

**PROGRAMMATIC ENVIRONMENTAL
ASSESSMENT
FOR
MODERNIZING AND OPERATING TRAINING RANGES
ON PREVIOUS OR EXISTING RANGE SITES ON
ARMY TRAINING AREAS**



**Prepared by the U.S. Army Environmental Command
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EXECUTIVE SUMMARY

The Army continues to evolve and adapt its weapons, weapon systems, unit tactics, and war-fighting doctrine to meet and defeat our nation's enemies. Live-fire ranges and maneuver training areas that support effective training for individual Soldiers and units on use of weapons, weapon systems, and war-time tactics are essential to their success on the battlefield. Many existing training ranges lack automation tools that can provide real-time evaluation of Soldier and unit performance. Many other ranges are neither equipped nor configured to train individual Soldiers and units effectively in current tactics and doctrine. The Army needs to provide modern ranges that allow Soldiers and units to train with existing weapons using current war-fighting doctrine, tactics and procedures to ensure their success on the battlefield.

This Programmatic Environmental Assessment (PEA) evaluates the potential environmental effects of modernizing and operating Army training ranges on previously disturbed ground where the total of disturbed ground would be approximately 40 acres or less. In this PEA, previously disturbed ground is defined as ground which is currently, or has been, used as a military training range. Construction of a range on a previous range site includes the demolition of existing structures on that range site.

The ranges selected for inclusion in this PEA are small arms firing ranges that require approximately 40 acres or less of ground disturbance to construct the range as well as other selected training non-live fire ranges that require approximately 40 acres or less of ground disturbance. Range impact areas and danger zones may vary in size. There would be no ground-disturbing activities undertaken in those areas, therefore, that acreage is not included in this analysis. Weapons fired on small arms ranges use ammunition equal to, or smaller than .50 caliber, which would also include 7.62mm and 5.56 ammunition used in rifles, 9mm ammunition used in pistols, and 12-gauge ammunition used in shotguns. Also included within this PEA are the hand grenade familiarization range and the 40mm grenade launcher range. The hand grenade qualification course and the bayonet assault course included in this PEA do not use live ammunition.

The purpose of the proposed action is to construct and operate these ranges on Army installations. The Army will use a programmatic approach under the National Environmental Policy Act (NEPA) to conduct environmental analyses for constructing and operating the training ranges. The Army has chosen to use a programmatic approach for environmental analysis for modernizing and operating training ranges listed in this PEA to reduce the time and cost of NEPA analysis.

The alternatives carried forward for consideration in this PEA were to:

(1) Modernize and operate new Army training ranges for which construction would occur on previously disturbed ground of approximately 40 acres or less, conducting the required environmental analysis using a programmatic approach. This is the preferred alternative, and would allow staff at Army installations to tier their environmental analysis under NEPA from this PEA. Table 1 identifies the ranges that would fall under the purview of this PEA. Proposed construction of any range not listed in Table 1, or any range, including those listed in Table 1 on a site other than one previously disturbed would require its own environmental analysis under NEPA.

(2) The No Action Alternative is to prepare a separate NEPA document for each individual range construction project at each installation. For range construction projects involving less than 40

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acres of previously disturbed ground (see Table 1), the anticipated potential environmental effects would be the same as Alternative (1).

Alternative (1) is the preferred alternative. Alternative (1) reduces the time and cost to conduct environmental analysis under NEPA. Alternative (1) also allows the Army to utilize limited funds to focus analysis on, and mitigate, environmental impacts from range construction and operation, rather than spend funds on redundant analyses. Under Alternative (2), the Army would have to spend money, time, and effort to produce redundant NEPA documentation for each individual range construction project. The potential environmental effects of alternatives (1) and (2) will be the same.

To prepare this PEA, the preparers identified and reviewed 17 Environmental Assessments (EAs) that were prepared for constructing and operating training ranges at Army installations across the U.S. These EAs analyzed the potential environmental effects of constructing and operating 20 different types of Army training ranges.

