CURTIS E. LEMAY CENTER
FOR DOCTRINE DEVELOPMENT AND EDUCATION

ANNEX 3-34 ENGINEER OPERATIONS

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ANNEX 3-34 ENGINEER OPERATIONS

INTRODUCTION TO ENGINEER OPERATIONS

Last Updated: 30 December 2014

Air Force civil engineer forces establish, operate, sustain, and protect installations as power projection platforms that enable Air Force and other supported commander core capabilities through engineering and emergency response services across the full mission spectrum. Air Force forces generally operate from fixed bases, yet are mobile enough to project combat airpower worldwide from both enduring and non-enduring bases. To support this concept, Air Force civil engineers organize, train, and equip to rapidly respond as part of the air expeditionary task force (AETF) performing comparable functions in peacetime and during contingencies. Engineers enable combat forces to operate across the range of military operations.

Engineer operations are increasingly being conducted in joint, interagency, and multinational environments. The forces involved require operating and maintaining both built and natural environments, including bases, facilities, infrastructure, and lines of communications for sustainment. Air Force civil engineers possess distinctive skills to provide engineering support throughout all phases of military operations, from airbase opening, establishing operating locations, receiving and bedding down forces, sustaining operating locations, recovering operating locations, to closing operating locations.

The importance of engineers arriving at a deployed location before aircraft has been stressed since World War II. A 1946 report of a board of officers on aviation engineers stated, “In any new theater of operations aviation engineers must arrive early in the theater to ensure the prompt build-up of combat units.”

Col Fritz Stehling, the Pacific Air Forces Deputy Chief of Staff for Civil Engineering, summarized this in 1967 during the Vietnam War: “The most obvious and repeated, yet often overlooked, lesson learned, is that we can deploy airplanes much faster than we can build air bases.”

ENGINEERING: THE AIRMAN'S PERSPECTIVE

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Air Force civil engineers organize for war during peacetime, train as organic units, and deploy fully capable of rapidly establishing airbases to support the projection of airpower.

Airpower is more than aircraft, missiles, or weapons. It is the coordinated activities of elements within the warfare system: the weapon system, the weapon support system, and the basing system. The weapon system comprises the delivery vehicle, weapon, and operator. The weapon support system directly supports the weapon system. The basing system includes the infrastructure, people, materiel, and information needed to sustain operations for both the weapon and the weapon support system. Examples of expeditionary basing include bare bases, main operating bases, joint operating bases, forward operating locations, combat outposts, and cooperative security locations. There are differences in how the Services view expeditionary bases. The Air Force views an expeditionary base as an airfield, described as an area prepared to accommodate (including buildings, installations, and equipment), landing and takeoff of aircraft. The Army refers to these types of bases collectively as base camps: an evolving military facility that supports military operations of a deployed unit and provides the necessary support and services for sustained operations. Regardless of Service Component lead, expeditionary bases serve varying purposes, may be different sizes, and are built using different standards based on factors such as the mission, anticipated life span, and expected population. At the heart of the basing system is the installation itself.

All Services provide capability to establish and maintain bases. However, each Service maintains core engineering capabilities stemming from its traditional roles to meet specific operational needs. Air Force civil engineers have expertise in providing close support to conventional and unconventional forces while maneuvering; similar to Army and Marine engineer close support to ground forces. Furthermore, civil engineers eliminate obstacles to continuing airpower operations through rapid repair of damaged airfields, or construction of expeditionary landing surfaces; employ obstacles to deny enemy freedom of maneuver through denial of potential enemy airfields; and construct protective structures to counter effects of direct and indirect weapons through expeditionary hardening. Similarly, Army and Marine engineers train extensively on combat engineering functions to provide close support to ground forces. They focus on eliminating obstacles to maneuver, employing obstacles to deny enemy freedom of maneuver, and constructing protective structures to counter effects of direct and indirect weapons.

Air Force engineers possess organic general engineering capabilities involving the planning, establishing, sustaining, and closing of facilities and infrastructure on military installations that support the operation of airpower assets. Furthermore, the experience gained from performing these functions at home station locations, when complemented with specific training in the employment of contingency equipment, adequately prepares Air Force engineers for the demands of contingency base operations in the expeditionary environment.

Unlike the Army and Navy, who provide home station base support primarily through a mixture of contracts and civilian employees, with their wartime combat service support forces residing primarily in the Reserve Component, the Air Force embeds military engineer manpower within the home station work force. This leverages engineer capacity for peacetime use, rather than keeping engineers as a "force-in-waiting" for the next war. Providing engineer capability in this manner can be viewed as a force multiplier for many different reasons. Mixing military and civilian personnel creates an environment that can leverage technical expertise and experience of long-term civilians to train military engineer forces, while simultaneously accomplishing the home station mission. Furthermore, when military expeditionary mission requirements increase, the cadre of engineer civilians can, with some contract augmentation and at a reduced level of service, support the minimum essential workload remaining at home station installations. Lastly, the Air Force does not have to maintain a completely separate combat service support force structure to support expeditionary missions, while also resourcing a home station work force. By mixing the two force structures, the Air Force gains the "benefit" of peacetime base support from the combat service support forces-in-waiting.

For more information on Air Force Expeditionary Engineering see the AIR FORCE CIVIL ENGINEER CENTER website.

Contested Environment

The proliferation of affordable, advanced stand-off weaponry indicates a growing concern in contested environment (formerly known as Anti-Access/Area Denial [A2/AD]) strategies to deter US military involvement. Operating in contested environments challenges freedom of movement and strategic agility because larger threat radius of stand-off weapons will hold more bases at risk over greater distances. The Air Force should address which enduring locations and contingency bases outside the operational area (as defined by the Joint Task Force Commander) are potential high threat areas subject to enemy attacks. Emerging joint concepts such as rapid aggregation and mission command portend a doctrinal shift in the differences between Combat Engineering and General Engineering. If Combat Engineering is defined by close support of maneuver forces in operations, then it stands to reason that Air Force civil engineers supporting operational maneuver of air and space power from bases operating in contested environments will be providing Combat Engineering support. The traditional approach to defining joint engineering should adapt to meet the challenges faced in contested environments.

ENGINEER SUPPORT

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Engineer capabilities are a significant force multiplier for a commander of Air Force forces, joint force commander, and combatant commander to meet mission objectives. These capabilities are grouped into categories: Engineering, Installations Support, and Logistics Services to achieve objectives at strategic, operational, and tactical warfare levels. From the Air Force engineer's perspective, installation support and logistics services categories are at the same level as engineering. These categories work together to form the foundation for Air Force engineer doctrine.

ENGINEER FUNCTIONS

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In joint and Air Force operations, engineering functions are categories of related engineer capabilities and activities that are grouped together to help commanders integrate, synchronize, and direct engineer operations. These functions fall into three basic groups: general engineering, combat engineering, and geospatial engineering. Following are descriptions of each of these functions:

General Engineering consists of those capabilities other than combat engineering used to modify, maintain, and protect the physical environment. Examples include construction, repair, maintenance, and operation of infrastructure, facilities, lines of communications, and bases; airfield damage repair (ADR); terrain modification and repair; and selected explosive hazard activities. General engineering provides the means to develop installations to project airpower. It can occur under combat conditions but differs from combat engineering in that it is not in support of the maneuver of forces, be it in the air or land domain. General engineering focuses on rapidly responding to establish, sustain, and recover airbases, conducting ADR as needed. These types of activities are usually required during initial stages of major operations when base infrastructure is unavailable or inadequate to support the commander Air Force forces (COMAFFOR) in achieving the joint force commander's objectives. Engineering tasks are time consuming, requiring centralized planning and control to effectively manage limited resources. Commanders may employ a combination of military engineers, civil service, contractors, multinational engineers, and host nation personnel to fulfill engineer requirements. Although the nature of some tasks or the threat of violence in an operational area may require military engineers, once the area begins to stabilize the tasks can be performed using multiple available resources. For more detailed information on general engineer capabilities, see Appendix B.

Combat Engineering is defined as those engineering capabilities and activities that support the maneuver of land combat forces and that require close support to those forces. It consists of mobility, countermobility, and survivability operations. The primary difference between combat engineering and general engineering is combat engineering's requirement for close support to land combat forces and its focus on mobility/maneuver versus supporting base and mission operations from fixed locations. This should not be confused with "engineering under combat conditions."

Although Air Force civil engineers are not specifically organized, trained, and equipped to conduct combat engineering, their inherent skills are used to conduct tasks to support the installation and are in close support of Air Force forces maneuvering within the operational environment. For example, engineers support mobility operations by

removal and demolition of obstructions on captured airfields. Engineers can also enhance mobility by establishing and recovering airfields and forward operating bases, providing the COMAFFOR with additional options of maneuver and flexibility. In support of countermobility, engineers emplace obstacles to achieve standoff, and work with Security Forces personnel to create obstacles to funnel enemy forces into firing zones that support integrated defense. To enhance base survivability, engineers build aircraft revetments; construct fighting positions and watch towers; reinforce overhead protection of key facilities; harden critical infrastructure; recover aircraft; and provide fire emergency services (FES), explosive ordnance disposal (EOD), and emergency management (EM) capabilities.

Geospatial Engineering contributes to a clear understanding of the physical environment by performing tasks that provide information and services to enhance effective use of the operational environment. Examples of geospatial data, information and services include: terrain analyses and visualization, digitized terrain products, nonstandard tailored maps, precision survey, data management, baseline survey data, and force beddown analysis. Installation geospatial data enable commanders to make informed decisions during installation planning throughout all phases of operations.

INSTALLATIONS SUPPORT

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Engineer Function of Installations Support

Installations support is the ability to provide installation assets and services necessary to support military forces. This includes activities necessary for effective real property life cycle management and installation services, the two elements of installations support. Installations support focuses on managing real property facilities and infrastructure in the US and at enduring and non-enduring bases in other geographic combatant commanders' areas of responsibility while providing protection, safety, security, and sustainability for personnel and mission-critical built and natural assets. Installations support activities may take place before, after, or concurrent with general engineering activities. During contingencies, engineers can expect to perform general engineering, geospatial engineering, and installations support activities, depending on the type of base required and whether existing facilities are already in place to support the mission, population, and expected mission duration. These concepts apply across the range of military operations.

Real Property Life Cycle Management. Defined as the ability to plan for and provide for the acquisition, operation, sustainment, recapitalization, realignment, and disposal of real property assets to meet the requirements of the force. Each area is covered in the following paragraphs:

Planning and Programing. Comprehensive base planning identifies mission priorities and the most pressing needs for Air Force or joint installations. **Base development is accomplished through a process of planning, programming, project development, design, and construction**. Planning is focused on base layout, environmental factors, infrastructure, and necessary subsystems, ensuring all requirements meet theater construction standards and comply with unified facilities criteria (UFC). Planning provides a logical progression of facilities development that fit together (functionally, environmentally, and architecturally) with provisions for long-range growth or mission realignment and issues such as flexibility, redundancy, and survivability. Civil engineers translate plans into base infrastructure through a combination of real estate, basing, and facility options. Planning includes research, development, and funding needed to provide mission-capable facilities. Planning should take into consideration force protection concerns wherever bases are to be developed. To be effective planners, **engineers should understand requirements created by high technology weapons systems and new operational concepts.** Project programming translates validated requirements into specific projects and fund sources. Design, construction, and commissioning form the final steps.

Acquisition. Engineers translate base plans into infrastructure through a range of real estate, basing, and facility options. Engineers work with contracting and legal functions to purchase, lease, program for construction, or gain installation assets, which include all land; natural resources; buildings; structures; portable facilities; airfields and roads; installed equipment; and all "interests" in the property such as easements, oil and mineral rights, or water and airspace.

Operation. Engineers operate and maintain infrastructure necessary to support air, space, and cyberspace missions. The requirement is to balance mission effectiveness versus efficient performance of infrastructure supporting base activities, e.g., operations, services, medical, security, and housing. Civil engineers have the ability to provide functional real property installation assets with utilities such as energy, water, and disposal of waste water, as well as contract and real property management, pollution prevention, and other essential services.

Sustainment. Engineers sustain installations (including natural and cultural resources) by effective assessment, maintenance, and repair of current assets and planning for future missions. Regular surveys of base layout, facilities, and equipment are conducted to enhance force protection and strengthen the combat capability of the base. Environmental and energy conservation and reduction plans should be developed to protect the health of the population, preserve the environment, and reduce waste. Maintenance requirements are prioritized, taking into account limited resources, cost, timing, energy efficiency, operational need, reliability, maintainability, environmental impacts, safety, and quality of life.

Recapitalization. Recapitalization efforts focus on restoration, modernization, and replacement of installation assets to meet mission requirements and comply with construction standards, UFCs, and statutory and regulatory requirements.

Realignment. Realignment includes any action that both reduces and relocates functions and civilian personnel positions, but does not include a reduction in force resulting from workload adjustments, reduced personnel or funding levels, or skill imbalances. These actions usually involve a great deal of planning. New facilities may need to be designed and constructed, and others demolished in an effort to achieve the overall purpose of the realignment.

Disposal of Installation Assets. Disposal of assets involves removing assets from the inventory by any means, with consideration of the impact to local communities. Disposal actions may become necessary when facilities and infrastructure deteriorate beyond the point of economical repair, become a safety hazard, interfere with new construction, and are no longer capable of meeting mission requirements and disposal will not create a deficiency.

Economic Adjustment Activities. Economic adjustment activities focus on assisting communities impacted by base beddown, realignment, expansion, closure, or other significant military operations. This includes assessing hardships, evaluating alternatives for local recovery, identifying resource requirements, creating action plans, and implementing mitigation measures approved by the appropriate authority. Civil engineers in an expeditionary environment work with the Department of State (DOS) to

assist communities to mitigate negative impacts of military operations, promote local cooperation, and further US-host nation relations. At enduring bases, measureable reduction or expansion of operations requires the civil engineer to coordinate actions with the US Office of Economic Adjustment (continental US [CONUS] locations) or the DOS (outside CONUS [OCONUS] locations).

Installation Services. Installation services are defined as the ability to deliver selected services not related to real property (or personnel services) to meet the requirements of the installation population and mission.

Emergency Services. Air Force civil engineers provide installation emergency services to protect, respond to, and recover personnel and resources from enemy attack, major incidents, hazards involving explosives, environmental hazards, and natural disasters. They focus on preparing for incidents, responding to and mitigating the effect of attacks or disasters, and performing recovery operations to restore installations after an attack or natural disaster. Civil engineers assist civil and international authorities when authorized by DOD.

Installation Safety. Civil engineers work closely with safety officials to prevent incidents, manage/mitigate risk, rapidly respond to incidents/accidents that do occur, and provide emergency services needed to recover and sustain the mission.

LOGISTICS SERVICES

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Engineer Function of Logistics Services

In joint and Air Force operations, logistics service is divided into water and ice service, contingency base services, and hygiene services (also see Appendix A).

Water and Ice Service is defined as capabilities to produce, test, store and distribute bulk, packaged and frozen water in a contingency environment. Associated engineering tasks include drilling new water wells, tying into municipal water systems, or erecting expeditionary water purification devices for water consumption; providing bladders and/or elevated water tanks for storage; installing water distribution pipes, pumps, valves and meters; and installing ice-making capabilities in the water plant.

Contingency Base Services provide shelter, billeting, waste management and common user life support management in a contingency environment. Engineers provide initial/temporary construction of facilities to support contingency base services using available materials or deployable kits. Engineers also maintain and repair these facilities as required.

Hygiene Services provide laundry, shower, sink, human waste collection and processing, and textile and fabric repair support. Engineers provide expedient field facilities in the early stages of deployments.

When Air Force forces are deployed in support of major operations where Air Force beddown and sustainment support is unavailable, the supported command, Service, or agency provides logistical sustainment requirements.

ANNEX 3-34 ENGINEER OPERATIONS

COMMAND AND ORGANIZATION

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To preserve unity of command, the joint force commander (JFC) will usually delegate operational control (OPCON) of Air Force forces to the commander, Air Force forces (COMAFFOR). Through the air expeditionary task force (AETF) structure, the COMAFFOR has both OPCON (as delegated by the JFC) and administrative control (ADCON), as established by the Air Force, of Air Force civil engineers assigned or attached to the JFC.

Civil engineer units performing regional operations are normally attached to an AETF and report directly to the COMAFFOR. Air Force civil engineers may be placed under the tactical control of a joint force engineer command structure if requested by the joint force commander.

The civil engineer organization consists of a total force mix of regular Air Force, Air Force Reserve, Air National Guard (ANG), and civilians. Air Force engineers are assigned or attached to organizations performing installation support, construction projects, and emergency response. Engineers provide training activities that support base and homeland operations, major commands (MAJCOMs), and numbered Air Forces (NAF) along with their subordinate wings. The civil engineer governance structure provides standardized guidance, training, equipment, and procedures through a corporate process.

To support the COMAFFOR, civil engineers are deployed as Prime Base Engineer Emergency Force (BEEF) or RED HORSE forces. Both train as organic units and remain fully prepared to rapidly deploy as full unit type codes (UTC) or tailored force packages. UTCs are ideally suited to provide the right skills at the right time. Prime BEEF organizations rapidly respond worldwide to provide a wide range of engineer support required to establish, operate, sustain recover, and reconstitute installations. RED HORSE is a self-sufficient, mobile heavy construction unit capable of rapid response and independent operations in a Level 1 threat environment. They provide heavy repair and construction capability that exceed Prime BEEF capacities.

The organization of Prime BEEF and RED HORSE forces under a single engineering commander has been proven as an alternative operational concept to support COMAFFOR requirements. Under this concept, limited theater-wide engineering forces can effectively be leveraged to prioritize and mass engineering capabilities, either light and/or heavy, at the right time and place to meet the demands. This concept first emerged in 2009 with the establishment of the Expeditionary Prime BEEF Group and evolved in 2012 into the Expeditionary Civil Engineer Group which placed both Prime

BEEF and RED HORSE forces under a single engineering commander with an empowered staff.

Maintaining unit integrity should be considered when building deliberate plans. Unit integrity enables engineers who train together to deploy together and provides the COMAFFOR an integrated mission-ready team.

PRIME BEEF

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Prime Base Emergency Engineer Forces (BEEF) consists of total force personnel assigned to home-station civil engineer organizations. During contingencies, civil engineers transition to an expeditionary mode as members of Prime BEEF teams. These teams are capable of rapidly responding worldwide to provide the full range of engineering expertise and emergency services needed to establish, sustain, and recover bases for employing Air Force weapon systems or supporting joint, interagency, or multinational operations.

