental Assessment (EA) on its proposal to replace the Joint Base San Antonio-Bullis (JBSA-BUL) tactical equipment maintenance facility (TEMF) with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage needs of the installation and complies with all applicable Unified Facilities Criteria. The Draft EA analyzes the potential for significant environmental and socioeconomic impacts from the Proposed Action and No Action Alternative. The Proposed Action would also include the following connected actions: constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF. The analysis contained within the Draft EA indicates that no significant impacts would occur from the Proposed Action and a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) would be appropriate.

USAF has analyzed the effects and determined that the Proposed Action would have no effect on federally-listed threatened and endangered species because the Proposed Action would be consistent with the conservation measures outlined in the *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* (see Sections 3.2.2 and 3.2.3 of the Draft EA). Therefore, USAF requests concurrence from the U.S. Fish and Wildlife Service that the Proposed Action would have no effect on federally-listed species and that further consultation under Section 7 of the Endangered Species Act is not required.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416 with the same title, we request your participation and comments on the attached Draft EA and Draft FONSI/FONPA. Your comments will be considered in the development of the Final EA and USAF's decision on whether or not to sign the FONSI/FONPA.

Please provide your written questions or comments on the attached Draft EA and Draft FONSI/FONPA at your earliest convenience but no later than 30 days from receipt of this document. Address all questions and comments to Mr. Jock Flores, 502 CES/CEIE, 1555 Gott Street, JBSA Lackland TX 78236-5645. Comments are encouraged to be sent by email to jock.flores@us.af.mil.

For questions, please email or call Mr. Flores at (210) 671-3944.

Sincerely

Digitally signed by ROBERSON.EDWARD.LEWIS.1124911688
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=ROBERSON.EDWARD.LEWIS.1124911688
Date: 2017.09.01 12:48:08 -05'00'

EDWARD L. ROBERSON

Attachment:
Draft Environmental Assessment Addressing Replacement of the Tactical Equipment Maintenance Facility at Joint Base San Antonio-Bullis, Texas. August 2017. Including Draft FONSI/FONPA.

Example Distribution Letter for the Draft EA and Draft FONSI/FONPA sent to the other Federal, State, and Local Government Agencies

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

29 August 2017

Mr. Edward L. Roberson, P.E.
Chief, Installation Management Flight
502 CES/CEI
1555 Gott Street
JBSA Lackland TX 78236-5645

Mr. Robert Brach
Bexar County Floodplain Administrator and Development Services Manager
233 North Pecos-La Trinidad Street
Suite 420
San Antonio, TX 78207

Dear Mr. Brach

U.S. Air Force (USAF) has prepared a Draft Environmental Assessment (EA) on its proposal to replace the Joint Base San Antonio-Bullis (JBSA-BUL) tactical equipment maintenance facility (TEMF) with a modern, adequately sized, and properly equipped TEMF that meets the tactical equipment maintenance and storage needs of the installation and complies with all applicable Unified Facilities Criteria. The Draft EA analyzes the potential for significant environmental and socioeconomic impacts from the Proposed Action and No Action Alternative. The Proposed Action would also include the following connected actions: constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF. The analysis contained within the Draft EA indicates that no significant impacts would occur from the Proposed Action and a Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) would be appropriate.

In accordance with Executive Order (EO) 12372, *Intergovernmental Review of Federal Programs*, as amended by EO 12416 with the same title, we request your participation and comments on the attached Draft EA and Draft FONSI/FONPA. Your comments will be considered in the development of the Final EA and USAF's decision on whether or not to sign the FONSI/FONPA.

Please provide your written questions or comments on the attached Draft EA and Draft FONSI/FONPA at your earliest convenience but no later than 30 days from receipt of this document. Address all questions and comments to Mr. Jock Flores, 502 CES/CEIE, 1555 Gott Street, JBSA Lackland TX 78236-5645. Comments are encouraged to be sent by email to jock.flores@us.af.mil.

For questions, please email or call Mr. Flores at (210) 671-3944.

Sincerely

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Date: 2017.09.01 12:50:23 -05'00'

EDWARD L. ROBERSON

Attachment:
Draft Environmental Assessment Addressing Replacement of the Tactical Equipment Maintenance Facility at Joint Base San Antonio-Bullis, Texas. August 2017. Including Draft FONSI/FONPA.