The EAs reviewed analyzed the potential effects on a number of valued environmental components (VECs) which could be affected by the construction and operation of an Army training range. A VEC is a resource area (e.g., air and water quality, noise, socioeconomics, traffic and transportation) commonly assessed in NEPA documents. The anticipated effects of constructing and operating these ranges as documented in those EAs is provided in Table B.2, Appendix B. Based on the analysis of those EAs, this PEA draws the following conclusions about modernizing and operating an Army training range on previously disturbed ground in a training area.

There were no effects on airspace at installations where installations have established Special Use Airspace that encompasses the installation's range and training areas. There were no anticipated effects relating to Environmental Justice (includes Protection of Children), or facilities and infrastructure.

Nearly every installation anticipated minor, short-term, localized air quality issues from constructing a range, due to air emissions from heavy construction equipment and from dust generated during earth-moving operations.

Almost all installations anticipated no potential effects on cultural resources from constructing and operating a range on land previously used for an Army training range.

Several installations anticipated some minor impact from hazardous waste and/or hazardous material, largely due to the potential risk of petroleum fluids leaked or spilled from heavy construction equipment. The issue was addressed by ensuring the installation implemented and followed its Spill Prevention, Control, and Countermeasures Plan. Other research indicates that the presence of metals from spent ammunition can accumulate in the soil on a range, and under certain soil conditions can migrate off a range area into surface waters and/or wetlands areas. The Army has identified a broad number of engineering solutions and best management practices that can be incorporated into range design and operating procedures to mitigate this issue and control the potential effects of lead and other metals from migrating into surface waters or wetlands areas. Those engineering solutions and best management practices are identified and discussed in detail in Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian and Watts, 2005), and Prevention of Lead Migration and Erosion from Small Arms Ranges (U.S. Army Environmental Center, 1998).

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The effect on land use was mixed between no impact and minimal impact. Overall, land use within the installation's range and training complex remained unchanged. There were minor impacts associated when the safety danger zone of a range overlapped an adjoining firing range or maneuver area. It was generally observed that constructing and operating a new range on an existing range would not impact land use within the installation cantonment area or adjoining communities.

There was a mixture of anticipated impact of noise from modernizing and operating a training range. There would be some noise generated from construction equipment, particularly large earth-moving machinery, but the noise would be localized and occur only during daylight hours on weekdays for the duration of construction. Other potential noise issues would be the result of weapons firing, which would occur during both daylight and evening hours, but because the ranges were located some distance from homes, schools and hospitals, the potential impact was minimal.

Generally, construction of ranges would have minor, short-term beneficial socioeconomic impacts on the community. This would result from the payment of salaries to the workforce and purchase of equipment and building supplies.

Each EA reviewed anticipated minor effects on soils and topography. This was largely due to concern about the potential for erosion resulting from large-scale earth-moving and construction activities. In almost every case, the installation addressed the issue by requiring the use of Best Management Practices (BMPs) to prevent and control erosion of exposed soils. These would include the use of silt fences, grading, and other means until vegetation had been restored.

The potential impact of solid waste was expected to be negligible or minor, with limited construction debris. Solid waste generated during range operations, such as from ammunition packaging, expended brass, and solid waste from food packaging is routinely the responsibility of the unit using the range and the waste would either be disposed of (e.g., food packaging waste), or recycled (expended brass) accordingly.

The potential impact on threatened or endangered species was expected to be negligible or minor, and reflected the fact that the proposed ranges would be constructed and operated on previously disturbed ground. Range construction could result in the loss of some habitat, but the loss was minor compared to the overall size of the habitat in the rest of the training area.

Some potential impact on water resources, to include wetlands, could occur as the result of sediment caused by soil erosion. As addressed earlier, the potential impact of soil erosion would be mitigated by employing BMPs. The loss of any wetlands was a very small percentage of the installation's wetlands inventory.