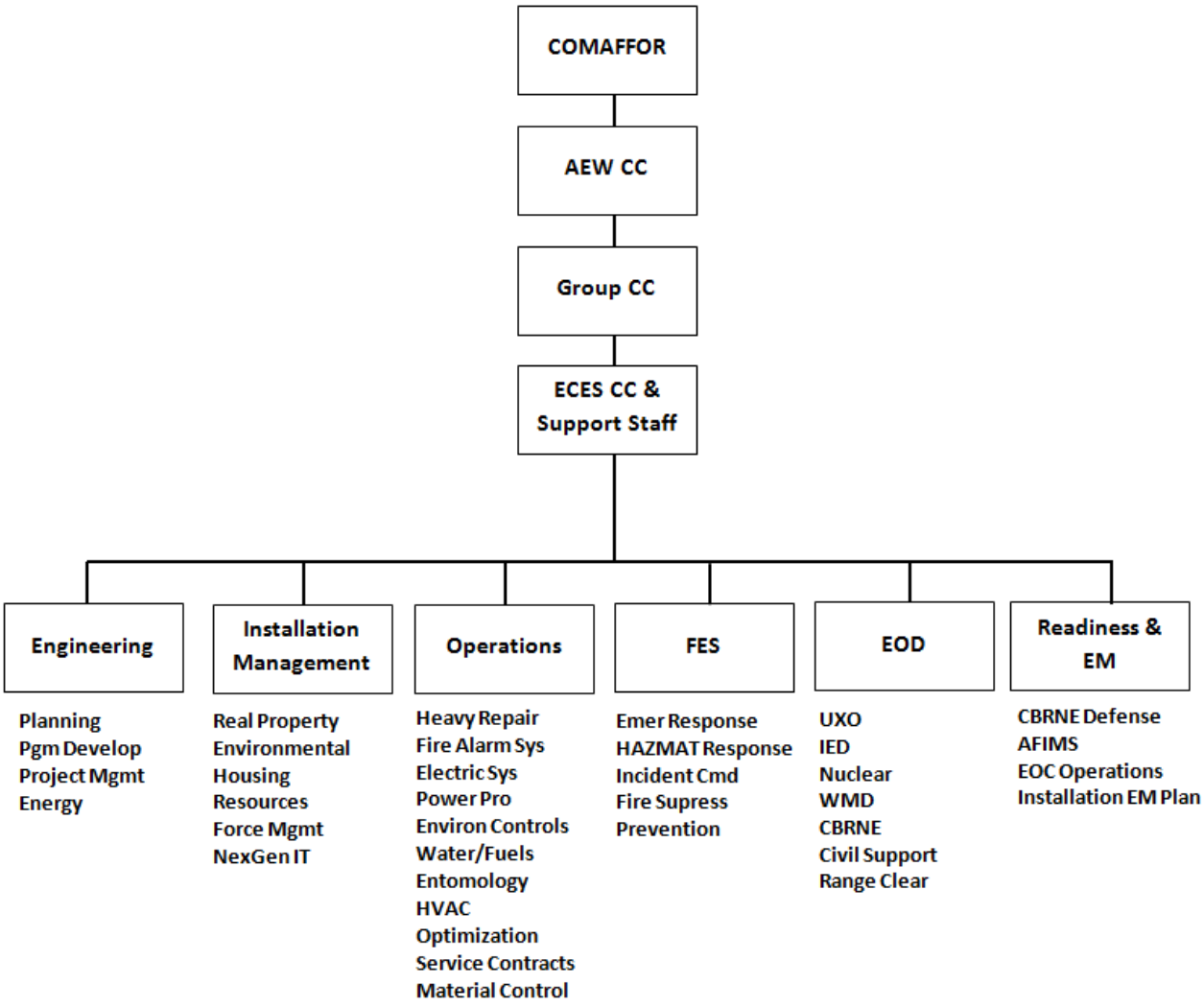
The core competencies of Prime BEEF are *expeditionary engineering* and *emergency services.* Expeditionary engineering involves general engineering and geospatial engineering activities that Prime BEEF teams perform in an expeditionary environment to beddown and sustain forces. Some activities are: establish expeditionary bases, modify terrain, repair or construct force protection sites, and implement environmental protection measures. Emergency services include fire emergency services (FES), explosive ordnance disposal (EOD), and emergency management (EM) activities.

Expeditionary Engineering

Expeditionary engineering focuses on force beddown, facilities and utilities construction repair, modification, maintenance, and operation. Forces provide expertise in facilities engineering and management, water purification, operation and maintenance of mobile or fixed aircraft arresting systems, airfield lighting, heavy equipment operations, road repair and construction, force protection design and construction, etc. The figure, Notional Template of an Expeditionary Civil Engineer Squadron, depicts a notional template of an expeditionary civil engineer squadron with elements such as Engineering, Installation Management, Operations, FES, EM and EOD. The commander determines which capabilities are needed to support the mission to achieve maximum effectiveness and efficiency.

Prime BEEF teams perform light horizontal and vertical construction; are capable of erecting specialized structures such as aircraft shelters, dome shelters, and clam shells with augmentation. They provide pest management and environmental management services and overall bare base master planning, design, and contract support. Additionally teams provide emergency services capabilities such as EM; hazardous materials (HAZMAT) response; firefighting; unexploded ordnance (UXO) safing and removal defeat of improvised explosive devices (IEDs), weapons of mass destruction (WMD), and chemical, biological, radiological, and nuclear (CBRN) threats; and conduct base recovery after attack, to include airfield damage repair and repairs to facilities or infrastructure systems. Prime BEEF personnel deploy as part of an air expeditionary task

force (AETF) to establish and maintain joint bases, main operating bases, forward operating bases, and combat outposts throughout the operational area.



Notional Template of an Expeditionary Civil Engineer Squadron
(IAW/HQ USAF Program Action Directive 12-03, *Implementation of Enterprise-Wide Engineer Transformation*, home station support)

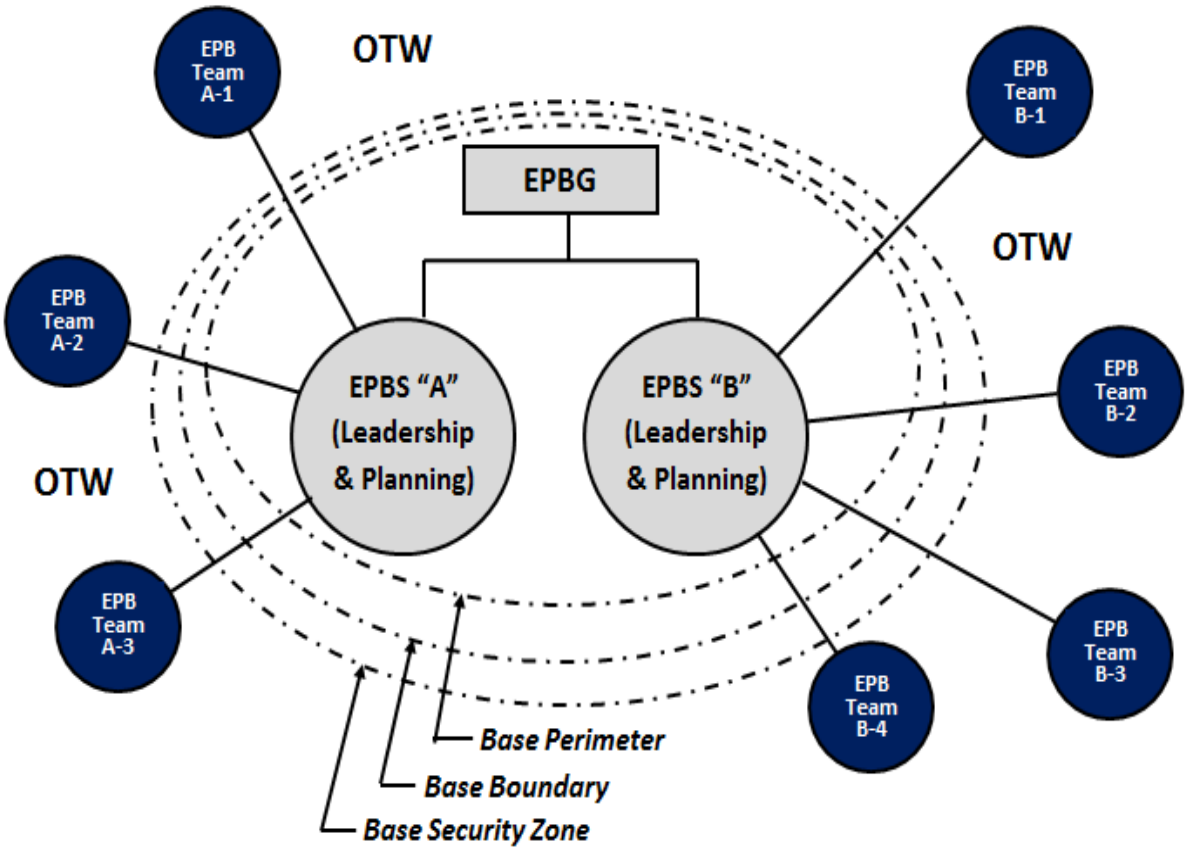
Prime BEEF teams can be formed into an expeditionary civil engineer organization to sustain bases as they transition from short-term bases with initial standards of construction to more enduring bases with temporary or permanent infrastructure. The expeditionary civil engineer organization would provide installations support. This capability focuses on managing real property, facilities, and infrastructure on US or enduring bases in geographic combatant commands outside the US while providing protection, safety, security, and sustainability for personnel and mission critical assets.

The expeditionary civil engineer organization would also provide a housing management program to include family housing, unaccompanied housing, and privatized housing. Prime BEEF teams would provide facility support to contingency quarters/dormitories in support of forward/contingency operating locations or short-term bases. For permanent party members and their families at US or enduring bases in geographic combatant commands outside the US, the home station engineer organization will manage General Officer homes, leased, referral and relocation services, and the furnishings management program.

Prime BEEF personnel provide specialized capabilities formed to focus on specific areas. These capabilities include staff augmentation teams capable of providing engineer command and control (C2); civil engineer operational planning; technical design; advanced construction management; and intermediate and depot-level repair support for power generation, electrical distribution, and aircraft arresting systems. Specialized teams also provide technical support for heating, ventilation, and air conditioning (HVAC) systems and electronic industrial controls and monitoring systems for infrastructure elements. Engineers also maintain airfield pavement evaluation teams capable of performing structural evaluations of airfields to determine suitability for aircraft operations including different types of aircraft and number of takeoffs and landings airfields can support.

To support operations beyond the perimeter of a forward base (i.e., operations “outside the wire”), expeditionary Prime BEEF squadrons (EPBS) can organize in a Hub-and-Spoke configuration and report directly to an expeditionary Prime BEEF group (EPBG) commander, or expeditionary Civil Engineer group (ECEG) commander if a RED HORSE squadron(s) is attached. With the ‘Hub-and-Spoke’ concept, each EPBS has its leadership and planning function in a hub located at an airfield and the work elements at spoke locations as required. Convoy operations between the hub and the spoke location(s) are provided by Army forces for EPBGs and potentially by RED HORSE forces for ECEGs in low to moderate threat areas. Work at the spoke location(s) will not be provided by CE forces unless adequate security is provided. The EPBG structure with assigned EPBS(s) and the ECEG structure with assigned EPBS(s) and RED HORSE squadron(s) provide unity of command, theater-wide integration of engineer forces, and effective use of limited resources. EPBS capabilities include base master planning; programming; technical design; contract development and oversight; and light troop construction and repair of expeditionary bases, facilities, utilities, and force beddown. Excluded from this mission set are routine facility modification, maintenance, and operations which are the responsibility of the designated base operating support integrator (BOS-I). See Notional Expeditionary Hub-and-Spoke concepts for the EPBG and ECEG illustrations.

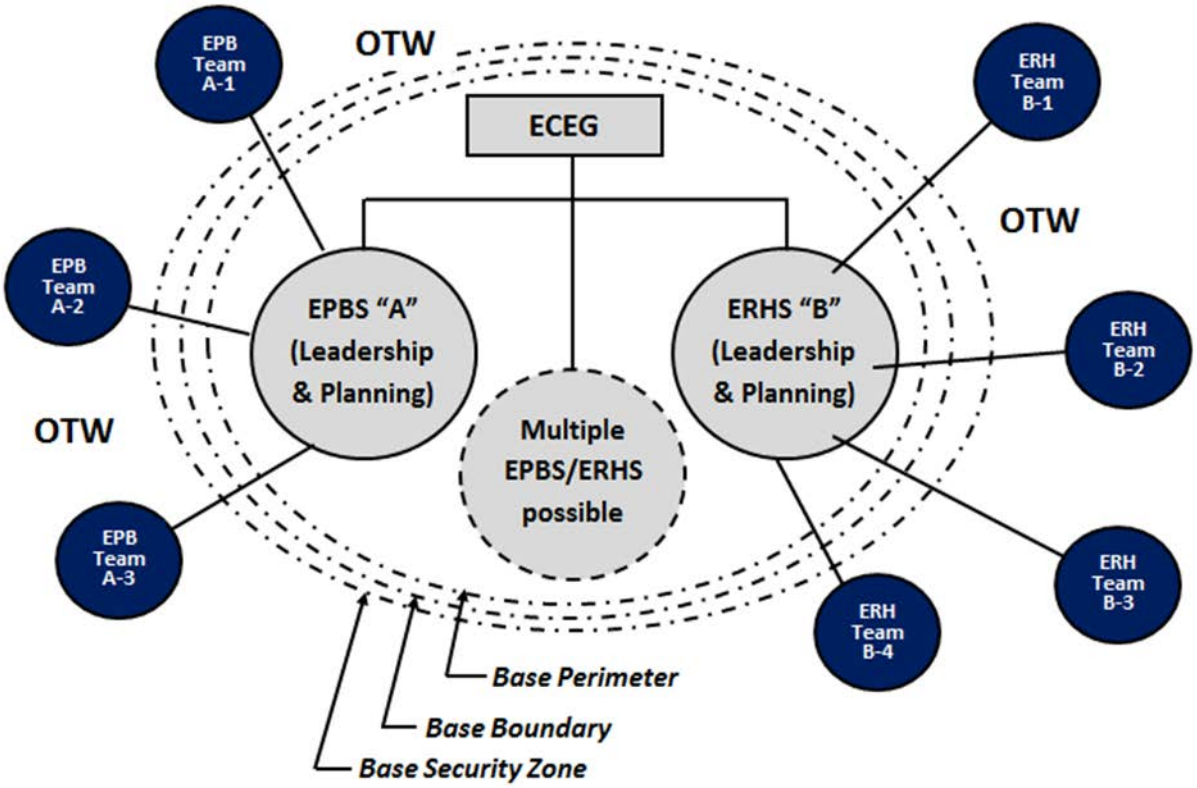
Notional Expeditionary Prime BEEF Group (EPBG) Hub-and-Spoke Concept



EPBG - Expeditionary Prime BEEF Group
EPBS - Expeditionary Prime BEEF Squadron
EPBF - Expeditionary Prime BEEF Flight
OTW - Outside-the-Wire (outside the base security zone)

NOTE: OTW convoy operations are provided by Army forces.

Notional Expeditionary Civil Engineer Group (ECEG) Hub-and-Spoke Configuration



ECEG - Expeditionary Civil Engineer Group
EPBS - Expeditionary Prime BEEF Squadron
ERHS - Expeditionary RED HORSE Squadron
EPBF - Expeditionary Prime BEEF Flight (for duration of project)
ERHF - Expeditionary RED HORSE Flight (for duration of project)
OTW - Outside-the-Wire (outside the base security zone)

NOTE: AF CE forces may operate OTW, but should not do so until the project area is first cleared of enemy forces by the US or HN Land Forces, convoy routes are cleared of IEDs by AF or other EOD forces, and force protection of the site is established by Army, Marines, or AF Security Forces. Convoy operations are provided by RED HORSE forces during low/moderate threat conditions, and Army forces during high threat conditions.

Emergency Services

Prime BEEF personnel perform emergency services to protect the base from intentional or unintentional damage, minimize loss of life, and protect property and the environment.

Fire Emergency Services

FES provide the capability to minimize loss to lives, property, and the environment occurring throughout all phases of military operations in peacetime, wartime, and in support of homeland operations. Included are both man-made and natural incidents; fire suppression or hazard mitigation; rescue; mitigation or containment of HAZMAT releases resulting from industrial accidents, terrorism, or WMD; and emergency medical response.

FES are capabilities-based, tailored to specific missions, geographic locations, and environmental and threat conditions. FES capabilities are packaged to support a variety of scenarios that may require a single firefighting crew, multiple firefighting crews, incident command, fire prevention or management, and oversight.

Firefighters are a primary emergency response team, responsible for supporting the commander's requirement to launch and recover aircraft.

Explosive Ordnance Disposal

Air Force EOD forces are primarily postured to support airbase operations. EOD flights are ideally postured at main operating bases supporting sortie generation and force protection by eliminating explosive threats to airfield and installation operations. Priority employment is within the base boundary and in support of base security zone (BSZ) operations. EOD is also employed in missions outside the base boundary or BSZ to enable greater freedom of maneuver for air or surface operations.

EOD provides the capability to mitigate and defeat hazards presented by the enemy or friendly employment of explosive ordnance. This encompasses IED; conventional explosives such as explosive remnants of war, UXO, CBRN, WMD, homemade explosives (HME), and incendiary materials.

In many instances, Air Force EOD is a key enabler in securing the JFC's objectives in reducing UXO, WMD, HME and IED threats to enable stabilization. EOD provides expertise to protect the mission, resources, and the

During Operation IRAQI FREEDOM, after elimination of any large scale explosive threats to Air Bases, the Air Force provided five EOD flights to Combined Joint Task Force Troy. In addition, 15 weapons intelligence teams, led by EOD Airmen, operated continuously "outside the wire." EOD Airmen provided 45 percent of the joint EOD operational capability, performing over 27,200 combat missions.

environment in airfield operations, ground combat, homeland operations, support to civil authorities, and worldwide contingencies. Successful joint operations will likely require proper use of Air Force EOD assets throughout all phases of a joint campaign. In OEF and OIF, the Services found no single Service could provide an EOD force for the monumental effort between the “Dominate” and “Enable Civil Authority” phases. We anticipate future scenarios will likely have similar demands.

Emergency Management

The primary mission focus of EM is to save lives; minimize the loss or degradation of resources; and continue, sustain, and restore operational capability in an all-hazards physical threat environment at Air Force installations worldwide. The protection of Air Force personnel and resources on Air Force installations is essential to ensure successful Air Force operations. The Air Force EM program addresses activities across the full spectrum of physical threats at home station or expeditionary locations. These physical threats may occur at any time, with or without prior warning. EM supports protection of personnel and resources through integration of installation preparedness, response, and recovery programs aimed at reducing the impact of these events on the installation, prepares for risks that cannot be eliminated, and prescribes actions required to deal with consequences of actual events and speeds recovery from those events using the Air Force Incident Management System (AFIMS).

EM Program planning and response is based on the EM wartime mission and AFIMS. EM personnel provide CBRN defense, and support FES when requested in HAZMAT detection, identification, sampling, and evidence collection capabilities to support theater and installation attack CBRN/HAZMAT defense operations.

EM personnel are responsible to manage emergency operations center and fulfill Emergency Support Function (ESF)-5, *Emergency Management*, responsibilities during contingency and home station incidents or events. Note: ESFs are modified from the National Incident Management System/National Response Framework construct to implement AFIMS. EM managers provide expertise to installation commanders who ensure there are measures to develop and implement policies, guidance, structure and responsibilities to prepare for, respond to, and recover from threats to their installation. This includes developing a resilient community and culture of preparedness through collaboration with installation agencies.