Notice of Availability for Public Review of the Draft EA and Draft FONSI/FONPA

A NOA for public review of this Draft EA and a Draft FONSI/FONPA was published in the *San Antonio Express-News* on Sunday, September 17, 2017. The NOA is below. Public comments received will be included on the following pages.

Notice of Availability

Draft Environmental Assessment (EA) Addressing Replacement of the Tactical Equipment Maintenance Facility (TEMF) at Joint Base San Antonio-Bullis (JBSA-BUL), Texas

The U.S. Air Force (USAF) announces the availability of and invites public comments on the Draft EA evaluating the potential for significant environmental impacts from the construction and operation of a new TEMF at JBSA-BUL, Texas. Connected actions including constructing and operating a four-bay vehicle wash facility; making improvements to Camp Bullis Road, Wilderness Trail, and New Lewis Valley Road; replacing the low water crossing on Camp Bullis Road with a culvert system; and demolishing the existing TEMF are also evaluated in the Draft EA. The analysis contained in the EA indicates the Proposed Action would not have a significant impact on the environment and a Finding of No Significant Impact/Finding of No Practicable Alternative (FONSI/FONPA) would be appropriate.

USAF invites public participation through the solicitation of comments on the Draft EA and Draft FONSI/FONPA. Comments are invited and will be accepted for 30 days from the publication of this notice. The Draft EA and Draft FONSI/FONPA are available on the internet at http://www.jbsa.mil/Information/Environmental/. Hard copies also are available at the following library:

San Antonio Public Library
600 Soledad Street
San Antonio, TX 78205

Please provide written comments to Mr. Jock Flores, 502 CES/CENPL, 1555 Gott Street, JBSA Lackland, TX 78236. Comments are encouraged to be sent by email to jock.flores@us.af.mil. The telephone number for questions is (210) 671-3944. When submitting comments, please include your name and address and identify your comments as for the TEMF EA.

B

Air Quality Calculations

Air Emissions for the Joint Base San Antonio-Bullis (JBSA-BUL) Tactical Equipment Maintenace Facility (TEMF)

Construction Year	NO_x (tpy)	VOC (tpy)	CO (tpy)	SO_2 (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	CO_2e (tpy)
Combustion	3.574	0.668	2.581	0.009	0.158	0.158	773.543
Fugitive Dust	NA	NA	NA	NA	15.626	1.563	NA
Haul Truck On-Road	0.487	0.047	0.175	0.001	0.019	0.017	150.514
Construction Commuter	0.144	0.132	1.713	0.001	0.003	0.002	150.998
Total	***4.205***	***0.848***	***4.469***	***0.011***	***15.805***	***1.740***	***1,075.055***

Combustion Emissions

Combustion Emissions of VOC, NO_x, SO_2, CO, $PM_{2.5}$, $PM_{10,}$ and CO_2e due to Construction and Demolition

	Construction and Demolition Activities	Area Disturbed		Source
1.)	Construct Proposed TEMF Building	18,800	ft^2	Section 2.1.1 of EA
2.)	Construct Hardstand for Tactical Equipment Parking	176,300	ft^2	Section 2.1.1 of EA
3.)	Construct Asphalt-paved POV Parking	13,940	ft^2	Section 2.1.1 of EA
4.)	Construct Organization Storage Building	1,000	ft^2	Section 2.1.1 of EA
5.)	Construct POL Storage Building	840	ft^2	Section 2.1.1 of EA
6.)	Construct Hazardous Waste Storage Building	840	ft^2	Section 2.1.1 of EA
7.)	Construct Detention Pond	33,670	ft^2	Section 2.1.1 of EA
8.)	Construct Four-bay Vehicle Wash Facility	3,000	ft^2	Section 2.1.1 of EA
9.)	Construct Concrete Hardstand for Vehicle Wash Facility	22,500	ft^2	Section 2.1.1 of EA
10.)	Improve Camp Bullis Road (850 feet)	17,000	ft^2	Section 2.1.1 of EA
11.)	Improve Wilderness Trail (600 feet)	12,000	ft^2	Section 2.1.1 of EA
12.)	Improve New Lewis Valley Road (350 feet)	7,000	ft^2	Section 2.1.1 of EA
13.)	Replace Low Water Crossing on Camp Bullis Road	2,520	ft^2	Section 2.1.1 of EA
14.)	Clear Debris from Salado Creek (150 feet)	3,750	ft^2	Section 2.1.1 of EA
15.)	Demolish Building 6104	21,600	ft^2	Section 2.1.1 of EA
16.)	Demolish Building 6106	2,460	ft^2	Section 2.1.1 of EA
17.)	Demolish Paved Tactical Equipment Parking Areas	200,000	ft^2	Section 2.1.1 of EA