When considering other past, present, and reasonably foreseeable future actions, the EAs reviewed and analyzed for this Programmatic EA determined that cumulative effects of modernizing and operating a range on the land previously used for an Army range, would not be significant. However, research shows the potential of migration of lead and other metals from spent ammunition on small arms ranges could be significant, unless proper design elements and best management practices are incorporated into a range's design and operation (U.S. Air Force, 1998). This effect can be effectively mitigated through engineering design of the range itself and implementation and sustained maintenance of best management practices (BMPs) that reduce or eliminate the risk of erosion from a training range.

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The overall effects on the environment of modernizing and operating Army training ranges on previously disturbed ground are not significant. However, the potential for lead and other metals from spent ammunition to migrate off the range and into water resources and/or wetlands via soil erosion could create conditions affecting the health of humans or the natural environment (U.S. Air Force, 1998). This impact can be effectively mitigated through engineering design of the range itself and implementation and sustained maintenance of best management practices (BMPs) that reduce or eliminate the risk of erosion from a training range. Those design solutions and best management practices are identified and discussed in detail in Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian and Watts, 2005), and Prevention of Lead Migration and Erosion from Small Arms Ranges (U.S. Army Environmental Center, 1998).

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SECTION 1 PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The proposed action is to construct and operate modernized ranges on previous or existing range sites on Army training lands where the land has been previously disturbed. For this PEA, a previously disturbed site (or previously disturbed ground) is defined as an area that is currently or has been used as a military training range. The proposed action also includes the demolition of any old structures on the previously disturbed sites (ranges). Construction also includes the modernization of an existing range, usually through the replacement of old targetry with modernized targetry. This may also be termed a range upgrade at some installations.

The primary mission of the Army is to fight and win the Nation's wars. Conducting offensive and defensive land operations has long been the Army's core competency. However, the recent experience of operations in the Balkans, Iraq, and Afghanistan, coupled with today's operational environments, indicates that the future will likely be an era of persistent conflict – one that will engage Army forces around the world to accomplish the Nation's objectives. This caused the Army to adopt a new mindset that recognizes the requirements to successfully conduct operations across the spectrum of conflict, anytime, anywhere (U.S. Army, 2008, p. 1-1). The spectrum of conflict reflects the range of intensity of conflict, from peace-keeping and stability operations, through high-intensity conflict (i.e., conventional warfare).

Since WWII, the Army's doctrine and equipment have changed substantially to adapt to changing threats to national security. The Army continues to change through development of new weapons, weapon systems, doctrine, and training standards. To keep individual Soldiers and units prepared to fight and win on the modern battlefield, the Army's ranges need to continue to adapt to meet those changes.

The Army is adapting to new technology, weapon systems, and doctrine to meet new threats to national security. Based on these changes, the Army has developed new training requirements, and designed new ranges for individual Soldiers and units to meet those requirements and succeed on the battlefield. While the Army continues to adapt to meet these changes, the footprint of lands available for unit and Soldier training remains virtually unchanged, forcing the Army to close older, obsolete ranges, and construct new ones in their place.

To adapt to a changing enemy and different battlefield conditions, the Army has developed and continues to refine a family of modernized ranges to train individual Soldiers and units to conduct operations in open terrain as well as close quarters and urban conditions.

Effective training is the cornerstone of success on the battlefield. Through training, leaders, individual Soldiers, and units achieve the tactical and technical competence that builds confidence and agility. These characteristics allow Army forces to conduct successful operations across the spectrum of conflict. Army forces train using training doctrine that sustains their expeditionary and campaign capabilities. Focused training prepares leaders, individual Soldiers and units to deploy, fight and win. Achieving this level of competence requires specific, dedicated training on offensive, defensive, stability and civil support tasks. The Army must train Soldiers and units daily in individual and collective tasks under challenging and realistic conditions (U.S. Army, 2008, p. 1-1).

The Army is modernizing its training ranges to meet wartime requirements and to provide facilities to reflect changes in training, doctrine, and weapon systems. As the Army continues to

modernize its training ranges within limited available land resources, the trend is to construct and operate a range on, or within, the footprint of an existing or former range that is no longer capable of supporting training on current techniques, doctrine, or weapon systems.