RED HORSE

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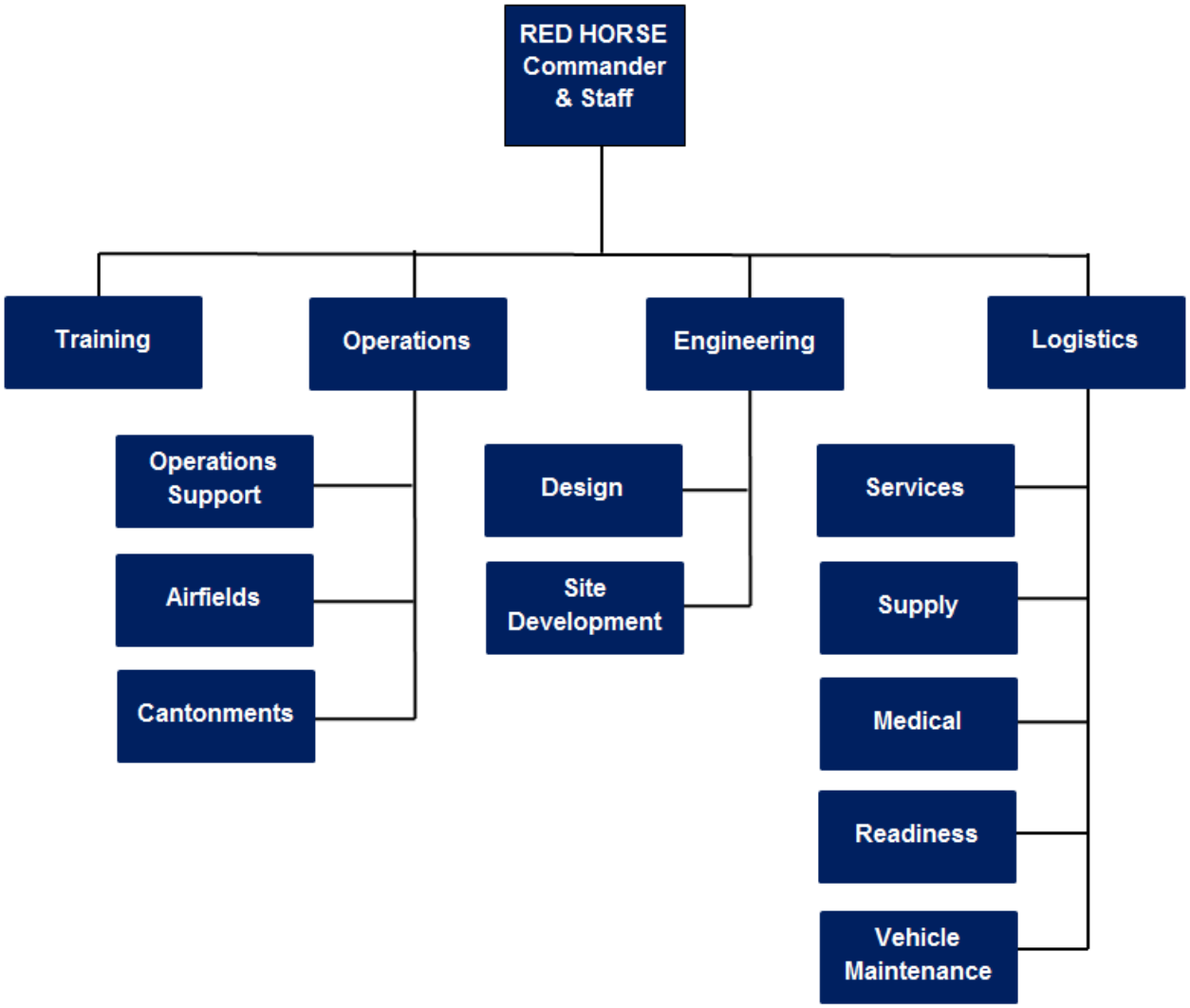
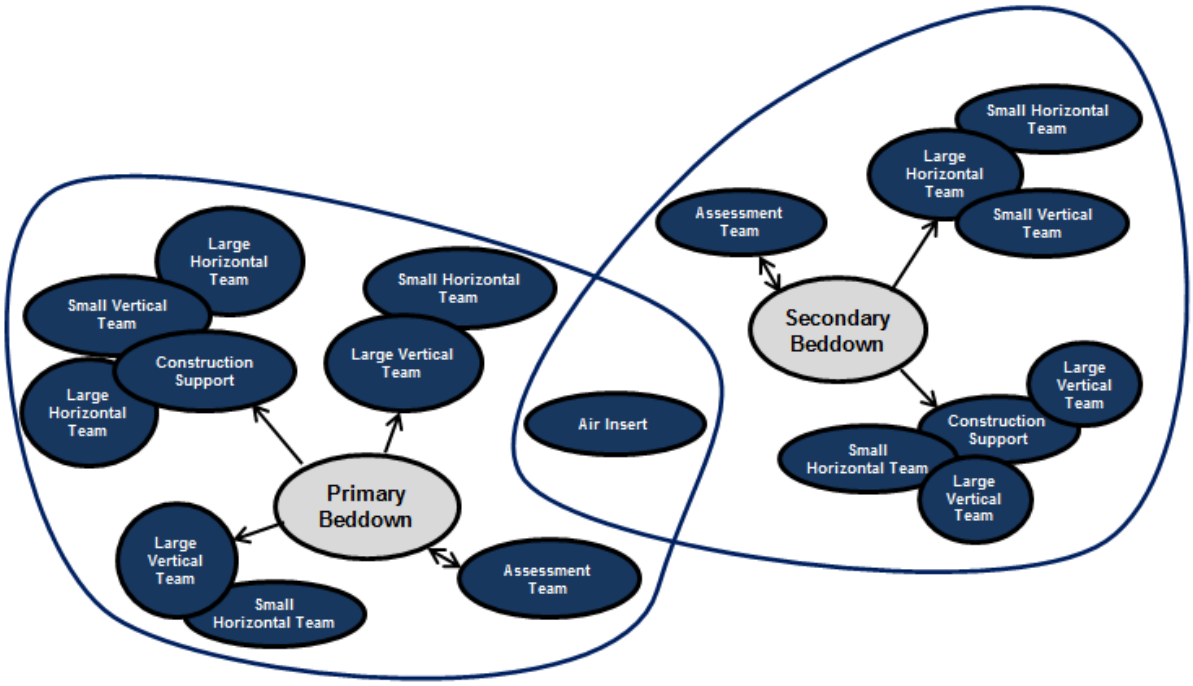
RED HORSE provides the commander, Air Force forces (COMAFFOR) a dedicated, flexible, airfield and base heavy construction and repair capability along with many special capabilities that allow the joint force commanders (JFCs) to move and support missions as the operation dictates. RED HORSE organizations are manned and equipped to provide highly mobile, rapidly deployable echelons to support force beddown requirements and to repair war damage. These units report to a NAF during peacetime and are typically organized as depicted in the figure, Notional RED HORSE Organization.



Notional RED HORSE Organization

These organizations are heavy construction entities that contain organic, self- sustaining, logistical support for vehicle maintenance, secure communications, food service, supply, and medical support. This organic support allows the unit to operate independently for extended periods of time until normal supply channels are established. RED HORSE special capabilities include water-well drilling, explosive demolition, quarry operations, concrete and asphalt batch plant operations, material testing, large expedient facility erection, and concrete and asphalt paving. RED HORSE units erect specialized structures such as aircraft shelters, dome shelters, clam shells, and expanded shelters. **RED HORSE organizations are normally not a wing asset**.

During contingencies, RED HORSE units (squadrons or groups) are capable of being deployed in a hub-and-spoke operation, exercising centralized control from the hub and executing missions from the spoke locations. This hub-and-spoke concept, depicted in the figure Typical RED HORSE Hub-and-Spoke Configuration, centers on primary and secondary beddown echelons which support specialized construction teams tailored to individual project requirements. The concept is to deploy entire units to an operational area along with equipment and vehicles. Units are typically task- or project-oriented. As the COMAFFOR establishes requirements and priorities, the organization deploys teams to accomplish these projects. **During wartime, RED HORSE units are used as a theater asset reporting to the COMAFFOR or other engineer commander with theater-side responsibilities.**



Typical RED HORSE Hub-and-Spoke Configuration

RED HORSE has a special capability to conduct expedient repairs to airfield surfaces and evaluate supporting infrastructure for potential follow-on forces. These teams can be employed using air insertion, air delivery, or ground transportation. Fundamental capabilities include initial site survey assessment or assessment of a site for CBRN materials, removal/demolition of obstructions, expedient force protection construction, repair of airfield surfaces for limited airlift operations, testing for potable water sources, and performance of airfield pavement assessment evaluations. Air inserted RED HORSE forces can be augmented by explosive ordnance disposal (EOD) to conduct limited clearance of unexploded explosive ordnance (UXO)/improvised explosive devices (IED) and explosive hazards, and by fire emergency services (FES) to conduct limited firefighting, rescue, and emergency medical services.

ROLES AND RESPONSIBILITIES

Last Updated: 30 December 2014

Headquarters Air Force provides policy and oversight for the Prime BEEF and RED HORSE programs. Air Force advocates policies, programs, and resources; reviews long-range civil engineer requirements; and serves as the primary interface with DOD agencies, Congress, and other legislative offices. Major commands (MAJCOM) and the ANG provide civil engineering capabilities to meet current and emerging requirements by organizing, developing, enabling, and retaining a trained and capable total force Civil Engineer (CE) team ready to meet current and emergent mission requirements.

When a component NAF (C-NAF) or Component MAJCOM (C-MAJCOM) serves as Air Force's warfighting component to the joint force commander (JFC), civil engineers are assigned or attached to the installation and mission support directorate to serve as engineer advisor to the COMAFFOR. They provide expertise needed to plan, assess, and oversee maintenance and execution of robust capabilities to establish operating platforms, protect and support mission forces and infrastructure; serve as an interface for other Service regional wartime construction management support; and conduct real estate activities for use or lease of host nation facilities and basing.

The Air Force Civil Engineer Center (AFCEC) provides reachback capability and forward deployed technical expertise. Deployed engineers can reach back to AFCEC for technical support; assistance in planning and designing infrastructure; and assistance with environmental concerns, real estate acquisition, and contract construction. It can also serve as a design and construction agent.

Civil engineer commanders are responsible for ensuring their units are organized, trained, and equipped to deploy and execute their assigned missions. These leaders focus on the health and welfare of personnel, effective organization, education and training, and equipping to ensure their units are prepared to respond to contingencies worldwide. Civil engineer commanders mentor and develop personnel through an iterative process involving education, training, and experience.
Air Force engineers rely upon the total force to support contingency operations while sustaining a capability to continue the mission at home station. Civil engineer civilians provide a wealth of knowledge, continuity, and technical abilities. Planners should identify deployment opportunities for civilians in accordance with (IAW) DOD guidance. This becomes particularly important during sustained operations, when engineer requirements will likely increase as engineers are tasked to sustain bases while also providing support to stability operations. To meet this surge in engineer requirements, commanders should encourage civilians to take full advantage of opportunities to augment the existing military

force, particularly in areas where shortfalls exist.

Teams specializing in expeditionary assets typically deploy to any operational area and assist civil engineers in force beddown, sustainment, and recovery. They provide technical assistance and support in erecting, reconstituting, and repairing large expeditionary structures such as aircraft hangars and domes. In working with these teams, engineers perform site preparation, ensure structures are available, and provide teams with any heavy equipment needed (e.g., forklift, high-reach, crane, etc.). These teams also provide support during foreign humanitarian assistance (FHA) and civil support operations.

Commanders balance contract support and military engineers to meet mission requirements. Military forces typically conduct initial contingency response due to the operational environment. As initial bases of operation are established, Air Force civil engineers may need to construct other operating locations in order to best project airpower or enable other Services to conduct counterinsurgency and stability operations within the joint environment. These requirements, after initial contingency response and surges, may exceed Air Force civil engineer capacity to adequately and simultaneously support all home station and expeditionary installations. In these instances, contracting services are a force multiplier and additional means to address shortfalls in engineer requirements across the range of military operations.

Civil Engineer Support to Air Force Special Operations

Lack of light easily employable base operating support (BOS) coupled with extremely short notice and rapidly evolving mission needs requires Air Force Special Operations Command (AFSOC) forces to arrive and conduct operations well ahead of BOS establishment.

To bridge the gap, AFSOC provides a family of small specialized force modules. These capabilities employ the latest technology to the greatest extent, tailored to absolute minimums, and in most cases personnel are multi-skilled, substantially reducing manpower footprints. Capabilities include explosive ordnance disposal (EOD) force protection teams, CE expeditionary teams, WMD/CBRN teams, collective protection with personnel teams, and a family of light, easily employable beddown assets known as air rapid response kits. These teams, their capabilities, and their employment are chiefly unique to AFSOC.

Rapid arrival and establishment of an “airhead” at disaster locations and prosecution of conflicts necessitate an increased demand on special operations forces (SOF), its enablers, and supporting agencies. An example of these types of activities include simultaneous anti-terrorist activities during OEF, OIF and in Africa. The nature of SOF heightens the probability of encountering hazards and accepting risk. AFSOC’s enablers provide the SOF combatant commander with great capability in minimized packaging to assist in avoiding and mitigating those risks.

PRESENTATION OF FORCES

Last Updated: 30 December 2014

Once the President or the Secretary of Defense (SecDef) authorizes implementation of a specific plan, deployment of Prime BEEF and RED HORSE forces is executed through the joint deployment system and conducted using guidance issued by the Director of Civil Engineers. During deployments, civil engineer forces are part of an Air Expeditionary Task Force (AETF) and follow command relationships affecting all Air Force forces.

Air Force civil engineers are presented to a joint force as part of an AETF commanded by a commander, Air Force forces (COMAFFOR). This is the case in engagement, cooperation, and deterrence operations; homeland operations; crisis response and limited contingency operations; and major operations and campaigns.

PLANNING

Last Updated: 30 December 2014

Air Force planning begins when the joint forces commander assigns the commander, Air Force forces (COMAFFOR) an operational mission. As a general rule, civil engineers participate in all stages of operational planning, providing estimates of capability, availability, resource requirements, and cost limitations. Initial plans focus on providing bases along with supporting infrastructure, environmental, and emergency services for each course of action (COA) being considered. Estimates are tracked during execution to determine if operations are proceeding according to the COMAFFOR's intent and if future operations are supportable.

Planning efforts should be aimed at *readying the force* and *preparing the operational* environment to support operational missions or other unforeseen contingencies. Readying the force includes educating, training, and equipping civil engineers to accomplish the mission. Preparing the operational environment involves building comprehensive contingency plans geared towards force beddown, protection, sustainment, and all other tasks engineers may be required to perform to meet the COMAFFOR's objectives. Engineers can also assist targeting efforts by assessing long-term effects of destroying infrastructure and determining the level of destruction targets can withstand yet be repairable with organic engineer capabilities for use by friendly forces.

Deliberate Planning

Civil engineer deliberate planning assists Air Force forces in preparing the operational environment. Plans identify all actions and requirements necessary to provide effective engineer support to all types and throughout all phases of military operations. While planning, civil engineers provide coordinated sourcing solutions to the global force management process. In general, deployment requirements are sourced before CONUS wartime in-place requirements are met. However, some forces are postured for strategic mission support, homeland operations, and CONUS force projection operations. Deliberate planning considerations may include evaluating, reconfiguring, modifying, and constructing facilities and infrastructure for immediate and sustained support of personnel, equipment, and weapon systems. Due to limited resources (e.g., manpower, funding, materiel, equipment, time) during prolonged contingencies, deliberate plans should incorporate several aspects of operational risks for effective use of available resources. However, risks should be mitigated by definitive, existing support plans, to include plans to obtain resources needed to backfill capabilities (e.g., contracting support, civilian overhires, etc.). Detailed engineer planning guidance is outlined in expeditionary engineering publications. Key aspects of engineer deliberate planning are:

Site Assessment. In concert with operational planning, engineers conduct site

assessments using all available tools, including geospatial data and other technological means to assess and map proposed beddown locations, and assist in developing plans for deployment, reception, beddown, employment, and sustainment. Site assessments identify requirements and describe capabilities of proposed beddown locations to accommodate and sustain missions. The objective is to compare mission requirements with a site's existing capabilities and identify shortfalls in existing assets and resource limitations. Once accomplished, the means to eliminate or mitigate the effects of these shortfalls and limitations can be addressed. The worst case would be the need to establish operations at a bare base, requiring mobile facilities, utilities, and support equipment that can be rapidly deployed and installed to convert undeveloped real estate into an operational airbase virtually overnight. **To ensure beddown requirements are accurately identified, civil engineers should always accompany Air Force, joint, or coalition survey and assessment teams to survey potential Air Force forces beddown locations.**

While performing site assessments, engineers gather the best available data on existing airfields and support infrastructure, water sources, the local threat, explosive remnants of war, climate, topography, soil conditions, host nation construction standards, and available logistics support. All available resources are considered, including support from other Services, multinational support, host nation support, local skilled labor, indigenous materials and equipment, and contract support. Where possible, asset prepositioning can be used to address anticipated shortfalls and limitations. A baseline environmental survey is also conducted to document existing environmental conditions.

Site Planning. Engineers prepare site plans prior to build up or beddown. Plans should include site layout, facility designs, and standards of construction, which is based on operational needs, the threat, and law of war requirements such as location of medical facilities. Site plans should maximize use of existing facilities and infrastructure.

To achieve successful mission generation, civil engineer site planning activities should be integrated with logistical and operational planning throughout all stages. Site plans should consider all standards relating to aircraft operations, other installation missions, force protection, energy and resource conservation, environmental protection, explosives safety, fire prevention, etc. Engineers should take advantage of site planning tools available to assist with developing base layout and designing facility and utility systems. These tools incorporate knowledge and lessons from previous deployments. Facility and infrastructure designs should include the abundance of resources available as well as resource limitations.

Although site assessment usually occurs before site plans are prepared, the assessment and plan development could occur simultaneously or possibly in reverse order based on the urgency of the situation. Several factors impact site planning and design and should be considered. These include local threats, access to resources, types and amount of indigenous materials and equipment, availability of skilled local labor and contract support, political variables, funding, manpower, time, commander's intent, and doctrine.

While planning, Air Force civil engineers should consider providing support and receiving engineering and construction support from other Services, agencies, and coalition partners. Engineers should be prepared to plan joint force beddown locations; consider long-term plans for airfields, support the senior airfield authority,

consider possible surge in operations including other Services' requirements as well as consider different layers of authority Services may have while providing base operating support. Since personnel and equipment will likely flow incrementally into the site, the site plan should be developed to reflect a phased buildup of facilities and support infrastructure to the anticipated requirement. If necessary, procurement of funds and programming actions take place immediately after site plans are complete.

Logistical Support. Engineers are ultimately responsible to identify and acquire resources needed to accomplish the mission; therefore, efforts should be made to achieve equipment common to other Services. Engineers should also remain abreast of advances in technology and aggressively work towards equipment modernization.

Due to heavy lift requirements, civil engineer deliberate plans largely depend upon leased or contracted, pre-stocked and prepositioned (war readiness materiel [WRM]) expeditionary assets, consumables, spares, and repair kits. Engineers work with logisticians to ensure assets reflected in deliberate plans will be available or delivered to the right location, in the proper sequence, when needed. Of particular importance are heavy equipment, tools, and supplies needed to establish airfields and conduct runway repairs. To ensure WRM equipment is reliable, engineers are integrated into logistics organizations, providing technical advice and quality assurance to confirm these items are mission capable.

Plans must also identify procedures to obtain Class V supplies (e.g., ammunition) and large amounts of Class IV supplies (e.g., construction and barrier materials). Effective reachback capabilities minimize the engineer footprint. To reduce dependence on airlift and sealift, use of indigenous equipment and materials is expected where feasible. Labor can be obtained through owner/user or be contracted to increase engineer capacity. Planners should keep in mind that the level of host nation support and access to resources will depend largely on whether forces enter the country under permissive, semi-permissive, or forced entry conditions.

Staging. Theater or regional engineer capabilities should be positioned at tactical mobility hubs to leverage the inherent ability to move and support missions as operations dictate.

Equipping. Prime BEEF and RED HORSE engineers must be properly equipped. Commanders focus on equipping at home station based on mission requirements and collaborative efforts within the civil engineer community. This includes individual protective clothing, hand tools, and team equipment required to conduct surveys, construct temporary facilities, and establish emergency services immediately upon arrival at deployed locations. Planners should assume equipment items and supplies needed to establish or repair base facilities and utilities and to perform runway repairs will not be available initially. Team kits should include items most critically needed. Since it is inevitable some equipment will be damaged during deployments, it is important to have a means of repairing items and have spares whenever possible. Commanders should ensure equipment and supply items maintained at home station are adequate and mission-capable at all times.