Total Building Construction Area:	24,480	ft^2	
	0.562	acres	
Total Building Demolition Area:	24,060	ft^2	
	0.552	acres	
Total Pavement Demolition Area:	238,520	ft^2	
	5.476	acres	
New Roadway and Pavement Construction Area	251,260	ft^2	
	5.768	acres	
Total Disturbed Area:	537,220	ft^2	
	12.333	acres	
Construction Duration:	12	months	
Annual Construction Activity:	264	days	Assumes 22 days per month.

All construction and demolition conservatively assumed to occur in one year.

Emission Factors Used for Construction Equipment

All emission factors are from the *Air Emissions Guide for Air Force Transitory Sources* , July 2016, Table 4-5. Page 57. These are valid for Calendar Year 2019.
Assumptions regarding the type and number of equipment are from Guide to Air Quality Assessment, SMAQMD, 2004 Table 3-1 unless otherwise noted.

Grading

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	CO_2e (lb/hr)
Bulldozer	1	1.695	0.223	0.839	0.002	0.068	0.068	239.588
Motor Grader	1	0.649	0.098	0.579	0.001	0.032	0.032	132.965
Water Truck	1	0.935	0.152	0.557	0.003	0.032	0.032	260.430
Total per 10 acres of activity per 8-hour day	3	26.232	3.784	15.800	0.048	1.056	1.056	5,063.864

Paving

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	CO_2e (lb/hr)
Paver	1	0.583	0.105	0.497	0.001	0.039	0.039	78.171
Roller	1	0.413	0.063	0.386	0.001	0.026	0.026	67.185
Truck	2	0.935	0.152	0.557	0.003	0.032	0.032	260.430
Total per 10 acres of activity per 8-hour day	4	22.928	3.776	15.976	0.064	1.032	1.032	5,329.728

Demolition

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	CO_2e (lb/hr)
Loader	1	0.527	0.080	0.444	0.001	0.027	0.027	108.792
Haul Truck	1	0.935	0.152	0.557	0.003	0.032	0.032	260.430
Total per 10 acres of activity per 8-hour day	2	11.696	1.856	8.008	0.032	0.472	0.472	2,953.776

Building Construction

Equipment[b]	No. Reqd.[a] per 10 acres	NO_x (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	CO_2e (lb/hr)
Stationary								
Generator Set	1	0.348	0.043	0.276	0.001	0.017	0.017	61.090
Industrial Saw	1	0.367	0.054	0.381	0.001	0.023	0.023	58.585
Welder	1	0.183	0.034	0.184	0.000	0.012	0.012	25.680
Mobile (non-road)								
Truck	1	0.935	0.152	0.557	0.003	0.032	0.032	260.430
Forklift	1	0.192	0.034	0.217	0.001	0.009	0.009	54.474
Crane	1	0.724	0.095	0.398	0.001	0.029	0.029	128.844
Total per 10 acres of activity per 8-hour day	6	21.992	3.296	16.104	0.056	0.976	0.976	4,712.824

Note: Footnotes for tables are on following page

Architectural Coatings

Equipment	No. Reqd.[a] per 10 acres	NO_x (lb/hr)	VOC (lb/hr)	CO (lb/hr)	SO_X (lb/hr)	PM_{10} (lb/hr)	$PM_{2.5}$ (lb/hr)	CO_2e (lb/hr)
Air Compressor	1	0.358	0.053	0.310	0.001	0.021	0.021	63.726
Total per 10 acres of activity per 8-hour day	1	2.864	0.424	2.480	0.008	0.168	0.168	509.808

a) The SMAQMD 2004 guidance suggests a default equipment fleet for each activity, assuming 10 acres of that activity, (e.g., 10 acres of grading, 10 acres of paving, etc.). The default equipment fleet is increased for each 10 acre increment in the size of the construction project. That is, a 26 acre project would round to 30 acres and the fleet size would be three times the default fleet for a 10 acre project.

b) Typical equipment fleet for building construction was not itemized in SMAQMD 2004 guidance. The equipment list above was assumed based on SMAQMD 1994 guidance.