1.2 SCOPE AND METHODOLOGY

This PEA evaluates the potential direct, indirect, and cumulative effects of constructing and operating any of 20 standard Army ranges (Table 1) on a previously disturbed site that would require earth disturbance of approximately 40 acres or less. For instance, a range's total area could be 720 acres, but only 20 acres would be disturbed in its construction. See section 3.4.13. For the purpose of this PEA a previously disturbed site (or previously disturbed ground) is defined as ground which is currently, or has been, used as a military training range. It includes the land not only used for the training range itself but also the area used for support facilities, such as covered mess area, latrines, control tower, classroom, and parking. This is known as the Range Operations and Control Area (ROCA). Support facilities are discussed in more detail in Section 3.2.2 and Appendix C.

Currently, installations conduct Environmental Assessments prior to constructing and operating training ranges in Army training areas. New ranges are frequently constructed on, or within, the footprint of outdated ranges that are no longer capable of providing Soldiers and units the training necessary for the modern battlefield. In addition, due to the shortage of maneuver training land on most Army installations, the construction of new modernized ranges on old outdated ranges enables the Army to maximize its maneuver training land capabilities.

Under the proposed action, Installations will be able to use a programmatic approach under the National Environmental Policy Act (NEPA) to conduct environmental analyses for constructing and operating modernized training ranges constructed on previously disturbed land. Using a programmatic approach to conducting environmental analyses for these Army training ranges will reduce the time and cost of performing environmental analyses under NEPA without increased risk to human health or the environment. This practice is redundant, incurs additional and unnecessary costs, and increases the time necessary to conduct environmental analyses before construction can begin. It is the Army's intent to use this programmatic approach for environmental analysis under NEPA for constructing training ranges listed in this PEA to reduce the time and cost of implementing the NEPA process.

The ranges selected for inclusion in this PEA are small arms ranges and other selected training ranges, which require approximately 40 acres or less of ground disturbance to construct the range. Small arms ranges use ammunition no larger than .50 caliber, which would also include 7.62mm and 5.56 ammunition used in rifles, 9mm ammunition used in pistols, and 12-gauge ammunition used in shotguns. Other ranges included within this PEA are the hand grenade familiarization range and the 40mm grenade launcher range; and the hand grenade qualification course and the bayonet assault course, which do not use live ammunition.

If the considerations and analyses in this PEA are applicable to local conditions, and no additional issues are identified, the requirements of NEPA can be met through the analysis contained within this PEA, the completion of the Record of Environmental Consideration (REC) checklist provided in Appendix A and the preparation of a REC, unless a higher level of NEPA analysis is appropriate. Alternatively, if after utilizing the REC Checklist at Appendix A of this PEA the proponent determines there is a need for further analysis on one or more issues, a brief, site-specific EA may be prepared, which could incorporate information from this PEA. Because the proposed action (see Section 2.3) may be implemented at any training range on an

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Army, Army Reserve, or Army National Guard installation in the United States or territories (e.g., Guam, Puerto Rico), the Army is analyzing the action with a programmatic approach.

This PEA enables the Army to facilitate compliance with the Army's regulation governing NEPA (Title 32 Code of Federal Regulations (CFR) Part 651) at installations that identify a need to construct new training ranges by providing:

- (1) a generic analysis of the impacts of this type of action;
- (2) a procedure to identify, and a mitigation plan (when required) for all impacts addressed in this PEA through the use of a site-specific REC checklist provided in Appendix A of this PEA; and
- (3) a procedure to ensure the preparation of a focused site-specific NEPA document when needed.

This PEA provides the public and decision-makers the information required for understanding and evaluating the potential environmental consequences of modernizing and operating a firing range on a previously disturbed site. This document will also assist in identifying when further site-specific analysis may be necessary and the potential for mitigating actions.

Table 1 identifies the Army training ranges analyzed in this PEA. These ranges either occupy approximately 40 acres, or the total of disturbed land involved with their construction involves 40 acres or less.