Force Protection. Civil engineer plans place emphasis on protecting the force, a unique challenge in the expeditionary environment. The severity of the threat, along

with desired levels of protection, are primary planning considerations. Some important planning factors include available real estate, existing facilities, existing natural or man-made features, and type and quantity of indigenous construction materials. These factors will affect decisions such as standoff, vulnerability reduction measures, and layout of facilities and supporting infrastructure. Plans should also minimize environmental, fire, safety, and health hazards. **As a general rule, civil engineers should design airbases to enhance operability and balance mission requirements with force protection standards**. Base design and layout should comply with force protection unified forces criteria, be defendable and effectively protect personnel, critical facilities, and weapon systems. Engineers should always be aware of anticipated threats and devise effective means to counter them.

Threats, hazard, vulnerability, capability, and criticality risk assessments are conducted in concert with Security Forces and Intelligence. These assessments are used to determine levels of protection for personnel and assets. Intelligence personnel working with local Air Force Office of Special Investigation counterintelligence provide products such as local threat assessments, current/emerging threats to critical infrastructure, or collateral effects of WMD, that generate recommendations to mitigate or eliminate a threat to facilities, airfields, entry control points, etc. When developing engineer plans in support of the assessments for airbase operations in the expeditionary environment, planners must understand the natural environment as well as adversary weapon systems and capabilities in order to conduct risk management. Civil Engineers should be members of installation force protection or antiterrorism working groups. Engineer planners can obtain critical data through threat information sharing during force protection or antiterrorism working groups. Force protection intelligence (FPI) is a key source of information for engineer planning. For additional information and guidance on force protection and FPI, see Annex 3-10, *Force Protection*.

Environmental Considerations. Civil engineers should advise commanders on the environmental aspects of contingency operations to allow them to consider alternative COAs prior to implementing any specific COA. Commanders should mitigate the effects of operations on personnel and the environment to the extent practicable. Consideration of the human environment and supporting documentation are a critical part of initial planning and decision making. Civil engineers strive to ensure plans include the capability to create secure and sustainable environments through responsible leadership, comprehensive training, awareness, and consistent monitoring. Plans should be developed to protect health of the population, preserve the environment, and reduce waste. Because contingency operations can be rapid and time-constrained, time may not permit conducting comprehensive environmental planning initially. However, this should be done as soon as possible in collaboration with other Air Force, joint, or coalition survey and assessment teams. Failure to maintain basic environmental standards could result in illness, disease, or death. Neglecting environmental concerns in foreign countries can also negatively impact local community relations and diplomatic efforts, and possibly increase insurgent activities, making it difficult to achieve US strategic objectives.

Energy Security. Civil engineers strive to reduce the demand for energy; increase energy supply through alternative and renewable energy sources and fuel efficient equipment; and factor energy security into every aspect of contingency

operations. Engineers use renewable energy and sustainable designs to plan, program, construct, maintain, and operate facilities and supporting infrastructure. Engineers provide technical expertise on energy security in all areas where the Air Force requires energy resources. As new technologies emerge (e.g., improvements in equipment, processes, etc.), engineers should leverage them to achieve optimum solutions to energy security.

Installation Management. Civil engineers strive to better quantify, articulate, and manage risk while supporting the mission with assets at the right size, condition, and cost to maximize value and utility of built and natural infrastructure. Engineers use Installation Management principles to integrate existing processes and provide visibility, supporting advocacy and resource allocation as well as enabling analysis to balance cost, risk, and benefits to permit better planning and operation of facilities supporting infrastructure and the natural environment. Engineers provide technical expertise on built and natural infrastructure in all areas where the Air Force requires efficiency.

Crisis Action Planning

Engineering considerations are similar for both deliberate and crisis action planning. Deliberate planning facilitates the transition to crisis action planning. Crisis action planning leads into positioning the force and is usually accomplished in a time-constrained environment, addressing situations and emergencies using assigned, attached, and allocated forces and resources. During dynamic crisis situations, changes to deployment plans may be necessary regardless of technical requirements and adverse impact. Commanders should ensure changes to requirements are accomplished accurately to minimize the impact on schedule development. Thus, plans should be flexible to respond to the demands of a dynamic situation.

EXECUTION

Last Updated: 30 December 2014

Execution involves putting a plan into action to accomplish the mission. This is the time engineers focus on turning the commander's, Air Force forces (COMAFFOR) decisions into actions that lead to achieving the joint force commander's (JFC) objectives. During execution, commanders focus on positioning the force, employing the force, sustaining the force, and recovering the force.

During contingencies, civil engineers adapt plan annexes to support selected courses of action (COAs). To position the force, Prime BEEF and RED HORSE deploy IAW the Air Force War and Mobilization Plan and other applicable orders and guidance. During execution, degradation of civil engineer capacity to support home station requirements, to include strategic missions, may be authorized to fill contingency requirements.

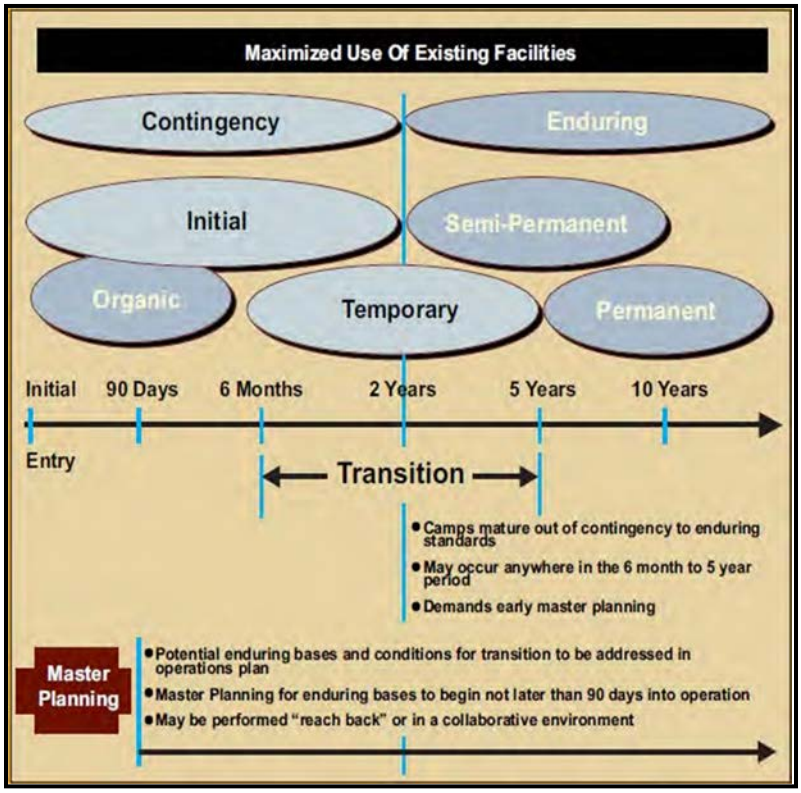
History has proven civil engineers should precede aircraft and other initial forces to establish bases. Once engineers arrive in theater, base operability and sortie generation can be accelerated. However, in some situations this may not be possible and engineers should be prepared to arrive where aircraft, personnel, and equipment are already in place. Upon arrival, civil engineers immediately establish or build out airfields to meet operational requirements

Commanders use prepared plans and officially published expeditionary engineering guidance to effectively employ the force based on the COMAFFOR's stated priorities and objectives. Site plans may need to be tailored.

Master planning should guide the future development requirements for bases. It should begin as soon as possible during initial deployment and continue through recovery of the force. In general, civil engineers begin to assess, construct, inspect and reconfigure infrastructure for industrial areas, administrative areas, communications, and utilities to provide support for personnel, equipment, and weapon systems. Special attention should be given to siting, constructing, operating, and maintaining prepositioned temporary shelters and support facilities capable of supporting sustained operations until more permanent facilities can be acquired (if needed). During this initial stage, emergency services are also established to provide fire emergency services (FES), explosive ordnance disposal (EOD), and emergency management (EM) capabilities essential to protecting personnel, weapon systems, and key infrastructure.

Actions to sustain the force begin the first day and remain continuous throughout

deployment, employment, and redeployment. For engineers, this could mean transitioning from initial base standards to temporary, semi-permanent or permanent standards (figure, Beddown and Basing Continuum). Construction standards are usually based on the anticipated life span of the base, population, and theater standards. Standards may evolve as the anticipated life span of the base changes. This can happen when the mission duration is unclear. Other factors affecting construction standards are available materials, labor resources, cost, and local threats. The decision to upgrade standards is based on factors such as JFC policies, commander's intent, and host nation considerations.



Beddown and Basing Continuum (Derived from JP 3-34)

The *contingency phase* for construction is considered to be the first two years of operation. During this phase, organic, initial, and temporary construction standards are used to sustain the force. Based on these standards, engineers construct facilities and infrastructure intended to be used for certain periods of time, up to two years.

The *enduring phase* for construction is considered to be after two years of military operations. During this phase, semi-permanent or permanent construction standards are used based on the combatant commander's operational requirements. Based on these standards, engineers construct facilities and infrastructure intended to be used for much longer periods of time. Multiple standards may be present on a given installation at the same time based on operational requirements. Detailed information on construction standards, intended periods of use, and methods that can be used to attain these standards is contained in JP 3-34, *Joint Engineer Operations*.

Sustaining the force also involves those actions taken by engineers to recover the

installation and ensure continued operations following incidents, natural disasters, or enemy attacks. Air Force engineers are trained to respond to these types of incidents. Teams with predefined responsibilities are formed to conduct airfield damage repair and base recovery actions to ensure critical operations continue unimpeded and to bring the installation back to full operational capability in minimum time. Detailed guidance and actions required by Air Force civil engineers following these types of incidents are outlined in numerous expeditionary engineering and emergency services publications that may be found on the Air Force Civil Engineering Center (AFCEC) website.

Once it is determined forces will be withdrawn from established operating locations, commanders should focus on efforts to **recover the force**. Civil engineers focus on base closure, relocation, and reconstitution. Redeploying/relocating includes moving personnel to a new location, rotating or replacing personnel, and reintegrating personnel to home units. Reconstituting is returning to prescribed levels of readiness and restoring operating locations/environments to pre-operational conditions. All of these actions can occur simultaneously.

Closing Operating Locations. Closure or transfer is accomplished through a multi-faceted process to include all activities necessary to satisfy laws and agreements affecting closure activities. Civil engineers should be familiar with all of these requirements. Sources of such requirements include land use agreements, status of forces agreements, final governing standards, overseas environmental baseline guidance documents, international treaties, and executive orders.

Early participation in cross-functional working groups is essential. Civil engineers develop plans to support the operational drawdown and reconstitution timeline. Closure plans could take several different approaches including gradual drawdown of personnel, infrastructure, and utilities; relocating functions to other parts of the base to free up areas for closure activities; relocating personnel off-site (providing security) while closure activities take place; contracting closure activities; or turning the base over in whole or part to host nation authorities if agreements are approved by proper authorities.

Detailed inventories of equipment, personnel, real property, facilities, and infrastructure ensure a smooth transition and facilitate appropriate transfers to host nation authorities. Civil engineers should work closely with logistics and other appropriate personnel to determine the disposition of civil engineer materiel.

In-place engineers and equipment are normally used to conduct closure activities. Therefore, it is important to have a plan to sequentially redeploy personnel as they are no longer needed for closure activities. Civil engineer capabilities outside the operating location may be used for closure. RED HORSE units can support activities such as facility demolition and horizontal construction when required.

Force protection should remain a top priority during closure. Civil engineers maintain appropriate levels of FES, EOD, and EM capabilities commensurate with the local threat and operational mission.

All local contracts and leases are assessed to determine final disposition (complete,

terminate, or transfer) and drawdown, or forces may modify the physical infrastructure to the minimum requirements needed for closure operations.

An environmental assessment is conducted once it is decided an operating location will be closed. This assessment compares findings from the initial survey to determine necessary cleanup efforts. Engineers develop a coordinated plan to execute remediation actions IAW DOD policy and status of forces agreements.

Base Denial. If required, civil engineers are prepared to inflict damage to a base and deny its use. Execution of base denial may be forced by enemy action, or it may be a voluntary, preplanned event.

ASSESSMENT

Last Updated: 30 December 2014

Civil engineer training and tactics, techniques, and procedures (TTP) require continual assessment of operational capabilities ensuring relevance for success in any environment. Engineers maintain estimates to determine if an operation is proceeding according to plan and if future operations are supportable throughout planning, preparation, and execution. Estimates initially focus on assessing which course of action (COA) is most supportable from each staff section's perspective. When the commander selects a COA, estimates focus on assessing the status of resources needed to effectively support the COA. Estimates include facts, assumptions, limitations, readiness levels, and availability of civil engineer forces, allies, and expected contract support.

Various reporting tools are used to assess unit readiness and provide broad bands of information on selected unit status indicators which include the commander's assessment of the unit's ability to execute the mission. It is critical that commanders identify those areas that are rated less than desired in order to promote and justify corrective action (including funding, personnel, and equipment allocations).

Civil engineers' success is enhanced through continual learning. Commanders should strive to capture positive and negative aspects of the deployment in after-action reports. Depending on the severity of mission impact, some lessons learned are implemented immediately and others are vetted through the Air Force Joint Lessons Learned Information System (AFJLLIS) process and/or incorporated in new TTPs and training.

CONSIDERATIONS ACROSS THE RANGE OF MILITARY OPERATIONS

Last Updated: 30 December 2014

This section focuses on aspects of civil engineer planning, execution, and assessment functions that may require unique efforts based on the type of operation being supported. It also describes the skills Air Force civil engineers provide throughout the range of military operations.

Engagement, Cooperation, and Deterrence Operations

Civil engineer planning, execution, and assessment for engagement, cooperation, and deterrence operations are similar to those activities required in support of other military operations. However, engineers should be familiar with different command and control structures and different cultures and languages while working alongside local engineers and with US government agencies and nongovernmental organizations. Engineers support the development of the commander, Air Force forces campaign support plan and country plans designed to shape the steady-state environment in support of the Joint Force Commander's (JFC) campaign plan.

Security Cooperation. Civil engineers facilitate security cooperation through exchange of knowledge, technology, and personnel. Providing engineering and construction expertise to partner nations assists the JFC's ability to maintain access in influence in key regions, and helps build partner nation (PN) capability and capacity in essential services. Civil engineers advise, assist, train, and enable PNs to help themselves as well as support third nation requests.

Building Partnership Capability (BPC):

Plans for possible conflicts in the Pacific region will continue to increase Air Force engineering relevance in BPC missions as part of CCMD theater security cooperation efforts. One of the main ways for engineers to engage in BPC is through working with host nations to develop airfields into viable options for Combatant Commanders in the event of contingencies, since a diverse set of operating locations will likely overwhelm enemy decision calculus and impose greater costs for escalating tensions. Whether the future need for a diverse set of operational airfields is in support of humanitarian efforts, military operations other than war, or as divert for operating locations in a contested environment, having more options for the rapid establishment of air operations is critical to maintaining deterrence in preserving the peace and maintaining Phase 0 for longer periods of time.

Building this type of capacity ensures other nations can contribute to an international civil engineering workload.

Forward Presence and Force Projection. Air Force civil engineers support both forward presence and force projections as deterrence options. Engineers establish and maintain basing platforms including forward operating bases and combat outposts from which airpower can be projected. These bases may be permanent, semi-permanent, or temporary depending on US international agreements and the JFC's intent.

Nuclear Operations. Civil engineers maintain critical infrastructure and facilities in support of the Air Force nuclear enterprise. Civil engineers provide the emergency services capabilities in support of nuclear incident response, hazard identification, decontamination expertise, and consequence management. For additional information see Annex 3-72, *Nuclear Operations*.

Homeland Operations

Homeland operations incorporate all applications of air, space, and cyberspace capabilities designed to detect, preempt, respond, mitigate, and recover from the full spectrum of attacks, incidents, and man-made or natural disasters. Civil engineer planning for homeland operations is somewhat different from other major operations, since detailed coordination between the installation and the community is critical.

Air Force civil engineers support homeland operations by construction management and operation and maintenance of facilities and infrastructure to support the Air Force's air sovereignty alert mission. Additionally, engineers are regularly placed on Prepare to Deploy Orders (PTDOs) in support of Joint Task Force Civil Support and prepared to respond in the immediate aftermath of natural and man-made disasters. The Readiness and Emergency Management Flight monitors and protects resources subject to chemical, biological, radiological, and nuclear (CBRN) events, emergency response, and incident command. Air Force firefighters have mutual support agreements for fire and medical response with civilian fire departments. Air Force firefighters are trained for an urban search and rescue capability. Engineers also assist federal, state, local, and tribal law enforcement agencies with explosive ordnance disposal (EOD) matters when determined to be in the interest of public safety. For additional information see *Annex 3-27, Homeland Operations.*

Defense Support to Civil Authorities (DCSA)

Civil Engineer support to civil authorities in response to the full spectrum of attacks, incidents and disasters will remain a core capability. One of the ways engineers prepare to support homeland defense and civil authorities is by maintaining mutual support agreements and partnership efforts designed to facilitate response when necessary. In response to Superstorm Sandy, Westover Air Reserve Base and FEMA demonstrated the value of these mutual support agreements. This successful DCSA and mutual aid response was based on three plus years of robust teamwork and a longer relationship. Through this partnership, Westover and FEMA had pre-scripted mission assignments and signed a Memorandum of Agreement (MOA) to formalize the partnership and provide long term continuity.

Crisis Response and Limited Contingency Operations

Civil engineers have the capability to respond anywhere to crises or limited contingencies. Early engineer assessments are critical to identify available support and other resources needed to meet anticipated requirements based on the situation. Plans are then tailored to the actual capability needed for the emergency response. Tasking only those capabilities actually needed reduces the burden on the deployment system and minimizes the engineer footprint. As the operation continues, some efforts may transfer to local civilians or contractors.

Foreign Humanitarian Assistance. During foreign humanitarian assistance (FHA) operations, engineers coordinate with appropriate NGOs for activities such as the following: train and construct surface transportation systems; drill wells; clear debris; dispose of solid waste; provide sewage treatment and flood control; construct relief centers and camps for dislocated persons; provide environmental management to control hazardous waste and disposal, potable water production and distribution, emergency power and lighting; restore public facilities and transportation routes; provide incident command and emergency response; and construct temporary facilities for governmental services and other operations as required. **In supporting NGOs, it is critical to establish effective communications with an engineer liaison to coordinate and execute engineering support**. Based on the severity of a disaster, the level of support provided can be limited or involve specialized Prime BEEF or RED HORSE capabilities.

Irregular Warfare Operations. Engineers executing operations outside the installation should remain vigilant and aware of local threats, and be familiar with local culture and language while working with local nationals and joint or combined forces. Engineers can assist communities in restoring essential services and becoming self-sufficient, thereby reducing their dependence on insurgents and reinforcing US support for the partner nation. Consideration should be given to employing the local populace to accomplish some tasks. While engineers can probably accomplish the task faster, the long term effect of increased self-sufficiency will further reduce insurgent dependency. *Appendix B* provides details on the engineering capabilities available for use in irregular warfare operations.

Stability Operations. Air Force civil engineers are organized, trained and equipped to support stability operations in addition to their mission to establish, operate, protect, and maintain airbases. Stability operations provide a means to terminate conflicts in a manner consistent with US political objectives. This capability requires a different approach to planning. Stability operations tend to be of long duration, requiring sustained support of forces and significant resources. Engineers may be working within communities in high-threat areas, making force protection a critical aspect of planning. Air Force civil engineers can assist local communities in providing emergency services and restoring essential services such as electrical power; potable water production; sewage treatment; expedient repair of critical infrastructure such as shelters, clinics, schools, and roads. Engineers also focus on permanent infrastructure development (e.g., roads, railways, airports, electrical power sectors, and municipal services). These projects should employ local populations and contribute to stabilization. While executing stability operations, civil engineers focus on training host nation personnel and assist local populations in sustaining themselves.

Traditional Warfare. Air Force civil engineers provide a component of combat support which supports the COMAFFOR during all phases of military operations. **Civil engineers provide sustainable installations as power projection platforms through engineering and installations support across the full mission spectrum.** Availability, suitability, and transportability of equipment and material needed for force beddown and force protection are critical. Funding, life-cycle costs, and quality of life factors should be included in planning. Engineer expertise needed to sustain and protect bases to ensure mission success underpins all of these requirements.