PROJECT-SPECIFIC EMISSION FACTOR SUMMARY

Source	Equipment Multiplier*	Project-Specific Emission Factors (lb/day)						
		NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	2	52.464	7.568	31.600	0.096	2.112	2.112	10,127.728
Paving Equipment	1	22.928	3.776	15.976	0.064	1.032	1.032	5,329.728
Demolition Equipment	1	11.696	1.856	8.008	0.032	0.472	0.472	2,953.776
Building Construction	1	21.992	3.296	16.104	0.056	0.976	0.976	4,712.824
Air Compressor for Architectural Coating	1	2.864	0.424	2.480	0.008	0.168	0.168	509.808
Architectural Coating**			12.752					

*The equipment multiplier is an integer that represents units of 10 acres for purposes of estimating the number of equipment required for the project.

**Emission factor is from the evaporation of solvents during painting, per "Air Quality Thresholds of Significance", SMAQMD, 1994

Summary of Input Parameters

	Total Area (ft^2)	Total Area (acres)	Total Days	
Grading:	537,220	12.333	6	(from "Grading" worksheet)
Paving:	251,260	5.768	28	
Demolition:	24,060	0.552	28	
Building Construction:	24,480	0.562	264	
Architectural Coating	24,480	0.562	20	(per SMAQMD "Air Quality of Thresholds of Significance", 1994)

Total Project Emissions by Activity (lbs)

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Grading Equipment	314.784	45.408	189.600	0.576	12.672	12.672	60,766.368
Paving	641.984	105.728	447.328	1.792	28.896	28.896	149,232.384
Demolition	327.488	51.968	224.224	0.896	13.216	13.216	82,705.728
Building Construction	5,805.888	870.144	4,251.456	14.784	257.664	257.664	1,244,185.536
Architectural Coatings	57.280	263.511	49.600	0.160	3.360	3.360	10,196.160
Total Emissions (lbs):	**7,147.424**	**1,336.759**	**5,162.208**	**18.208**	**315.808**	**315.808**	**1,547,086.176**

Results: Total Project Annual Emission Rates

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2
Total Project Emissions (lbs)	7,147.424	1,336.759	5,162.208	18.208	315.808	315.808	1,547,086.176
Total Project Emissions (tons)	3.574	0.668	2.581	0.009	0.158	0.158	773.543

Construction Fugitive Dust Emissions

Construction Fugitive Dust Emission Factors

	Emission Factor	Units	Source
Demolition Activities	0.00042	lb PM_{10}/cubic foot	AFCEC 2016.
Grading, Excavating and Trenching.	0.220	ton PM_{10}/acre-month	AFCEC 2016.

$PM_{2.5}$ Emissions

$PM_{2.5}$ Multiplier	0.100	(10% of PM_{10} emissions assumed to be $PM_{2.5}$)	USEPA 2006

Control Efficiency for Grading, Excavating and Trenching Emissions	0.500	(assume 50% control efficiency for PM_{10} and $PM_{2.5}$ emissions)	USEPA 2006

Demolition (0.00042 lb PM_{10}/cubic foot)

Area of Buildings	24,060	square feet
Average Height of Buildings	15	feet

Grading, Excavating and Trenching (0.22 ton PM_{10}/acre-month)

Duration of Project	12	months
Area	11.781	acres

	Project Emissions (tons/year)	
	PM_{10}	**$PM_{2.5}$**
Demolition	0.076	0.008
Grading, Excavating and Trenching	15.550	1.555
Total	**15.626**	**1.563**

Construction Fugitive Dust Emission Factors

Demolition Emission Factor

0.00042 lb PM_{10}/cubic foot Source: AFCEC 2016

This emission factor is from AFCEC 2016, Section 4.3.1.1 and Equation 4-3.

Grading, Excavating and Trenching Emission Factor

0.220 ton PM_{10}/acre-month Source: AFCEC 2016

This emission factor is from AFCEC 2016, Section 4.3.1.2 and Equation 4-4.