This PEA is intended to avoid expensive, time-consuming, and unnecessarily redundant analyses of common range projects at Army installations across the United States, when the impacts of such projects on currently or pre-existing range lands are well known from prior Army experience and analyses, and there are no extenuating circumstances requiring deeper, site-specific analysis.

Table 1: Training Ranges

FCC*	Range Type	FCC*	Range Type
17803	Automated Field Fire Range (AFF)	17891	Infiltration Course
17805	Automated Record Fire Range (ARF)	17897	Infantry Platoon Battle Course (IPBC)
17812	Automated Sniper Field Fire Range	17895	Infantry Squad Battle Course (ISBC)
17816	Bayonet Assault Course (BAC)**	17810	Known Distance Course (KD)
17822	Combat Pistol Qualification Course (CPQC)	17880	Live Fire Exercise Breach Facility
17892	Fire and Movement Range	17879	Live Fire Exercise Shoothouse
17884	Grenade Launcher Range	17806	Modified Record Fire Range (MRF)
17883	Hand Grenade Familiarization Range	17801	Rifle/Machinegun Zero Range
17882	Hand Grenade Qualification Course**	17893	Squad Defense Range
17829	Heavy Sniper Range	17878	Urban Assault Course (UAC)

* FCC = Facility Category Code

** Does not use live ammunition

This PEA can be used at Army, US Army Reserve, and Army National Guard installations and facilities, including joint (multi-service) installations on which there are current or formerly active Army ranges. This PEA can be used to conduct the environmental analysis under NEPA for the ranges listed in Table 1 when the proposed construction involves approximately 40 acres or less

on previously disturbed ground. This PEA may not be used for ranges other than those listed in Table 1 or for any range proposed for a site that is not previously disturbed.

1.3 REGULATORY AUTHORITY

This PEA has been prepared in compliance with the National Environmental Policy Act of 1969, as implemented by the President's Council on Environmental Quality's (CEQ) regulation governing NEPA (Title 40 CFR Parts 1500-1508), and the U.S. Army's regulation governing NEPA, Environmental Analysis of Army Actions (Title 32 CFR Part 651).

1.4 PURPOSE OF THE PROPOSED ACTION

The Army exists to deter war, or if deterrence fails, to reestablish peace through victory in combat wherever U.S. interests are challenged. Training is the process that melds human and materiel resources into these required capabilities (U.S. Army, 2002).

The Army continues to evolve and adapt its weapons, weapon systems, unit tactics and war-fighting doctrine to defeat our nation's enemies. Live-fire and maneuver ranges that support effective training for individual Soldiers and units on use of weapons, weapon systems, and war-time tactics is essential to their success on the battlefield. The Army is modernizing its training ranges to take advantage of new automation technologies and to train individual Soldiers and units in current tactics and doctrine.

The purpose of the proposed action is to provide Soldiers and units modernized training capabilities they will need to be effective in the contemporary and future operating environments. Many of the ranges on Army installations are outdated and need modernization.

Unlike many of the outdated ranges on Army installations, the computer-controlled ranges of today allow trainers to develop scenarios and control targets and battlefield simulation devices. This permits Soldiers and units to practice mission essential tasks in a stressful environment. Computerized systems also provide performance feedback. After-action reviews (AAR), using data recorded during training, permits the commander to assess the unit's performance. The accurate feedback allows leaders to assess the mission status of their units and design training programs to overcome the identified shortcomings. The performance feedback highlights positive actions to reinforce correct procedures and to foster Soldiers' confidence—enabling Soldiers and leaders to recognize and correct their shortcomings.

1.5 NEED FOR THE PROPOSED ACTION

Soldiers must enter engagements with the best possible assurance of success and survival. Therefore, the Army needs to train Soldiers to be proficient in live fire and other skills. As weapon systems become more lethal and capable of delivering greater firepower over increased distances, Army ranges must change. Current training ranges are required to support Soldiers using their weapons through live - fire, sub-caliber devices, and laser and simulation technology. The ranges of the future must serve as the focal point of training as the Army integrates the Live-Virtual –Constructive-Gaming training environments and adds digital command and control elements. At company level and below, Soldiers train and hone their combat skills in live fire and maneuver. In an era of intense resource competition, each dollar spent to develop, mitigate, or restore training ranges must deliver the maximum return in effective training and combat readiness.