APPENDIX A:
PRIME BEEF/RED HORSE CAPABILITY DESCRIPTIONS

Last Updated: 30 December 2014

This Appendix describes capabilities the Prime BEEF and RED HORSE teams are organized trained, and equipped to provide in support of military operations. The capabilities are laid out in corresponding "tiered" levels with the Joint Capabilities Areas (JCAs), a standardized set of definitions that cover the full range of military operations. Tier 1 (**black**), Tier 2 (**dark blue**), etc., further refine each area and provide additional description. The terminology not color coded in this document are Air Force Engineer tasks used to describe our capabilities to the COMAFFOR and his Staff for planning purposes. This document also provides reference for Air Force Civil Engineer Squadron Commanders to facilitate communication among other Services. These definitions were pulled from multiple sources. A full list of references can be found at the end of this Appendix.

Force Support - The ability to establish, develop, maintain and manage a mission ready total force.

Force Management - The ability to integrate new and existing human and technical assets from across the Joint Force and its mission partners to make the right capabilities available at the right time and place to support National security.

Global Force Management - The ability to align force apportionment, assignment, and allocation methodologies in support of the National Defense Strategy and joint force availability requirements; present comprehensive insights into the global availability and operational readiness of US military forces; globally source joint force requirements; and provide senior decision makers a vehicle to quickly and accurately assess the impact and risk of proposed allocation, assignment and apportionment changes. (From Annex A [Glossary] "Global Force Management Guidance FY 2005").

Readiness Reporting - The ability to evaluate, appraise, and characterize the status of military forces and the supporting infrastructure to perform assigned missions.

Air and Space Expeditionary Force (AEF) Unit Type Code (UTC) Reporting Tool (ART) – ART collects and collates unit-reported data to answer, in whole or in part, the following questions: Are UTCs able to accomplish their Mission Capability (MISCAP) statement? Are UTCs able to accomplish their deployment tasking? Are adequate resources and training available in order to accomplish and sustain the AEF mission(s)? ART complements readiness data reported in Status of Resources and Training System

(SORTS) by focusing on the modular, scalable capability-based UTCs designed to meet the needs of the AEF while SORTS is unit-centric.

Defense Readiness Reporting System (DRRS) – DRRS is the sole readiness reporting system for the Department of Defense (DOD), which establishes a capabilities-based, adaptive, near real-time readiness reporting system for the DOD to measure the readiness of military units to meet missions and goals assigned by the Secretary of Defense.

Facility Priority Listing – Critical facilities such as those serving aircraft; ammunition; petroleum, oil, and lubricants (POL) trucks and systems; liquid oxygen storage; wing and squadron operations; photo labs; essential utilities; ADR equipment; fire response equipment; and command and control functions should be in hardened or semi-hardened shelters/facilities, bunkers, or revetted areas. A full listing of your installation's priority list can be found in Appendix J of your installation's Contingency Response Plan.

Status of Resources and Training System (SORTS) – SORTS is an internal management tool used to provide data critical to crisis planning, provides for the contingency and peacetime planning processes, and is used by the Chief of Staff United States Air Force (CSAF) and subordinate commanders in assessing their effectiveness in meeting Title 10, "United States Code," responsibilities to organize, train, and equip forces for combatant commands.

Force Preparation - The ability to develop, enhance, adapt and sustain the total force to effectively support National security.

Training - The ability to enhance the capacity to perform specific functions and tasks using institutional, operational, or self-development (to include distance learning) domains in order to improve the individual or collective performance of personnel, units, forces, and staffs. (Derived from CJCSM 3500.03B).

Contingency Skills Training (CST) – As defined in Attachment 2, AFI 10-209, *RED HORSE Program*.

Field Training – As defined in Attachment 3, AFI 10-209.

Home Station Training (HST) – As defined in Attachment 2, AFI 10-210, *Prime Base Engineer Emergency Force (BEEF) Program*.

Mission Essential Equipment Training (MEET) – As defined in Attachment 4, AFI 10-210.

Silver Flag (SF) Exercise Training – As defined in Attachment 5, AFI 10-210.

Special Capabilities Training – As defined in Attachment 4, AFI 10-209.

Staff Augmentation Team (S-Team) Training – As defined in Attachment 6, AFI 10-210.

Vehicle/Equipment Training – As defined in Attachment 3, AFI 10-210 and Attachment 5, AFI 10-209.

Weapons Training – As defined in Attachment 6, AFI 10-209; and Attachment 2, AFI 10-210.

Exercising - The ability to plan, prepare, execute and evaluate maneuvers or simulated operations to validate training or conduct mission rehearsal. (Derived from CJCSM 3500-03A).

Contingency and Wartime Chemical, Biological, Radiological and Nuclear (CBRN) Attack Response – Operations that include chemical, biological, radiological, and nuclear, either individually or in combination. Toxic Industrial Material (EIM) and Hazardous Materials (HAZMAT) are considered part of CBRN.

Major Accident Response including Hazardous Material (HAZMAT) – An accident involving DOD materiel or DOD activities that is serious enough to warrant response by the installation Disaster Response Force. It differs from the minor day-to-day emergencies and incidents that installation agencies typically handle.

Natural Disaster Response – As defined by the Robert T Stafford Disaster Relief and Emergency Assistance Act, any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought) or, regardless of cause, any fire, flood or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under this act to supplement the efforts and available resources of States, local governments, and disaster relief organizations in alleviating the damage, loss, hardship, or suffering caused thereby.

Response to Terrorist Attack with CBRN Materials, Including Toxic Industrial Chemicals/Toxic Industrial Materials (TICs/TIMs) – A set of procedures established for response forces to deal with the effects of a terrorist incident. It includes DoD preparedness and response for mitigating the consequences of a terrorist incident, including terrorist use of WMD.

Battlespace Awareness - The ability to understand dispositions and intentions as well as the characteristics and conditions of the operational environment that bear on national and military decision-making by leveraging all sources of information to include Intelligence, Surveillance, Reconnaissance, Meteorological, and Oceanographic.

Collection - The ability to gather data and obtain required information to satisfy information needs.

Measurements and Signatures Collection - The ability to collect parameters and distinctive characteristics of natural or man-made phenomena, equipment, or objects.

Chemical/Biological Materials and Nuclear Radiation (CBRN) - The ability to gather information from chemical and biological agents, objects and activities. The ability to obtain information derived from nuclear radiation and other physical phenomena associated with nuclear weapons, reactors, devices, facilities and fissile materials.

Analysis – A continuous and integrated process of compiling and examining information on the protective posture of a unit or activity. The process assesses multiple factors (antiterrorism, force protection, medical surveillance, CBRN defense capabilities [strengths and weaknesses] of a force or activity). The assessment provides the commander with an estimate of the potential severity of a CBRN attack or accidental release.

Modeling – CBRN hazard and prediction modeling is capable of near-real-time Course of Action (COA) analyses and predictive evaluations under CBRN situations and provides CBRN staff planners with the analytical capability to determine and assess the impact of a CBRN incident on military operations.

Prediction – Using advanced CBRN modeling scenarios, in conjunction with Joint Warning and Reporting Network (JWARN), as a CBRN shape tool during execution activities. JWARN provides the ability to compute the transport and dispersion of chemical and biological (CB) agents and simulate hazards in a variety of scenarios.

Logistics - The ability to project and sustain a logistically ready joint force through the deliberate sharing of national and multi-national resources to effectively support operations, extend operational reach and provide the joint force commander the freedom of action necessary to meet mission objectives.

Logistics Services - The ability to provide services and functions essential to the technical management and support of the joint force.

Water and Ice Service - The ability to produce, test, store and distribute bulk, packaged and frozen water in a contingency environment.

Bulk Water (non-potable and potable) - The ability to provide and distribute fresh, brackish, or seawater from storage to point of use that has not been treated or disinfected and has not been approved for human consumption. The ability to produce, inspect, and distribute bulk potable water from storage to point of use.

Expeditionary Drinking Water Systems/Processes – Consult Bioenvironmental Engineering (BE) in design and development of drinking water systems/processes. The BE flight plays an instrumental role in drinking water quality, treatment, and vulnerability.

Expeditionary Ice-Making Capabilities – As part of the follow-on stage of installing Basic Expeditionary Airfield Resources (BEAR) assets (within the first 30-days), survivability enhancements are to be considered. Establishing ice-making capabilities in the water plant is one of these tasks.

Expeditionary Water Distribution and Storage System – Includes storage (elevated tanks, bladders, etc.), pumps, piping (underground, surface laid, etc.), valving, and metering.

Expeditionary Water Treatment – Includes operating existing water treatment plants, establishing expedient water treatment plants, chlorinating, and fluoridating.

Local Municipality Tie-in – Tie into local municipalities where it is economically feasible, and conditions meet health and force protection standards. The installation of a water purification station should be considered during the initial planning for the base camp and be part of the startup costs for the base camp.

Reverse Osmosis Water Purification Unit (ROWPU) – A water purification device that uses a series of membranes to eliminate impurities. It is capable of removing dissolved minerals. Expeditionary requirements may lead to a switch over to ROWPU treated water for consumption when the base population surges beyond the AF's ability to purchase, marshal, and ship enough bottled water to support base populations in remote areas.

Well-Drilling – A minimum of two wells per camp, one primary and one back up, within the boundaries of the base camp are recommended. Planning will include the drilling of all wells at the same time to reduce mobilization costs. If economically feasible, plan and install water storage distribution systems. Additional wells may be drilled within the base camp boundaries, if the situation allows, if additional capacity is required. Well-drilling should be contracted through civilian markets where it is economically feasible and conditions meet force protection requirements. Postured equipment limits drilling to a depth of 1,500 feet.

Contingency Base Services - The ability to provide shelter, billeting, waste management and common user life support management in an a contingency environment.

Shelter - The ability to provide covered areas and other spaces for industrial operations, administration, and personnel.

Expeditionary Construction – A level of construction support that employs no external engineer support, uses unit organic equipment and systems and/or host nation resources, provides for initial force presence and maneuver activities until force flow supports arrival of engineer resources, and has a mission duration typically 1-90 days. Site work is minimal to none with maximized use of existing facilities.

Initial Construction – Relatively austere facilities and utilities that require minimal engineer effort. This construction is intended for use during the first six months of a

contingency. Wood framed tents with flooring, latrines with sewage lift stations, tactical generators for electrical distribution and portable refrigeration are examples of this standard. BEAR assets are generally categorized as “initial” construction facilities. It is possible that some of these assets will last several years before needing replacement.

Permanent Construction – A level of construction in which finishes, materials, and systems are selected for high energy efficiency and low maintenance and life-cycle costs. Permanent standard construction has a life expectancy of more than 10 years. Construction standards should consider the final disposition and use of facilities and any long-term goals for these facilities to support HN reconstruction. The JFC must specifically approve permanent construction.

Semi-Permanent Construction – A level of construction in which finishes, materials, and systems are selected for moderate energy efficiency, maintenance, and life-cycle costs. Semi-permanent standard construction has a life expectancy of more than two, but less than 10 years. The types of structures used depend on their duration. Semi-permanent construction may be used initially if directed by the JFC after carefully considering the political situation, cost, quality of life, and other criteria.

Temporary Construction – Facilities and utilities of a more substantial nature. It is used to increase efficiency and sustain operations for at least 24 months and with upgrades for up to five years. Wood frame buildings, bathhouses, commercial electric power and paved roads are examples of the temporary standard.

Utility Operations - The ability to manage and operate power, environmental control, water, and waste systems.

Expeditionary Graywater Disposal – Evaporation beds (aka drying beds) are often used to dispose of graywater from shower and laundry facilities in hot, dry climates and where clay soil prevents the use of standard soakage pits.

Expeditionary Heating, Ventilation, Air Conditioning, Refrigeration (HVAC/R) Systems and Controls – Maintenance and operation support of fixed and mobile heating and air conditioning systems, and HVAC controls.

Expeditionary Power Production and Distribution – During bare base electrical power generation and distribution development, phase one is to provide initial power via mobile electric power (MEP) generators and the second is to establish power plants and install the overall base electrical distribution network. Where economically supportable and practical, connect base camp power grids to commercial power.

Expeditionary Solid Waste Disposal – Disposal of garbage, refuse, sludge, and other discarded materials, including solid, semi-solid, liquid, and contained gaseous materials resulting from industrial and commercial operations and from community activities. Possible disposal options, environment dependent, are to use host-nation contractors to dispose of solid waste, on-site facilities, or a combination of these methods. Other options include recycling, composting, landfills, incinerator facilities, and burn pits. Whatever method is used, minimize the amount of solid waste that must be disposed of

while still satisfying command requirements.

Expeditionary Wastewater Disposal – Proper wastewater disposal is essential to protect the health of the force. Consider connecting to an established installation sanitary sewer system, collecting and retaining wastewater for engineer/contractor removal to a fixed treatment facility, engineering a semi-permanent wastewater collection and disposal system, and using a field expedient wastewater disposal system, if available. Examples of field expedient wastewater disposal systems include evaporation beds, seepage pits, soakage pits and soakage trenches, sewage lagoons and leach fields.

Water Reuse - The ability to collect, process and return grey water from showers and laundries for re-use in showers and laundry.

Bare Base Planning – Plan ahead to take advantage of opportunities to reuse wastewater for other purposes. Activities/facilities that use non-potable water should be sited, when possible, near those that generate wastewater (e.g., wastewater from laundry and shower units could be used for mixing concrete, compacting soil and controlling dust).

ROWPU Operations – A water purification device that uses a series of membranes to eliminate impurities. It is capable of removing dissolved minerals. Expeditionary requirements may lead to a switch over to ROWPU treated water for consumption when the base population surges beyond the AF's ability to purchase, marshal, and ship enough bottled water to support base populations in remote areas.

Hygiene Services - The ability to provide laundry, shower, textile and fabric repair support.

Personal Hygiene Services - The ability to provide personal shower and sink facilities and human waste collection and processing for individuals of both sexes in a field environment.

Expedient Field Facilities – In the early stages of bare base deployments, deployable hygiene and sanitation kits may not be readily available. Expedient facilities could include any of the following: latrines, urinals, hand-washing stations, shower and shaving stations, and water-heating or mess kit cleaning devices. Construct these facilities when no other practical options are available or permitted.

Expedient Latrine Facilities – Basic versions of either pit or above-ground drum type latrines. They are normally collocated with urine tubes and hand-washing stations. Even commercial portable latrines can be considered a drum type latrine because it must be emptied after some period of use—albeit by contractor personnel. In general, expedient latrines are intended for temporary use until suitable facilities are erected or an existing sanitary sewer system is being rehabilitated.

Engineering - The ability to execute and integrate combat, general, and geospatial engineering to meet national and JFC requirements to assure mobility, provide infrastructure to position, project, protect, and sustain the joint force, and enhance visualization of the operational area, across the full spectrum of military operations.

General Engineering - The ability to employ engineering capabilities and activities, other than combat engineering, that modify, maintain, or protect the physical environment. Examples include: the construction, repair, maintenance, and operation of infrastructure, facilities, lines of communication and bases; terrain modification and repair; and selected explosive hazard activities. (JP 3-34)

Base Denial – Removal of resources from a threatened area, rendering resources unusable by fire or explosives, removal of parts, contamination (other than by nuclear, biological, or chemical means), immobilizing, partially or totally destroying military equipment, supplies or infrastructure.

Batch Plant Operations (Asphalt/Concrete) – Performing batch plant operations, training, procuring, and maintaining batch plant, designing and planning asphalt/concrete batch mix and operations.

Contingency Contract Management – Managing and inspecting construction and maintenance contracts. Interpreting plans, specifications, and other contract documents. Coordinating, evaluating, monitoring, and documenting contract activities and progress. Preparing recommendations for contract modifications. Reviewing material submittals for compliance with contract specifications. Conducting pre-final, acceptance, and post-acceptance inspections.

Engineer Reconnaissance/Site Survey – Conducting reconnaissance, site location, construction, and mapping surveys.

Explosive Demolition Operations – Conducting explosive demolition for construction purposes, quarry operations, facility demolition, or base denial.

Provide Technical Engineer Advice – Providing technical advice on all matters pertaining to general engineering and installations support (e.g., force beddown and sustainment, capabilities and limitations, environmental concerns, installation geospatial data).

Quarry Operations – Use of explosives, rock drilling, rock crushing, and conveyor operations to produce aggregate to support asphalt and concrete operations.

Staff Augmentation (Echelon Above Wing) – Providing command force staff augmentation for operational planning, engineer management, technical design, construction management, C2 expeditionary site planning, and reporting in support of wartime or stability operations.

Targeting Assistance – Providing advice on the effects of targeting to avoid unnecessary destruction of infrastructure and estimate repair efforts for friendly forces.

Gap Crossing - The ability to enable joint forces to overcome breaks or openings in terrain (dry or wet, natural or man-made) by providing a system of temporary and permanent crossing techniques and equipment.

Construct and Maintain Combat Roads and Trails – Project combat power across a linear, dry obstacle by delineating routes, conducting reconnaissance, clearing ground cover, performing earthwork, providing drainage, stabilizing soil, and preparing the road surface for transit by combat and tactical vehicles.

Unexploded Explosive Ordnance (UXO)/Explosive Ordnance (EO)/Improvised Explosive Device (IED) Clearance – Performing clearance of UXO, EO, and IEDs needed to assure mobility and maneuver where and when desired, without interruption or delay, to achieve the mission. Direct combat support missions include the destruction of stockpiled and abandoned enemy ordnance, route clearance, post-attack investigation, and Counter (C)-IED operations.

Develop and Maintain Facilities - The ability to develop, rehabilitate, and maintain bases and installations by providing design, real estate, construction and environmental services which extend through final disposition.

Area Lighting – Installing, operating, and maintaining remote area lighting systems.

Asphalt Paving Operations – Designing and constructing asphalt paved surfaces.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Berm and Dike Construction – Constructing and maintaining berms and dikes for force protection and control of other resources.

Concrete Paving Operations – Designing and constructing concrete surfaces required for lines of communications and other purposes.

Construct Temporary Facilities – Erecting temporary facilities/equipment to include wooden structures, storage structures, underground water and power distribution systems.

Construction Materials Testing – Performing soils exploration, classifying soils in field conditions, and determining strength of materials.

Construction Surveying – Determining distances, areas, and angles; establishing reference points for horizontal and vertical control; marking lines, grades, and principal points; preparing maps, layout structures; determining vertical and horizontal placement of utilities, etc.

Disease Vector Surveillance/Control – Performing integrated pest management functions. Conducting pest management surveys. Determining pest management actions needed to control and prevent infestations by plant and animal pests. Interacting and coordinating with medical personnel to control health hazards.

Erect Expeditionary Facilities – Erecting expeditionary facilities and equipment to include deployable shelter systems, latrines, shower and shave units, environmental control units, generators, boilers, water production equipment, etc.

Expedient Locksmith – Troubleshooting, repairing, and installing commercially manufactured locking devices such as keyed, combination, cipher, panic hardware/exit devices, and padlocks. This does not include General Services Administration certification unless line items require it.

Fire Protection Systems - Inspecting, testing, repairing, and maintaining wet pipe, dry pipe, deluge, foam, and specialized fire protection systems.

Horizontal Construction – Managing, constructing, repairing, and modifying temporary or permanent structural systems and wooden, masonry, metal, and concrete buildings. Managing, constructing and repairing horizontal pavement structure to include asphalt, concrete and unimproved surfaces. Fabricating and repairing components of buildings, utility systems, and real property.

HVAC/R Systems – Installing, operating, and maintaining HVAC/R systems, combustion equipment, and industrial air compressors.

Lightning Arresting Protection – Installing, maintaining, testing, and troubleshooting lightning protection systems.