$PM_{2.5}$ Multiplier **0.100**

$PM_{2.5}$ emissions are estimated by applying a particle size multiplier of 0.10 to PM_{10} emissions. This methodology is consistent with the procedures documents for the National Emission Inventory (USEPA 2006).

Control Efficiency for PM_{10} and $PM_{2.5}$ **0.50**

The USEPA National Emission Inventory documentation recommends a control efficiency of 50% for PM_{10} and $PM_{2.5}$ in PM nonattainment areas (USEPA 2006). Wetting controls will be applied during project construction.

References:

U.S. Environmental Protection Agency (USEPA). 2006. *Documentation for the Final 2002 Nonpoint Sector (Feb 06 version) National Emission Inventory for Criteria and Hazardous Air Pollutants.* Prepared for: Emissions Inventory and Analysis Group (C339-02) Air Quality Assessment Division Office of Air Quality Planning and Standards, United States Environmental Protection Agency. July 2006.

Air Force Civil Engineering Center (AFCEC). 2016. *Air Emissions Guide for Air Force Transitory Sources* , July 2016. Pages 42 and 43.

Haul Truck Emissions

Emissions from hauling excavation material, demolition materials, and construction supplies are estimated in this spreadsheet.

Emission Estimation Method:
Air Force Civil Engineering Center (AFCEC). 2016. *Air Emissions Guide for Air Force Mobile Sources. Methods for Estimating Emissions of Air Pollutants For Mobile Sources at U.S. Air Force Installations.* July 2016.

Assumptions:
Haul trucks carry 10 cubic yards of material per trip.
The average distance from the project site to the materials source is 15 miles; therefore, a haul truck will travel 30 miles round trip.
Estimated number of trips required by haul trucks = total amount of material/10 cubic yards per truck
Assumes soil would not need to be hauled to or from the site.

Amount of Building Materials =	8,160	cubic yards	Assumes 9 cubic feet of building material are needed per square foot of building space
Amount of Paving Material =	18,140	cubic yards	Assumes 1 cubic foot of pavement is needed per square foot of pavement construction. Additionally, 1 cubic foot of pavement debris is generated per square foot of pavement demolition.
Amount of Building Debris =	3,564	cubic yards	Assumes 4 cubic feet of demolition debris is generated per square foot of building space
Number of trucks required =	2,986	heavy duty diesel haul truck trips	
Miles per trip =	30	miles	

Heavy Duty Diesel Vehicle (HDDV) Average Emission Factors (grams/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
4.936	0.479	1.768	0.013	0.189	0.174	1524.069

Notes:
Construction assumed to occur in Calendar Year 2019.
Emission factors for all pollutants are from AFCEC 2016, Table 5-24, On-Road Vehicle Emissions Factors - 2019 for HDDV in Texas, 2019. Page 276.

HDDV Haul Truck Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
lbs	974.940	94.610	349.209	2.568	37.331	34.368	301,028.267
tons	0.487	0.047	0.175	0.001	0.019	0.017	150.514

Example Calculation: NO_x emissions (lbs) = miles per trip * number of trips * NO_x emission factor (g/mile) * lb/453.6 g

Construction Commuter Emissions

Emissions from construction workers commuting to the job site are estimated in this spreadsheet.

Assumptions:

The average round-trip commute for a construction worker =	40	miles
Number of construction days =	264	days
Number of construction workers (daily) =	30	people

Light-Duty Trucks (Gasoline Powered) Emission Factors for Year 2019 (grams/mile)

NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
0.411	**0.379**	**4.906**	**0.003**	**0.008**	**0.007**	**432.402**

Source: Air Force Civil Engineering Center (AFCEC). 2016. A*ir Emissions Guide for Air Force Mobile Sources. Methods for Estimating Emissions of Air Pollutants For Mobile Sources at U.S. Air Force Installations.* July 2016. Table 5-24, On-Road Vehicle Emissions Factors - 2019 for LDGT in Texas, 2019. Page 276.

Construction Commuter Emissions

	NO_x	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
lbs	**287.048**	**264.698**	**3,426.413**	**2.095**	**5.587**	**4.889**	**301,995.048**
tons	**0.144**	**0.132**	**1.713**	**0.001**	**0.003**	**0.002**	**150.998**

Example Calculation: NO_x emissions (lbs) = miles/day * NO_x emission factor (grams/mile) * number of construction days * number of workers ÷ 453.56 grams/lb

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