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Army doctrine requires combined arms teamwork and synchronization. Units must train for wartime combined arms operations. Combined arms proficiency results from regular practice of combat missions and tasks in the live domain. It starts with developing individual skills. Individual skills, when combined and practiced, build unit proficiency from crew through brigade task force. (TC 25-8, May 2010).

The Army has developed a modernized family of training ranges that provides training opportunities to develop and improve Soldier and team proficiency and competence in the use of sophisticated weaponry. Individual Soldier proficiency and collective training ranges realistically portray combat conditions.

The modernization of Army ranges directed in AR 350-19, Sustainable Range Program (SRP) supports this doctrine. Range design and construction must support the development of Soldier skills in individual weapons and crew-served weapon systems. The ranges also support unit training to standards established in Combined Arms Training Strategy (CATS) using Army Training and Evaluation Program (ARTEP) and mission training plans (MTPs) manuals. Multiple-use ranges meet these requirements and reduce construction and operating costs by permitting training with a variety of weapons on the same range. Several of these ranges support collective training for small units. The Army manages and schedules construction of modernized ranges on Installations through the Army Range Modernization Program (ARMP).

Computer technology has been integrated into modernized Army ranges. Computer technology enables the Army to equip ranges with remote controlled targets that depict realistic battlefield conditions under a variety of offensive and defensive scenarios. Computer-recorded hits and misses enable trainers to analyze performance, provide corrective instruction, and provide accurate AARs. Computer technology combined with other training devices creates stressful, challenging scenarios for Soldiers to train as they will fight. Computer automation has also shown value in not only enhancing the training process with automated targetry, but also with increased feedback to Soldiers and units. Computer automation has been incorporated into the Automated Field Fire Range (AFF), Automated Record Fire Range (ARF), Modified Record Fire (MRF), Combat Pistol Qualification Course (CPQC), Sniper Field Fire Range, Heavy Sniper Range, Anti-Armor Tracking and Live-Fire Range, Urban Assault Course (UAC), Shoothouse, Fire and Movement Range, Squad Defense Range, Infantry Squad Battle Course (ISBC) and Infantry Platoon Battle Course (IPBC).

As the proponent schools identify new live fire training requirements, the Army will continue to modernize existing ranges and construct new types of ranges as required. The focus for ranges will be interoperability, standardization, improved targetry, digital capability, and multi-purpose utility.

Implementation of the range modernization program:

- Establishes a family of ranges for compatible weapons to provide training of one or more well-defined requirements.
- Provides training to meet standard weapons qualification and sustainment training requirements.
- Permits commanders to assess combat readiness and prepare individuals and units for advanced targeted training.
- Fosters standing operating procedures leading to a common understanding of force employment.
- Provides accurate throughput capabilities of ranges for mobilization planning. This lets

mobilization planners determine the number of ranges needed to meet training requirements.

SECTION 2 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

Training ranges are a fundamental element of the Army's requirement to be ready to implement its National Defense Mission. Training ranges are the facilities where individual Soldiers and units train on the effective use of their weapons and of individual and unit tactics to be successful on the modern battlefield.

2.2 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER STUDY

2.2.1 Travel to and Use of Another Installation's Ranges

While Army units do travel to other installations to conduct training such as Brigade Combat Team level training at the National Training Center at Fort Irwin, California or the Joint Readiness Center at Fort Polk, Louisiana, the transportation of Soldiers, weapons and equipment to another installation for routine training would substantially increase the cost and time required to conduct required training. These costs would be installation-specific, depend on the distances traveled, number of Soldiers, weapons and equipment, and other site-specific factors that cannot be readily assessed in a programmatic manner. Given the costs of transportation, loss of training time, and logistics associated with movement of large number of troops and their equipment, this alternative is prohibitively costly, unsustainable, and undesirable in most cases.