Master/Comprehensive Planning and Programming – Performing comprehensive planning to address the full range of issues affecting or affected by the installation's development. Through this process, goals and objectives are defined, issues are identified, information is gathered, alternative solutions are developed, and a sound decision-making process is employed to select a preferred alternative for implementation.

Passive Defense Measures – Ensuring appropriate standoff; designing effective facility and road layout; constructing berms, revetments, ditches and fences; employing barriers; installing lighting; assisting in asset dispersal, facility hardening, etc.

Pest, Animal, and Vegetation Control – Performing integrated pest management functions. Conducting pest management surveys. Determining pest management actions needed to control and prevent infestations by plant and animal pests.

Power Generation/Distribution Systems – Installing and operating electrical power production systems and equipment.

Project Management and Execution – Planning, organizing, and overseeing installation facility and infrastructure projects, ensuring entire scope of work is

accomplished in accordance with performance work statements and other predetermined criteria, on time and within budget.

Project Planning and Programming – Providing quality facilities needed to perform the mission. Ensuring project requests meet validated requirements, are in compliance with all applicable standards, are programmed at the lowest life cycle cost, achieve optimum resource efficiency and minimize damage to the natural and human environments, and are within authorities and available resources.

Service Contract Management – Validating contract requirements, preparing performance work statements, preparing surveillance plans, and conducting quality assurance evaluations for facilities operation and maintenance activities.

Vertical Construction - Constructing small and medium facilities to include pre-engineered buildings and super spans.

Waste Collection/Disposal Systems – Establishing and maintaining field sanitary landfills or other similar systems for disposal of trash and refuse. Providing design and construction services for waste collection disposal.

Waste Water Collection/Disposal Systems – Installing, maintaining, and repairing wastewater collection systems. Does not include support to operate and maintain domestic wastewater treatment plants. Wastewater disposal limited to evaporation and facultative lagoons.

Water Production/Distribution Systems – Operating and maintaining water production in field conditions. Installing, maintaining, and repairing water production system components (i.e., pumps, valves, motors). Does not provide support to operate and maintain domestic water treatment plants. Installing, maintaining, and repairing water distribution piping systems (i.e., valves, fire hydrants, booster stations, well pumps, and chlorination).

Well Drilling – Drilling and piping groundwater sources for the production of potable and non-potable water. Postured equipment capacity is 6-inch diameter wells at a maximum depth of 1,500 feet.

Establish Lines of Communication (Airfields) - The ability to assess, construct, repair, and improve routes, railroads, intermodal facilities, and supporting infrastructure to allow the speedy flow of personnel, supplies, and equipment into theater and forward to tactical units.

Aircraft Arresting System – Installing equipment used to stop aircraft by means of absorbing its momentum via a mechanical/hydraulic/pneumatic breaking system in a routine/emergency landing or an aborted takeoff.

Airfield Assessment Repair, Initial (Air Insert) – Rapidly deploying to establish initial airfield operations with personnel from supporting units. Assessing airfield capabilities, preparing helicopter or aircraft landing areas, clearing obstacles, making expedient

airfield damage repairs, and providing initial assessment of required follow-on forces and material resources to establish airfield operations. Does not include capture of airfields via forcible entry or operating on airfields controlled by other US or coalition forces or opening airfields not held by enemy forces.

Airfield Damage Assessment/Repair (ADR) – All actions including damage assessment, explosive ordnance reconnaissance, minimum airfield operating surface (MAOS) selection, UXO hazard mitigation, pavement repair, airfield marking, airfield lighting, arresting system installation, and utility system repairs required to establish, sustain, or recover flying operations capability at an airfield.

Airfield Lighting and Marking – Installing and maintaining airfield lighting to permit night flying and defining the boundaries on an aircraft landing strip or pad. (Note: Air insert RED HORSE does not maintain this capability.)

Airfield Pavement Evaluation – Performing tests and training personnel in airfield pavement standards, procuring and maintaining equipment, generating reports.

Asphalt/Concrete Milling Operations – Conducting asphalt/concrete milling operations. Heavy transport required for milling equipment.

Asphalt/Concrete Paving Operations – Conducting asphalt/concrete paving operations to include roads, taxiways, runways, ramps, ramp expansions, ADR, and other concrete operations. Heavy transport required for paving equipment.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

CBRN Assessment/Support – Conducting limited site assessments to determine presence of toxic industrial materials or CBRN hazards. Includes aircraft CBRN contamination assessments.

Firefighting/Emergency Medical Services (EMS) – Containing or hindering the spread of fires and assisting trained firefighters in protecting resources during the initial stages of opening a base/airfield.

Improve Airfields – Conducting pavement evaluations, expanding width and length of runways, reducing obstacles to air operations, improving runway surfaces, marking, lighting, arresting systems, etc.

Revetments – Assembling/erecting revetments to protect aircraft, critical equipment, and facilities.

Snow/Ice Control – Maintaining continuous mission capability by removing snow and ice from airfields and base pavements.

UXO/EO/IED Clearance – Performing rapid narrow scoped clearance of UXO, EO, and IEDs needed for initial bed-down/site survey operations. During this phase, initial EOD

teams should conduct surveys to determine the need for follow-on forces, with additional resources (people, equipment, and explosives) to conduct large-scale, sustained operations.

Global Access Engineering - The ability to enable theater access by determining and documenting infrastructure capacities, in-situ soils, hydrology, and environmental conditions, and forecast and mitigate limitations to enable deployment and improve throughput capacities.

ADR – All actions including damage assessment, explosive ordnance reconnaissance, MAOS selection, UXO hazard mitigation, pavement repair, airfield marking, airfield lighting, arresting system installation, and utility system repairs required to establish, sustain, or recover flying operations capability at an airfield.

Force Protection (FP) Construction – Serves as the AF subject matter expert on Unified Facilities Criteria (UFC) Anti-Terrorism (AT) standards.

Open the Airbase – Complete site assessments and provide expeditionary site plans and airfield survey information for development of the airfield suitability and restrictions report.

Structural Blast Analysis – Using the Vulnerability Assessment Protection Option Program (VAPO) for all critical, new, and renewed lease facilities.

Vulnerability Assessments – Ensures engineering infrastructure, installation, and/or facility design projects supporting vulnerabilities identified in the Core Vulnerability Assessment Management Program are referenced and prioritized in ACES.

Repair and Restore Infrastructure - The ability to rehabilitate critical infrastructure. This capability includes repairing or demolishing damaged buildings, restoring utilities such as electrical power, and bringing critical facilities such as hospitals, water treatment plants and waste management facilities online.

ADR – All actions including damage assessment, explosive ordnance reconnaissance, MAOS selection, UXO hazard mitigation, pavement repair, airfield marking, airfield lighting, arresting system installation, and utility system repairs required to establish, sustain, or recover flying operations capability at an airfield.

Area Lighting – Installing, operating, and maintaining remote area lighting systems.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Facilities/Infrastructure Damage Assessment/Repair – Inspecting damaged facilities, determining priority of repairs based on information provided from the emergency response plan and performing expedient repairs and permanent repairs at a later time.

HVAC/R Systems – Repairing, HVAC/R systems, combustion equipment, and industrial air compressors.

Power Generation/Distribution Systems – Maintaining, modifying, and repairing electric power generating and control systems.

Waste Collection/Disposal Systems – Providing design and construction services for waste collection disposal.

Waste Water Collection/Disposal Systems – Providing design and construction services for waste water collection disposal.

Water Production/Distribution Systems – Repairing water production system components and water distribution piping systems. Providing design and construction support for water distribution.

Well Drilling – Drilling and piping groundwater sources for the production of potable and non-potable water. Postured equipment capability is 6-inch diameter wells at a maximum depth of 1,500 feet.

Harden Key Infrastructure and Facilities - The ability to apply site- and threat-adaptable plans and designs, advanced construction techniques and materials in order to enhance the prevention or mitigation of hostile actions against materiel resources, facilities and infrastructure.

Collective Protection – Assembling systems to protect personnel inside a building, room, shelter, or tent against contamination through the combination of impermeable structural materials, air filtration equipment, air locks, and over-pressurization.

Develop FP Plan – Assisting in developing FP plan consisting of specific measures to protect facilities and critical assets. Engineer aspects of the FP plan should include elements that contribute to protection of personnel and key aspects of FP such as site layout, barrier placement, berm construction, security lighting, backup power, water source protection, expedient hardening, terrain modification, etc.

Provide Installation FP Measures – Providing protection for personnel using site layout methods, barrier placement, berm construction, security lighting, backup power, water source protection, expedient hardening, terrain modification, etc.

Master Facility Design - The ability to integrate land use, bills of material and forecasts, and construction requirements that facilitate project execution and developing infrastructure and facilities.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Installation Master Planning – Identifying, planning, and programming facilities to support assigned missions. Installation master planning is focused on the base layout, taking into account the environment, base infrastructure, and necessary subsystems, ensuring all requirements meet theater construction standards and comply with unified facilities criteria.

Project Design – Designing facilities and utilities necessary to support the estimated population, mission, and anticipated life span.

Project Planning and Programming – Identifying facilities needed to satisfy current and future requirements, determining most economical methods based on construction standards, developing estimates, obtaining funding, developing project timeline and schedule.

Combat Engineering - The ability to employ engineering capabilities and activities that support the maneuver of land combat forces and that require close support to those forces. Combat engineering consists of three types of capabilities and activities: mobility, countermobility, and survivability. (JP 3-34)

Defeat Explosive Hazards - The ability to locate and neutralize the full range of enemy and friendly explosive hazards that may impede routine operations, decrease mobility or present a threat to force protection. It includes the capability to locate, avoid, and neutralize hazards in concert with mounted or dismounted maneuver (breach) or as part of tactical/operational movement (route clearance).

Base Denial – Includes systems to rapidly clear heavy concentrations of area denial or UXO submunitions from aircraft operating surfaces; Standoff Munitions Disruption (SMUD), using projectile attack as an expedient means of rapidly disrupting large numbers of UXO; specialized vehicle-borne IED and CBRN defeat capabilities; and explosive demolition.

Base Opening Procedures – Explosive Ordnance Disposal teams may augment other airbase opening forces such as special tactics teams, crisis response force (CRF), and airfield assessment teams when intelligence or threat analysis expects unexploded explosive ordnance contamination or if improvised explosive devices are suspected.

Combat Support Missions – Destruction of stockpiled and abandoned enemy ordnance, route clearance, conduct post-attack investigation, conduct C-IED operations, render safe and removal of unexploded ordnance, and defeat improvised explosive devices.

Explosive Ordnance Disposal (EOD) – Identify, evaluate, safe, recover, and dispose of any explosive threat to include abandoned munitions; UXOs; IEDs; weapons of mass destruction (WMD); and chemical, biological, radiological, and nuclear (CBRN).

Small Unit Tactics – Operate, maintain, and employ weapons, including but not limited to, individually assigned small arms, crew served weapons and remote weapon systems.

Wartime Range Clearance – Sub-surface recovery of (sometimes deeply buried) ordnance.

Geospatial Engineering - The ability to portray and refine data pertaining to the geographic location and characteristics of natural or constructed features and boundaries in order to provide engineer services. Examples include: terrain analyses, terrain visualization, digitized terrain products, nonstandard tailored map products, facility support, and force beddown analysis. (JP 3-34)

Utilize Geospatial Data - The ability to provide the Joint Force Commander with the foundation layer of the operational environment for use with collaborative decision-support, and terrain analysis tools.

Geospatial Information Systems (GIS) – Collecting and using GIS data for installation planning.

Base and Installations Support - The ability to provide enduring bases and installations with the assets, programs, and services necessary to support US military forces.

Real Property Life Cycle Management - The ability to acquire, operate, sustain, recapitalize, realign, and dispose of real property assets to meet the requirements of the force.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Installation Master Planning – Identifying, planning, and programming facilities to support assigned missions. Installation master planning is focused on the base layout, taking into account the environment, base infrastructure, and necessary subsystems, ensuring requirements meet theater construction standards and comply with unified facilities criteria.

Provide Installation Assets - The ability to purchase, lease, program for construction, or gain real property installation assets by any other means, including all land, natural resources, anything growing on the land, buildings, structures, housing, stationary mobile facilities, linear structures, firmly attached and integrated equipment (such as light fixtures), plus all "interests" in the property such as easements, oil and mineral rights, or use water and airspace.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Identify Facility Requirements – Coordinating with contracting and legal functions to purchase, lease, program for construction, or gain installation assets, including all land, natural resources, buildings, structures, portable facilities, airfields and roads, installed equipment, etc.

Facilities Support - The ability to provide functional real property installation assets with utilities - energy, water, and wastewater; contract and real property management; pollution prevention; and essential services throughout natural or man-made disasters.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Base Operating Support (BOS) – Directly assisting, maintaining, supplying, and distributing support of forces at the operating location to achieve the mission and maintain the operation of its infrastructure.

Design Management – Providing technical support and contract management for planning and designing base infrastructure.

Energy Security – Establishing and executing a facility infrastructure energy program.

Installations and Facilities – Providing, operating, maintaining, restoring, and protecting the built and natural infrastructure necessary to support the Air Force mission.

Operational Range Clearance (Testing and Training) Support – Clearing operational ranges and test and evaluation ranges of UXO. While normally a surface clearance, operational test and evaluation ranges sometimes require sub-surface recovery of deeply buried experimental ordnance.

Real Property HVAC/R Systems – Installing, operating, maintaining, and repairing heating, ventilation, air conditioning, and refrigeration systems, combustion equipment, and industrial air compressors.

Real Property Management – Maintaining an accurate inventory of all Air Force-controlled real property and real property installed equipment with descriptions of current physical condition, capacity, sizes, and uses.

Real Property Power Generation/Distribution Systems – Installing, operating, maintaining, and repairing electrical power production systems and associated equipment.

Real Property Waste Collection/Disposal Systems – Developing performance work statements to procure waste collection and disposal equipment and services; developing waste management plans; providing administrative oversight for waste collection and disposal activities.

Real Property Waste Water Collection/Disposal Systems – Installing, inspecting, maintaining, troubleshooting, modifying, and managing waste water treatment systems.

Real Property Water Production/Distribution Systems – Installing, inspecting, maintaining, troubleshooting, modifying, and managing plumbing and water distribution systems.

Sustainment of Installation Assets - The ability to assess, preserve, maintain, and repair any built, natural, and cultural installation assets. Includes regular surveys and inspections, and measures to comply with environmental and conservation requirements.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Environmental Program Management and Compliance – Developing environmental plans to protect the health of the population, preserve the environment, reduce waste, and comply with international treaties, overseas environmental baseline guidance documents, final governing standards, etc.

Preventive Maintenance and Inspection of Installation Facilities, Utilities, and Infrastructure – Providing effective assessment, maintenance, and repair of current assets and planning for future missions. Regularly surveying the installation layout, facilities, and equipment, and performing preventive maintenance as needed.

Recapitalization of Installation Assets - The ability to perform the restoration, modernization, and replacement of installation assets to meet tenant requirements and comply with safety and environmental laws to include cleanup of contamination from hazardous substances, pollutants, and contaminants.

Installation Management – The process of better quantifying, articulating, and managing risk while supporting the mission with assets of the right size, condition, and cost to maximize value and utility of built and natural infrastructure. Installation management applies standard levels of service across the Air Force, and integrates existing processes across all civil engineer divisions/flights. Installation management provides resource visibility, supports advocacy and resource allocation, and enables analysis to balance costs, risks, and benefits.

Installation Master Planning – Installation master planning is focused on the base layout, taking into account the environment, base infrastructure, and necessary subsystems, ensuring all requirements meet theater construction standards and comply with unified facilities criteria.

Project Design – Designing facilities and utilities necessary to support the estimated population, mission, and anticipated life span.

Project Management and Execution – Planning, organizing, and overseeing installation facility and infrastructure projects, ensuring entire scope of work is accomplished in accordance with performance work statements and other predetermined criteria, on time and within budget.

Project Planning and Programming – Identifying facilities needed to satisfy current and future requirements, determining most economical methods based on construction standards, developing estimates, obtaining funding, developing project timeline and schedule.

Remediation/Restoration of Environmental Sites – Conducting cleanup of spills and environmental contamination that poses known imminent and substantial endangerment to the health and safety of US/coalition forces and host nation noncombatants.

Disposal of Installation Assets - The ability to conduct demolition and disposal activities resulting in the removal of installation assets from the asset inventory by any means, with consideration of the impact to local communities.

Asset Management – Planning, acquiring, managing, and divesting real property to ensure the overall sustainability and support of Air Force missions, as well as the larger defense requirements of the Department of Defense.

Redeploy Air Force Expeditionary Facilities, Utilities, Infrastructure, and Vehicles/Equipment – The dismantling, readying, and transporting of expeditionary construction, vehicles, and equipment, as required.

Installation Services - The ability to deliver selected services not related to real property (or personnel services) to meet the requirements of the installation population and mission.

Emergency Services - The ability to protect and rescue people, facilities, aircrews, aircraft and other assets from loss due to accident or disaster.

Aerospace Vehicle Mishap Response/Recovery – Supporting sortie generation and space operations by responding to airfield emergencies to render safe ordnance and aerospace launch platforms during in-flight and ground emergencies. Planning, organizing, directing, and assisting in safing, removing, and disposing of EO, explosive hazards, and classified components on or in operational aerospace platforms during crash situations.

Aircraft Rescue and Firefighting – Firefighting actions taken to rescue persons and to control or extinguish fire involving or adjacent to aircraft on the ground.

Air Force Emergency Management (EM) Program – The single, integrated Air Force program that implements the mission, vision, and strategic goals and objectives as well as the management framework to prepare for, protect against, respond to, recover from,

and mitigate the direct and indirect consequences of an emergency or attack. The Air Force EM program is managed by the Office of The Civil Engineer (AF/A7C).

Air Force Incident Management System (AFIMS) – A methodology designed to incorporate the requirements of Homeland Security Presidential Directive (HSPD)-5, the National Incident Management System (NIMS), the National Response Framework (NRF), and Office of the Secretary of Defense (OSD) guidance while preserving the unique military requirements of the expeditionary Air Force.

All Hazards Response – Describing an incident, natural or man-made, that warrants action to protect life, property, environment, and public health or safety, and to minimize disruptions of government, social, or economic activities.

Antiterrorism (AT) – Locating, identifying, and neutralizing explosive hazards and triggering devices; defeating criminal and terrorist explosive devices. Training others on IED recognition, hazards, and precautions. Providing Terrorist Response and Terrorist Consequence Management planning and operations.

Detect/Sample/Identify CBRN/TIM Hazards – Locating CBRN/TIM hazards by use of CBRN detectors or monitoring or survey teams. Collecting representative amounts of gas, liquid, solid or characteristics of one of these, such as gamma or ph, to analyze. Determining which CBRN/TIM material or pathogen is present.

Emergency Operations Center (EOC) Operations – Providing C2 to direct, monitor, and support the installation's actions before, during, and after an incident. The EOC is the physical location at which the coordination of information and resources to support incident management activities normally takes place.

EMS/Emergency Medical Responder (EMR) – Non-transport services provided to patients facing immediate medical emergencies that occur outside of military treatment facilities.

EOD Initial Threat Assessment, Confirmation, Risk Mitigation, Site Stabilization – Obtaining as much information as possible to develop a plan of attack to include gathering information on perpetrator/target; threat analysis; employing detection assets, providing safe approach, and conducting diagnostics.

Federal Agency and Civil Authority Support – Providing assistance to federal and civil authorities by preparing for, deterring, or responding to terrorist or other criminal acts, accidents, found explosive items, and other requests for support. (Note: Support includes US Secret Service, US State Department, and Joint EOD Very Important Persons Protection Support Activity taskings.)

Fire Prevention – Measures such as training, public education, plans reviews, surveys/inspections, engineering reviews, and life safety code enforcement directed toward avoiding the inception of fire and minimizing consequences if a fire occurs.