2.2.2 Construct a Sub-caliber Range

This alternative would involve constructing a sub-caliber weapons and using it for live fire weapons and maneuver training. Sub-caliber weapons are sometimes used for large caliber weapon systems, such as the 120mm gun on the Abrams Tank. Sub-caliber training with large caliber weapons such as the Abrams tank 120mm gun is a cost-effective means to train a weapons crew in the crew-oriented processes associated with finding, targeting and firing on a target without actually firing the 120mm gun. There are, however, no sub-caliber systems for the small arms weapons used on the ranges addressed in this PEA nor is it feasible for the Army to develop sub-caliber systems for these weapons systems. The weapons employed on the ranges in this PEA fire 9mm, 5.56mm, 7.62mm, .50 caliber, and 40mm grenades. Hand grenades would be utilized on the hand grenade qualification range. While a reduced scale range would be more economically feasible for larger weapons systems, it is not a viable alternative for small arms weapons training or the ranges covered in this PEA. This alternative will not be carried forward for further analysis.

2.2.3 Use of Simulations Instead of Constructing a Modernized Range

This alternative would involve using simulations instead of live fire weapons and maneuver training. The Army's training strategy includes the use of a mix of live fire and maneuver training, virtual (simulations) training, constructive training, and gaming to meet the Soldier and

unit training requirements. Simulation training involves the development of virtual simulations which will substitute for live fire or maneuver training. The Army does not have any simulation that will currently replicate the training conducted on the modernized ranges in this PEA, nor are there any plans to develop such simulation devices. Within the limited funding available to the Army for virtual, constructive, and gaming systems, a priority has not been placed on developing any systems which can eliminate the need for live training on the ranges covered in this PEA. This alternative is not a viable alternative for small arms weapons training or the ranges covered in this PEA. This alternative will not be carried forward for further analysis.

2.2.4 Construct and Operate Modern Ranges Impacting 40 Acres or Less on Army Installations on Previously Undisturbed Ground

Under this alternative the Army would construct any of the 20 types of ranges listed in Table 1 on undisturbed ground. Based on the need established in section 1.5, and the scope of the PEA established in section 1.2, this alternative falls outside the intent of this PEA because site specific analysis would likely be required. This alternative will not be carried forward for further analysis.

2.3 ALTERNATIVES CONSIDERED

2.3.1 Alternative 1. Construct and operate modern ranges impacting 40 acres or less on Army installations on previously disturbed ground. (Preferred Alternative)

The Army would construct and operate any of the 20 types of ranges listed in Table 1 on a previously disturbed site that would require earth disturbance of approximately 40 acres or less. For the purpose of this PEA a previously disturbed site (or previously disturbed ground) is defined as an area which is currently, or has been, used as a military training range. The proposed action also includes the demolition of structures on the previously disturbed sites (ranges). In addition the term construction also includes the modernization of an existing range normally through the replacement of old targetry with modernized targetry. This may also be termed a range upgrade at some installations. Site specific NEPA analysis for each range would be prepared utilizing the Record of Environmental Consideration (REC) checklist at Appendix A. After careful application of the REC checklist, it is anticipated that a REC would generally suffice. Use of the checklist could reveal it is appropriate and necessary to address site-specific environmental considerations, so an EA or even an EIS could be necessary. The site-specific analysis would tier off of this PEA, and utilize the analysis in this PEA to the maximum extent possible, thus limiting the site-specific analysis to the critical issues. This is the preferred alternative. Table 1 identifies the types of ranges that would fall under the purview of this PEA. Proposed construction and operation of any range not listed in Table 1, or any range, including those listed in Table 1 proposed for a site other than one previously disturbed would require its own environmental analysis under NEPA.

Section 3 provides information about each of the ranges listed in Table 1. The data in Section 3 includes a description of the purpose of the range, its five-digit Facility Category Code (FCC), dimensions and surface area, and listing of support facilities necessary for effective operation of the range. Appendix C provides details and photographs of the range support facilities commonly required for the ranges included in this PEA.