Hazardous Material Incident Response – Responding to an incident where a hazardous material is present. Hazardous material is a substance (solid, liquid, or gas)

that, when released, is capable of creating harm to people, the environment, and property.

Incident Command – Providing incident command system organizational element responsible for overall management of the incident and consisting of the incident commander (either single or unified command structure) and any supporting staff.

Integrated Incident Management – Assisting with the broad spectrum of activities and organizations providing effective and efficient operations, coordination, and support applied at all levels of government, using both governmental and nongovernmental resources to plan for, respond to, and recover from an incident.

Mortuary Services - Explosive Hazard Analysis/Removal – Detecting, identifying, and removing explosive hazards left on or embedded in human remains during port mortuary operations, theatre remains processing, prisoner of war (POW)/missing in action (MIA) recoveries, mass fatality support operations, and other operations involving human remains.

Nuclear Weapons/Weapons of Mass Destruction (WMD)/CBRN Accident/Incident Response – Locating CBRN contamination, assessing damage, and aiding in the recovery and cleanup following a WMD attack. For nuclear weapons, efforts may include locating, securing, assessing, and recovering a nuclear weapon involved in an accident, and preparing the recovered weapon for transfer to the Department of Energy.

Operational Range Clearance – Clearing active bombing and gunnery ranges in coordination with range management officials and environmental agencies.

Structural Firefighting – Performing rescue, fire suppression, and property conservation activities in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.

Urban Search and Rescue – Locating, rescuing (extricating), and initial medical stabilization of victims trapped in confined spaces.

UXO Recovery Operations – Clearing UXO during runway and airbase recovery operations, and neutralizing hazards from explosive-related incidents, which, because of unusual circumstances, present a threat to operations, installations, personnel, or materiel.

Weapons Technical Intelligence – Conducting post-blast analysis and explosive device exploitation to gather information to build a common picture of enemy capabilities, inform commanders of new enemy tactics, techniques, and procedures, and support material developers in building necessary countermeasures.

Housing Services - The ability to manage housing or billeting assignments, referrals, and physical asset management, and provide necessary furnishings and equipment.

Furnishings Management – Manages the installation furnishings and appliances

Program. Provides furnishings for government owned/controlled family housing, unaccompanied housing, and General Officers including Special Command Positions. In addition to housing, provides furnishings for base lodging facilities, Airmen Leadership School sleeping areas and lounges, alert facilities and fire stations sleeping and entertainment areas. Ensures efficient use and storage, accurately account for, properly dispose of, or adequately safeguard furnishings.

Government Owned/Leased Family Housing – Operates and manages Military Family Housing, General Officer Homes, and Unaccompanied Housing for permanent party members including technical training students. Briefs residents on DOD and AF FH management standards regarding tenant liability, resident responsibilities for cleaning, and for maintenance and repair (M&R) of their unit. Monitors planning and programming and manages programs to replace, improve, operate, maintain, repair and lease required FH and UH quarters. Conducts initial, pre-termination and final management and resident inspections. Budgets, controls and authorizes expenditures for the MFH and O&M programs.

Housing Referral and Relocations (HRR) – Ensures DOD personnel and their families receive equal housing opportunities regardless of race, color, religion, national origin, gender, familial status or handicap. Works with government agencies, public utilities, civic organizations and community leaders to provide adequate community housing assets. Counsels and advises members and their families regarding all of their available housing options. Helps eligible DOD personnel find adequate community housing that meets AF standards. Mediates community housing complaints and inquiries into allegations of housing discrimination against applicants for community housing and recommends action to the Installation Commander.

Privatized Housing (PH) – Provides members information on PH, referral policies and lease requirements and refers interested housing applicants to the Property Management Office (PMO). Assists the Project Owner (PO) in marketing PH to eligible and other eligible tenants to help maximize occupancy. Ensures that appropriate compliance testing has been accomplished, maintains adequate records to demonstrate compliance, and submits quarterly compliance checklists to the AF Portfolio Manager. Reviews and coordinates on the Project Owner's annual budget submission, and other financial statements, in accordance with the transaction documents and provides comments to Portfolio Management. Monitors and analyzes trends, identifies areas of concern and ensures status is provided to installation leadership, MAJCOM and AFCEC. Updates and validates annual Utility Rates. Facilitates, in partnership with PMO, the Management Review Committee meetings.

Range Management - The ability to safely maintain, schedule, control and monitor ranges, and uses associated with airspace/sea space and safety zone environments related to fixed point (non-maneuver) ranges.

Range Clearance – Render safe and dispose of unexploded ordnance; environmental UXO remediation is usually only a surface clearance.

Command and Control - The ability to exercise authority and direction by a properly designated commander or decision maker over assigned and attached forces and resources in the accomplishment of the mission.

Organize - The ability to align or synchronize interdependent and disparate entities, including their associated processes and capabilities to achieve unity of effort.

Establish and Maintain Unity of Effort with Mission Partners, and Foster Organizational Collaboration – The ability to foster, maintain, and establish internal structures and processes with mission partners and partner organizations.

Cultivate Relations with Mission Partners and Partner Organizations – The ability to facilitate professional and personal relationships and sustain synergy with military and civilian counterparts.

Air Advisor Building Partnership (BP) Engagements – This type of engagement is focused on building relationships and rapport with partner nation personnel.

CST – Home Station Training (HST) such as unit leadership and operations in a joint environment. CST is often performed with multiple organizations, which fosters inter-organizational coordination.

Contingency Construction Training – Home Station Training (HST) for civil engineer officer and enlisted personnel which includes construction skills, routine operations, planning and design, horizontal/vertical construction, and construction management. Units perform a minimum of one multi-trade construction project every 12 months for active duty and every 24 months for Air Reserve Component civil engineers. Such projects facilitate professional and personal relationships with military and civilian counterparts.

Defensive Operations Training – Hands on training for personal and work party security, convoy operations, military vehicle operator training, air base defense, defensive fighting positions, revetments and obstacles. This training is often provided by multiple organizations, which fosters inter-organizational coordination.

Field Sanitation and Health Training – Home Station Training (HST) such as personal hygiene, control of communicable diseases, kitchen and mess sanitation, extreme climate problems, field hygiene, water purification and related topics. This training is often performed with multiple organizations, which fosters inter-organizational coordination.

Force Beddown Training – Includes information on BEAR assets, package configuration, and playbook options. Lessons cover items such as base layout, utility systems, facility hardening, and environmental protection. This multi-disciplinary training facilitates professional competence and personal relationships.

Realistic Military Training (RMT) Off Federal Real Property – The use of training

environments off federal property when required once they have been properly coordinated with local (e.g., civil, tribal, and private) authorities and when the requirements in DODI 1322.28 have been met. This training cultivates coordination with local authorities which may be of value during Defense Support of Civil Authorities (DSCA) and Homeland Defense missions.

Silver Flag Exercises – SORTS-reportable exercise training highlighting command and control of civil engineer forces through various exercise scenarios, which enhances organizational coordination.

S-Team Training – Staff training above wing level to include Contingency Wartime Planning Course, Deliberate and Crisis Action Planning and Execution System, and Joint Operation Planning and Execution System to enhance synergy with staff counterparts.

Structure Organization to Mission – The ability to dynamically organize elements, assess and integrate capabilities, and define roles, responsibilities, and authorities.

ART – ART collects and collates unit-reported data to answer, in whole or in part, the following questions: Are UTCs able to accomplish their Mission Capability (MISCAP) statement? Are UTCs able to accomplish their deployment tasking? Are adequate resources and training available in order to accomplish and sustain the AEF mission(s)? ART complements readiness data reported in Status of Resources and Training (SORTS) by focusing on the modular, scalable capability-based UTCs designed to meet the needs of the AEF while SORTS is unit-centric.

CBRN Control Center – Serves as an advisory element to the EOC and the Installation Commander on hazards, countermeasures, and protective actions.

Commander's Expectations for Air Force (AF) Civil Engineers (CE) – See War Mobilization Plan (WMP-1), CE Supplement, Enclosures A-I for information on mission requirements, direction, and guidelines for periods of national emergency or war. They give general guidelines to aid in disaster planning and background information for base level planning.

Crisis Action Team (CAT), EOC, Unit Control Center (UCC) – Command and control nodes activated during a contingency situation. Operations are composed of pre-designated personnel scalable to meet the specific requirements of each situation.

DRRS – Sole readiness reporting system for the Department of Defense (DOD), which establishes a capabilities-based, adaptive, near real-time readiness reporting system for the DOD to measure the readiness of military units to meet missions and goals assigned by the Secretary of Defense.

EOC – Provides an organizational structure with command and control functions necessary to place multiple measured response and recovery plans into action and implement them as needed. The EOC determines mission capability, allocates resources and personnel, and ensures the effective direction of personnel supporting response and recovery operations.

Engineer Operations Management – Manage and control work requirements and logistics support for the CE workforce. Included are CE operations management, planning, vehicle management, and material acquisition. Information management systems used to manage, control, plan, schedule, and program work requirements include the Interim Work Information Management System (IWIMS) and the Automated Civil Engineer System (ACES).

Hub and Spoke Concept – Base master planning, programming, technical design, contract development and oversight, light troop construction, and repair of expeditionary bases, facilities, utilities, and force beddown conducted while strategically located in a hub-and-spoke configuration from different locations. This concept provides unity of command while allowing theater-wide integration of engineer forces and effective use of limited resources.

Review Unit Manpower Documents (UMDs) and Mission Capability Statements (MISCAPs) – Review of the UMD and the MISCAPs of the UTCs reflected on their DOC statement, assists commanders in assigning roles and responsibilities for tasked missions.

SORTS – SORTS is an internal management tool used to provide data critical to crisis planning, provides for the contingency and peacetime planning processes, and is used by the Chief of Staff United States Air Force (CSAF) and subordinate commanders in assessing their effectiveness in meeting Title 10, "United States Code," responsibilities to organize, train, and equip forces for combatant commands.

Tailor AF CE UTCs – Consists of reviewing, comparing, and adjusting AF CE UTCs with mission requirements.

Work Control – Managing, controlling, planning, scheduling, and programming work requirements. Air Force model automated systems are the Interim Work Information Management System (IWIMS) and the Automated Civil Engineer System (ACES), which can transmit data to higher headquarters.

Establish Collaboration Policies and Procedures – The ability to promulgate authoritative direction that facilitates the exchange of information and ideas.

Checklists – Checklists outline actions to be taken in response to emergencies, abnormal, or recurring circumstances; to implement Alert Condition (LERTCON) actions (e.g., Emergency Action Messages [EAM]); or to implement operational order (OPORD) or operational plan (OPLAN) requirements. They are brief, concise, and lead controllers through an orderly and prioritized sequence from initiation to completion.

Common Operating Procedure (COP) – A single identical display of relevant information shared by more than one command. A COP facilitates collaborative planning and assists all echelons to achieve situational awareness.

Defense Support of Civil Authorities (DSCA)/Mutual Aid Agreements – Activities and

measures taken by DOD Components to foster mutual assistance and support between the DOD and any civil government agency in planning, preparing for, or applying military forces and resources in response to, civil emergencies or attacks, including national security emergencies. They set up arrangements where organizations with like capabilities can support each other when called upon in an emergency. FES, SF, and the medical group often enter into these agreements. A major advantage is the speed in which support is initiated. Usually only a phone call from one organization to the other is needed.

Host Nation Support (HNS) Agreements – Used interchangeably with the term "memorandum of understanding (MOU)." A high level agreement between two countries.

Host-Tenant Support Agreements (HTSA) – These detail the relationship between a host base and tenant units. The agreement specifies what support the host base provides to a tenant organization and the responsibilities of the tenant. HTSAs are typically peacetime agreements including a commitment of resources (i.e., reimbursable utilities), but does not typically apply to emergency situations other than disaster response. Occasionally, however, there are units on base that have special capabilities that can be used in a disaster.

Informal Agreements – These are probably the most useful in obtaining emergency response support and are also the most common. They are quicker to produce, with a handshake enough to seal the agreement. The value of such agreements depends on the personality and integrity of the participants, but in most cases, except possibly with a foreign host, they achieve the same results. Foreign hosts may be willing, but are often limited as to what they can do without getting approval from higher headquarters. Informal agreements with outside DOD agencies must be coordinated with the legal office to ensure they are not in violation of law.

Inter-Service Support (also called Intra-Agency Support) – The support provided by the Air Force to a DOD Component. When ANG is the receiver on an AF Active Duty base, with AF property and AF appropriations, the relationship is also considered an inter-service support agreement. Use AFI 25-201, *IS, IA and IA Support Agreement Procedures*.

Intra-Service Support – The support provided by the Air Force to another Air Force unit to include AFRC. When the ANG is the supplier on AF Active Duty or ANG property, with 100 percent AF appropriations (i.e., funds provided by the AF instead of the States), it will be considered an intra-service relationship. ANG to ANG (between different states) support agreements will also be considered intra-service (within the Air Force). Use AFI 25-201, *IS, IA and IA Support Agreement Procedures*.

Joint Support Plans (JSPs) – A formal agreement between the host nation installation commander, the USAF commander who will use the facilities, and the USAF support base commander. It implements more general country-to-country agreements. Consequently, it will probably not be easy to alter the agreement, nor will it be done quickly. The terms and conditions in Joint Support Plans differ by country and by base. Guidance for this plan is theater specific.

Understand and Plan – The ability to individually and collectively comprehend the implications of the character, nature, or subtleties of information about the environment and situation to aid decision-making, and the ability to establish a framework to employ resources to achieve a desired outcome or effect.

After Action Reports (AAR) – AARs are the means by which the AF records issues, best practices, and lessons learned from major exercises, operations, and experiments. Reviewing AARs from previously deployed units will increase mission awareness and the likelihood of success for follow-on units.

Base Comprehensive Planning Process – Component Plan O (Contingency Plan) contains information on land use, addressing such issues as wartime disposal of toxic wastes, human wastes, and solid refuse.

Concepts of Operation (CONOPS) – CONOPS describe key AF mission areas and/or functional areas for enabling desired joint warfighting effects in accordance with national, joint, and service guidance. AF CONOPS provide the conceptual foundation for the Capabilities Review and Risk Assessment and the AF capabilities-based planning process.

GIS – Provide GIS data for installation planning.

Information Gathering from Off-Base Agencies – Consulting with local Civil Defense, Red Cross (or Red Crescent), host nation civil and military authorities, and other emergency response agencies and officials can help form a clear picture of the kinds of hazardous materials transported near the base and how often they pass. They may be able to provide a local history of the area's natural disasters, major accidents, and intentional acts that caused significant damage (set forest fires, vandalism on facilities, etc.). This can also help clarify what CE can do for them and what they can do for CE. The US Army Corps of Engineers can help determine the probability of the base suffering floods or other kinds of related disasters. USAF units with similar missions, or in similar areas, and the MAJCOM can provide guidance on the historical trends of incidents that happen to bases in similar circumstances or with similar missions. If overseas, units that provide short range and point air defenses and perimeter security will have additional threat information.

Information Gathering from On-Base Agencies – The wing plans office has information about the wing's mission. Group and unit planning offices know their capabilities and weaknesses, which will help determine the adequacy of the current level of protection. Wing intelligence and the Office of Special Investigation can identify enemies. Security Forces, safety office, and FES have records on major accidents or mishaps. The bioenvironmental engineers, FES, and the logistics group's maintenance, supply, and transportation units can provide the location, quantities, common uses, and transportation details of most hazardous materials on base. The supporting weather shop has information on the local natural disaster hazards.

Installation Development Plan (IDP) – A summary of the strategic goals and supporting geospatial and written information to advocate for the health and welfare of natural and built resources through project programming, energy initiatives, and encroachment solutions on and off the installation. The document highlights installation capacity, sustainability, and future development.

Lessons Learned (L2) – An L2 is an observation that, when resolved, results in an improvement in military operations or activities at the strategic, operational, or tactical level and results in long-term, internalized change to an individual or an organization. Reviewing L2s pertinent to an upcoming mission may help avoid similar issues.

Major Command (MAJCOM) Instructions and Planning Guidance – MAJCOM guidance, often provided in OPLANs, that each base in their command is expected to follow. Bases may find additional command guidance at the Wings Plans office, the Logistics Plans office, and the CE Readiness and Emergency Management Flight. Many of the common references are listed at the end of this section.

USAF WMP-1 Volume 1, CE Supplements – The CE Supplements to the WMP-1 provides information on mission requirements, direction, and guidelines for periods of national emergency or war. They give general guidelines to aid in disaster planning and background information for base level planning.

Decide, Direct, and Monitor – The ability to select a course of action informed and influenced by the understanding of the environment or a given situation, employ resources to achieve an objective, and observe and assess events/effects of a decision.

CBRN Control Center – The CBRN Control Center facilitates force survivability and mission continuation for forces on and off the installation. The control center directs CBRN reconnaissance activities to shape the hazards and advises the commander on hazards, countermeasures and protective actions. The CBRN Control Center plots and maintains CBRN hazards status on the airbase, in off-base areas of operational concern, and at potential recovery bases.

Emergency Responders – The response element of a Disaster Response Force that deploys to the accident scene after the First Responders to expand C2 and perform support functions. CE Emergency Responders include follow-on elements such as firefighters, emergency management personnel, and EOD personnel.

EOC – The C2 support elements that directs, monitors, and supports the installation's actions before, during, and after an incident.

Facilities Board (FB) – The FB is the installation's local decision-making body for the acquisition, construction, use, maintenance, modification, consolidation, development, demolition, and disposal of built and natural infrastructure at Air Force managed installations. The FB ensures an installation asset portfolio perspective is applied in all decisions and advisory actions. Additional working groups/sub-working groups may be

directed by the Installation Commander. At overseas locations, coordination with host nation liaison offices and/or host nation Forces/NATO representatives may be required.

First Responders – The Disaster Response Force elements that deploy immediately to the disaster scene to provide initial C2, to save lives, and to suppress and control hazards. Firefighters and Explosive Ordnance Disposal (EOD) personnel during Improvised Explosive Device and nuclear accident response operations provide the initial, immediate CE response to a CBRNE incident.

Protection - The ability to prevent/mitigate adverse effects of attacks on personnel (combatant/non-combatant) and physical assets of the United States, allies and friends.

Mitigate - The ability to minimize the effects and manage the consequence of attacks (and designated emergencies) on personnel and physical assets.

Mitigate Lethal and Non-Lethal Effects - The ability to minimize the effects of attacks or designated emergencies which have/don't have the potential to kill personnel and destroy physical assets.

Chemical, Biological, Radiological, and Nuclear - The ability to minimize the effects of chemical, biological, radiological, and nuclear attacks which have/do not have the potential to kill personnel and destroy physical assets.

Contamination Control Area (CCA) Processing – Perform contamination control measures specific to the incident for both peacetime incidents and wartime operations.

Mass Casualty Management – Treatment for mass casualties is often limited to life- or limb-saving care, and triage must be conducted within strict guidelines. Medical staffs conducting triage should know the differences in triage priorities that occur, depending on which CBRN agent is suspected. For example, while it is important that patients be decontaminated before they are admitted to an uncontaminated area, radiation-contaminated casualties usually pose a low risk to health care workers, so treatment may be started before decontamination.

Mass Fatality Management – Requires contaminated remains be processed through the mortuary affairs decontamination collection point. In general, an appropriate medical authority (the theater mortuary affairs officer, medical examiner), possibly in coordination with the joint security coordinator, will determine the degree of hazard and appropriate disposition of human remains.

Restoration Operations – Provide a critical foundation for post-conflict planning to eliminate adversary capabilities, restore forces and infrastructure to normal capability, and establish effective monitoring and other controls. Restoration operations after a CBRN attack must include actions to reduce MOPP, effectively treat CBRN-affected personnel, decontaminate affected equipment, and conduct CBRN vulnerability and capability assessments.

Explosives and Projectiles - The ability to minimize the effects of explosive and projectile attacks which have/do not have the potential to kill personnel and destroy physical assets.

Counter-Improved Explosive Device (C-IED) Operations – Eliminate or mitigate explosive hazards and terrorist/criminal devices, to include missions outside the base boundary or Base Security Zone to enable greater freedom of maneuver for air or surface operations.

Destruct Stockpiled/Abandoned Ordnance – A direct combat support mission to recover/destroy weapon caches.

Explosive Demolition – A special capability system used for base denial effects.

Reduce Area Denial – A special capability system used to rapidly clear heavy concentrations of area denial or UXO submunitions from aircraft operating surfaces.

Route Clearance – A direct combat support mission that ensures lines of communication are free from explosive threats.

Standoff Munitions Disruption (SMUD) – A special capability system using projectile attack as an expedient means of rapidly disrupting large numbers of UXO.

Natural Hazards - The ability to minimize the effects of attacks or designated emergencies which have/do not have the potential to kill personnel and destroy physical assets.

EMS – Services provided to patients facing immediate medical emergencies that occur outside of military treatment facilities.

EOC Operations – Coordinating information and resources to support incident management (on-scene operations) activities. EOC may be a temporary facility or located in a more central or permanently established facility, perhaps at a higher level of organization within a jurisdiction. EOCs may be organized by major functional disciplines (e.g., fire, law enforcement, medical services), by jurisdiction (e.g., federal, state, regional, tribal, city, county), or by some combination thereof.

Structural Firefighting – Performing rescue, fire suppression, and property conservation activities in buildings, enclosed structures, aircraft interiors, vehicles, vessels, aircraft, or like properties that are involved in a fire or emergency situation.

Building Partnerships - The ability to interact with partner, competitor or adversary leaders, security institutions, or relevant populations by developing and presenting information and conducting activities to affect their perceptions, will, behavior, and capabilities in order to build effective, legitimate, interoperable, and self-sustaining strategic partners.

Shape - The ability to conduct activities with partner leaders, security institutions, and relevant populations to build defense relationships that promote shared global security interests, develop allied and friendly security capabilities for self-defense and multi-national operations, and provide U.S. forces with peacetime and contingency access to a host nation.

Build the Capabilities and Capacities of Partners and Institutions - The ability to assist domestic and foreign partners and institutions with the development of their capabilities and capacities -- for mutual benefit -- to address U.S. national or shared global security interests.

Enhance Partner Capabilities and Capacities - The ability to assess and facilitate the development of partner capabilities and capacities in a manner that takes into account the partner's ability to sustain them and advances partnership goals and mutual interests.

Air Advising – Assess, train, advise, assist, and equip partner nation personnel in development and operation of basic aviation infrastructure. Educate and train on foundational skills for USAF standard and partner nation ground equipment.

Engineer Skills Training for Building Partnerships – Air Force civil engineers are a valuable asset to building partnerships providing skills, knowledge, and experience to assist local governments in recovering from disasters or to become self-sufficient.

Multi-Trade Construction Project – Completing the inherently AF requirement of one multi-trade construction project every twelve months will increase the unit's ability to be efficient at providing aid during a building partnership event or subject matter exchange.

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Civil Engineer working groups
Career field analyst descriptions

APPENDIX B: PRIME BEEF/RED HORSE CAPABILITIES

Last Updated: 30 December 2014

This appendix lists capabilities that Prime BEEF and RED HORSE teams are organized, trained, and equipped to provide in support of military operations. The capabilities are laid out in corresponding "tiered" levels with the Joint Capabilities Areas (JCAs), a standardized set of definitions that cover the full range of military operations.

It is important to differentiate between primary and secondary capabilities listed in the table below. A primary capability (P) is one in which the ability to perform the function is organic to the unit and is a specified task within the unit mission; the unit is also equipped and trained to accomplish the task. A secondary capability (S) is one in which the unit has limited ability (training, expertise, equipment) to accomplish the task.

LEGEND			
	JCA Tier 1	P-	Primary capability
	JCA Tier 2	S-	Secondary capability
	JCA Tier 3	1-	Prime BEEF Operations Teams
	JCA Tier 4	2-	RED HORSE
	AF Tasks	3-	Prime BEEF Explosive Ordnance Disposal (EOD)
		4-	Prime BEEF Fire Emergency Services (FES)
		5-	Prime BEEF Emergency Management (EM)
		6-	Prime BEEF Specialized Teams (see pages 17-18)

Task	Type
Force Support	
Force Management	
Global Force Management	
Readiness Reporting	
AEF UTC Reporting Tool (ART)	S[2,5]
Defense Readiness Reporting System (DRRS)	S[2,5]
Facility Priority Listing	P[1]
Status of Resources and Training System (SORTS)	S[2,5]
Force Preparation	
Training	
Contingency Skills Training (CST)	P[2]

Field Training	P[2]
Home Station Training (HST)	P[1,3,4,5,6]
Mission Essential Equipment Training (MEET)	P[1]
Silver Flag (SF) Exercise Training	P[1,3,4,5]
Special Capabilities Training	P[2,6]
Staff Augmentation Team (S-Team) Training	P[6]
Vehicle/Equipment Training	P[1,2,3,4,5,6]
Weapons Training	P[1,2,3,4,5,6]
Exercising	
Contingency and Wartime Chemical, Biological, Radiological and Nuclear (CBRN) Attack Response	P[1,3,4,5]
Major Accident Response including Hazardous Material (HAZMAT)	P[1,3,4,5]
Natural Disaster Response	P[1,4,5]
Response to Terrorist Attack with CBRN Materials	P[1,3,4,5]
Battlespace Awareness	
Collection	
Measurements and Signatures Collection	
Chemical/Biological Materials and Nuclear Radiation (CBRN)	
Analysis	P[5]
Modeling	P[5]
Prediction	P[5]
Logistics	
Logistics Services	
Water and Ice Service	
Bulk Water (non-potable and potable)	
Expeditionary Drinking Water Systems/Processes	P[1,2]
Expeditionary Ice-Making Capabilities	P[1,2]
Expeditionary Water Distribution & Storage Systems	P[1,2]
Expeditionary Water Treatment	P[1,2]
Local Municipality Tie-In	P[1,2]
Reverse Osmosis Water Purification Unit (ROWPU)	P[1,2]
Well-Drilling	P[2]
Contingency Base Services	
Shelter	
Expeditionary Construction	P[1,2]
Initial Construction	P[1,2]
Permanent Construction	P[1,2]
Semi-Permanent Construction	P[1,2]
Temporary Construction	P[1,2]
Utility Operations	

Expeditionary Graywater Disposal	P[1], S[2]
Expeditionary Heating, Ventilation, Air Conditioning, Refrigeration (HVAC/R) Systems and Controls	P[1,2]
Expeditionary Power Production and Distribution	P[1,2]
Expeditionary Solid Waste Disposal	P[1], S[2]
Expeditionary Wastewater Disposal	P[1], S[2]
Water Reuse	
Bare Base Planning	P[1], S[2]
ROWPU Operations	P[1], S[2]
Hygiene Services	
Personal Hygiene Services	
Expedient Field Facilities	P[1], S[2]
Expedient Latrine Facilities	P[1], S[2]
Engineering	
General Engineering	
Base Denial	P[1,2,3,4,5]
Batch Plant Operations	P[2]
Contingency Contract Management	P[1,2]
Engineer Reconnaissance/Site Survey	P[1,2]
Explosive Demolition Operations	P[2], S[6]
Provide Technical Engineer Advice	P[1,2,3,4,5,6]
Quarry Operations	P[2]
Staff Augmentation (Echelon Above Wing)	P[1,4,5,6]
Targeting Assistance	P[1,6], S[2,3,5]
Gap Crossing	
Construct and Maintain Combat Roads and Trails	P[1,2]
Unexploded Explosive Ordnance (UXO)/Explosive Ordnance (EO)/Improvised Explosive Device (IED) Clearance	P[3]
Develop and Maintain Facilities	
Area Lighting	P[1,2]
Asphalt Paving Operations	P[1,2]
Asset Management	P[1,2,3,4,5,6]
Berm and Dike Construction	P[1,2]
Concrete Paving Operations	P[1,2]
Construct Temporary Facilities	P[1,2]
Construction Materials Testing	P[2,6], S[1]
Construction Surveying	P[1,2]
Disease Vector Surveillance/Control	P[1,2]
Erect Expeditionary Facilities	P[1,2]
Expedient Locksmith	P[1]

Fire Protection Systems	P[1], S[4]
Horizontal Construction	P[2], S[1]
HVAC/R Systems	P[1]
Lightning Arresting Protection	P[1], S[2]
Master/Comprehensive Planning and Programming	P[1,6]
Passive Defense Measures	P[1,3,4,5], S[2]
Pest, Animal, and Vegetation Control	P[1,2]
Power Generation/Distribution Systems	P[1,2]
Project Management and Execution	P[1,2]
Project Planning and Programming	P[1,2]
Service Contract Management	P[1,2]
Vertical Construction	P[1,2]
Waste Collection/Disposal Systems	P[1], S[2]
Waste Water Collection/Disposal Systems	P[1,2]
Water Production/Distribution Systems	P[1,2]
Well Drilling	P[2]
Establish Lines of Communication (Airfield)	
Aircraft Arresting System	P[1,2,6]
Airfield Assessment/Repair, Initial (Air Insert)	P[2]
Airfield Damage Assessment/Repair (ADR)	P[1,2,3,5]
Airfield Lighting and Marking	P[1,2]
Airfield Pavement Evaluation	P[1,6], S[2]
Asphalt/Concrete Milling Operations	P[2]
Asphalt/Concrete Paving Operations	P[2], S[1]
Asset Management	P[1], S[2]
CBRN Assessment/Support	P[5], S[4]
Firefighting/Emergency Medical Services (EMS)	P[4]
Improve Airfields	P[1,2]
Revetments	P[1,2]
Snow/Ice Control	P[1]
UXO/EO/IED Clearance	P[3]
Global Access Engineering	
ADR	P[1,2,3,5]
Force Protection (FP) Construction	P[1,2]
Open the Airbase	P[2,6], S[1]
Structural Blast Analysis	P[1,2]
Vulnerability Assessments	P[1,2]
Repair and Restore Infrastructure	
ADR	P[1,2,3], S[4,5,6]
Area Lighting	P[1,2]

Asset Management	P[1,2,3,4,5,6]
Facilities/Infrastructure Damage Assessment/Repair	P[1,2]
HVAC/R Systems	P[1,6]
Power Generation/Distribution Systems	P[1,2,6]
Waste Collection/Disposal Systems	P[1], S[2]
Waste Water Collection/Disposal Systems	P[1,2]
Water Production/Distribution Systems	P[1,2]
Well Drilling	P[2]
Harden Key Infrastructure and Facilities	
Collective Protection	P[1,5], S[2]
Develop FP Plans	P[1,2,3,4,5,6]
Provide Installation FP Measures	P[1,2,3,4,5,6]
Master Facility Design	
Asset Management	P[1,2,3,4,5,6]
Installation Master Planning	P[1,6], S[2]
Project Design	P[1,2,6]
Project Planning and Programming	P[1,2,6]
Combat Engineering	
Defeat Explosive Hazards	
Base Denial	P[3]
Base Opening Procedures	S[3]
Combat Support Missions	P[3]
Explosive Ordnance Disposal (EOD)	P[3]
Small Unit Tactics	P[3]
Wartime Range Clearance	P[3]
Geospatial Engineering	
Use Geospatial Data	
Geospatial Information Systems (GIS)	P[1], S[2]
Base and Installations Support	
Real Property Life Cycle Management	
Asset Management	P[1,2,3,4,5,6]
Installation Master Planning	P[1], S[2]
Provide Installation Assets	
Asset Management	P[1,2,3,4,5,6]
Identify Facility Requirements	P[1,2]
Facilities Support	
Asset Management	P[1,2,3,4,5,6]
Base Operating Support (BOS)	P[1]
Design Management	P[1,2]
Energy Security	P[1]
Installations and Facilities	P[1,2]

Operational Range Clearance (Testing/Training)	P[3]
Real Property HVAC/R Systems	P[1,6]
Real Property Management	P[1], S[2]
Real Property Power Generation/Distribution Systems	P[1,2,6]
Real Property Waste Collection/Disposal Systems	P[1], S[2]
Real Property Waste Water Collection/Disposal Systems	P[1,2]
Real Property Water Production/Distribution Systems	P[1,2]
Sustainment of Installation Assets	
Asset Management	P[1,2,3,4,5,6]
Environmental Program Management and Compliance	P[1]
Preventive Maintenance and Inspection of Installation Facilities, Utilities, and Infrastructure	P[1]
Recapitalization of Installation Assets	
Installation Management	P[1,6]
Installation Master Planning	P[1,6], S[2]
Project Design	P[1,2,6]
Project Management and Execution	P[1,2,6]
Project Planning and Programming	P[1,2,6]
Remediation/Restoration of Environmental Sites	P[1,6]
Disposal of Installation Assets	
Asset Management	P[1,2,3,4,5,6]
Redeploy Air Force Expeditionary Facilities, Utilities, Infrastructure and Vehicles/Equipment	P[1]
Installations Services	
Emergency Services	
Aerospace Vehicle Mishap Response/Recovery	P[1,3,4,5]
Aircraft Rescue and Firefighting	P[4]
Air Force Emergency Management (EM) Program	P[5]
Air Force Incident Management System (AFIMS)	P[1,3,4,5]
All Hazards Response	P[3,4], S[1,5]
Antiterrorism (AT)	P[3,4,5]
Detect/Sample/Identify CBRN/TIM Hazards	P[5]
Emergency Operations Center (EOC) Operations	P[5], S[1,3,4]
EMS/Emergency Medical Responder (EMR)	P[4], S[2]
EOD Initial Threat Assessment, Confirmation, Risk Mitigation, Site Stabilization	P[3]
Federal Agency and Civil Authority Support	P[1,2,3,4,5,6]
Fire Prevention	P[4]
Hazardous Material Incident Response	P[4], S[1,2]
Incident Command	P[4]
Integrated Incident Management	P[1,4,5]

Mortuary Services - Explosive Hazard Analysis/Removal	P[3]
Nuclear Weapons/Weapons of Mass Destruction (WMD)/CBRN Accident/Incident Response	P[3,4,5], S[1,2]
Operational Range Clearance	P[3]
Structural Firefighting	P[4]
Urban Search and Rescue	S[4]
UXO Recovery Operations	P[3]
Weapons Technical Intelligence	P[3]
Housing Services	
Furnishings Management	P[1]
Government Owned/Leased Family Housing	P[1]
Housing Referrals and Relocations (HRR)	P[1]
Privatized Housing (PH)	P[1]
Range Management	
Range Clearance	P[3]
Command and Control	
Organize	
Establish and Maintain Unity of Effort with Mission Partners, and Foster Organizational Collaboration	
Cultivate Relations with Mission Partners and Partner Organizations	
Air Advisor Building Partnership (BP) Engagements	S[1,2,3,4,5,6]
CST	P[1,2,3,4,5,6]
Contingency Construction Training	P[1]
Defensive Operations Training	P[1,2,3,4,5,6]
Field Sanitation and Health Training	P[1,2,3,4,5,6]
Force Beddown Training	P[1,2,3,4,5,6]
Realistic Military Training (RMT) Off Federal Property	S[1,2,3,4,5,6]
Silver Flag Exercises	P[1,3,4,5]
S-Team Training	P[6]
Structure Organization to Mission	
ART	P[1,2,3,4,5,6]
CBRN Control Center	P[5]
Commander's Expectations for AF CE	P[1,2,3,4,5,6]
Crisis Action Team (CAT), EOC, Unit Control Center (UCC)	P[1,3,4,5,6]
DRRS	P[1,2,3,4,5,6]
EOC	P[1,2,3,4,5,6]
Engineer Operations Management	P[1,2]
Hub and Spoke Concept	P[1,2]
Review Unit Manning Documents (UDMs) and Mission Capability Statements (MISCAPs)	P[1,2,3,4,5,6]

SORTS	**P[1,2,3,4,5,6]**
Tailor AF CE UTCs	**P[1,2]**
Work Control	**P[1,2,6]**
Establish Collaboration Policies and Procedures	
Checklists	**P[1,2,3,4,5,6]**
Common Operating Procedure (COP)	**P[1,2,3,4,5,6]**
Defense Support of Civil Authorities (DSCA)/Mutual Aid Agreements	**P[1,2,3,4,5,6]**
Host Nation Support (HNS) Agreements	**S[1,2,6]**
Host-Tenant Support Agreements (HTSA)	**P[1,2,4,5]**
Informal Agreements	**P[1,2,6]**
Inter-Service (Intra-Agency) Support	**P[1,2,6]**
Intra-Service Support	**P[1,2,6]**
Joint Support Plans (JSPs)	**P[1,2,6]**
Understand and Plan	
After Action Reports (AAR)	**P[1,2,3,4,5,6]**
Base Comprehensive Plans	**P[1,2,6]**
Concepts of Operation (CONOPS)	**P[1,2,3,4,5,6]**
GIS	**P[1,2,6]**
Information Gathering from Off-Base Agencies	**P[1,2,3,4,5,6]**
Information Gathering from On-Base Agencies	**P[1,2,3,4,5,6]**
Installation Development Plan (IDP)	**P[1,2,6]**
Lessons Learned (L2)	**P[1,2,3,4,5,6]**
MAJCOM Instructions and Planning Guidance	**P[1,2,6]**
See AFI 10-211, *CE Contingency Response Planning*	**P[1,2,3,4,5,6]**
See AFI 10-2501, *EM Program Planning & Operations*	**P[1,2,5]**
See AFI 10-2603, *Emergency Health Powers*	**P[3,4,5]**
See AFI 10-2607, *AF CBRN Survivability*	**P[5]**
See AFI 32-1001, *Operations Management*	**P[1,2]**
See AFI 32-1021, *Plan & Program MILCON Projects*	**P[1,2]**
See AFI 32-1022, *Plan & Program NAF Construction*	**P[1,2]**
See AFI 32-1032, *Plan & Program APF M/R/C Projects*	**P[1,2]**
See AFI 32-6002, *Family Housing*	**P[1,2]**
See AFI 32-7062, *Comprehensive Planning*	**P[1,2,3,4,5,6]**
See AFPAM 10-219-Series for Contingency Engineering Planning Guidance	**P[1,2,3,4,5,6]**
USAF War & Mobilization (WMP) Volume 1, *CE Supplement*	**P[1,2,3,4,5,6]**
Decide, Direct, and Monitor	
CBRN Control Center	**P[5]**
Emergency Responders	**P[3,4,5]**
EOC	**P[1,2]**

Facilities Board (FB)	P[1,2]
First Responders	P[3,4,5]
Protection	
Mitigate	
Mitigate Lethal and Non-Lethal Effects	
Chemical, Biological, Radiological, and/or Nuclear (CBRN)	
Contamination Control Area (CCA) Processing	P[1,5], S[2]
Mass Casualty Management	S[4,5]
Mass Fatality Management	S[5]
Restoration Operations	P[5]
Explosives and Projectiles	
Counter-IED Operations	P[3]
Destruct Stockpiled/Abandoned Ordnance	P[3]
Explosive Demolition	P[3]
Reduce Area Denial	P[3]
Route Clearance	P[3]
Standoff Munitions Disruption (SMUD)	P[3]
Natural Hazards	
EMS	P[4]
EOC Operations	P[5], S[1,3,4]
Structural Firefighting	P[4]
Building Partnerships	
Shape	
Build Capabilities and Capacities of Partners and Institutions	
Enhance Partner Capabilities and Capacities	
Air Advising	S[1]
Engineer Skills Training for Building Partnerships	S[1,2,3,4,5,6]
Multi-Trade Construction Project	S[1]