2.3.2 Alternative 2. The No Action alternative

Under this alternative the Army would retain outdated ranges on Army installations. If the Army would decide to construct and operate a new range, the Army would conduct discrete environmental analyses under NEPA for each individual range construction project. This alternative would continue the practice of preparing repetitive, time-consuming, and expensive, site-specific Environmental Assessment for common range projects on previously disturbed sites that are, or were, being used for the same purpose. The potential environmental effects for constructing and operating training ranges listed in Table 1 would be the same for conducting separate NEPA documents as under the Programmatic EA.

2.4 VALUED ENVIRONMENTAL COMPONENTS (VECs)

Listed below are the resource areas or VECs by which the alternatives will be analyzed and evaluated in Section 4.

- Airspace
- Air Quality
- Cultural Resources
- Energy
- Environmental Justice
- Facilities & Infrastructure
- Hazardous Materials and Hazardous Waste
- Land Use
- Natural Resources and Soils
- Noise
- Socioeconomics
- Solid Waste
- Threatened and Endangered Species
- Traffic and Transportation
- Water Resources
- Wetlands

SECTION 3.0 ARMY RANGES, CONSTRUCTION OF ARMY RANGES, AND RANGE SUPPORT FACILITIES

3.1 INTRODUCTION

This section provides information on the general nature of Army ranges, site planning for the range, Range operations, the layouts of the 20 ranges covered in this PEA, and the size and character of the range support buildings and structures and their layout within the range complex. Developing and improving Army ranges is a continuous and challenging process that requires integrated management and comprehensive planning.

3.2 RANGE MODERNIZATION

Due to the shortage of lands for live-fire training, it is increasingly common practice to site new, modernized ranges over existing outdated ranges. These modernized ranges are compliant with TC 25-8, which contains specific requirements for modernized, state-of-the-art training ranges (Training Circular 25-8, *Training Ranges* (U.S. Army, 2010).

3.2.1 Utilities and Infrastructure

Range construction, to include modernization or upgrade projects, may involve utility services. The impacts of providing water, sewer, communications, electricity and natural gas for range projects are discussed below.

Providing water and sewer service to a range project is a rare occurrence. Even though water and sewer services make for a more conventional and comfortable latrine facility, the remoteness of ranges from the installation's existing infrastructure make them impractical. The distances between ranges and a sewage processing plant is normally too far to justify the expense of a sewer system. Low volume and sporadic use contribute to the impracticality of running both sewer and drinking water lines to ranges. Due to these issues, most ranges use dry-vault latrines, septic tank with drain field, or portable latrines under contract. Using units routinely bring their own supply of drinking water with a 400-gallon water trailer or in five-gallon containers.

There is no requirement for telephone or fiber optics communications between a range and the installation. The only communication requirement for operating a range is to maintain two forms of communications to contact Range Control. These two forms of communication can be hand-held radio, vehicle radio, telephone, cell phone, or microwave. If telephones are justified for the project, normally the most cost effective way to bring communications to a site is via poles. Sometimes training activities or installation rules require that communications be brought to the range site below ground. Either of these methods would usually require clearing and grubbing of the communications line path.

Electrical service is routinely extended to the range site to operate lights, heating and air conditioning and provide power for targetry systems.

Propane/Natural gas is normally only provided by refillable tanks on a range site. This is an installation decision and should be coordinated with the DPW for any installation regulations. The designer must ensure that the gas tanks are located in positions where they cannot be hit by tactical vehicles or accidentally shot with a stray round.

Access and maintenance roads are discussed in some detail in Appendix C.

3.2.2 Range Operations Control Area (ROCA)

The Range Operations and Control Area (ROCA) is the center for overall control and operation of the range. From the ROCA, downrange target and simulation equipment are operated and activities are monitored for scoring and performance data review. The data is collected and distributed to the participants for an after action review. Table 2 lists the support facilities commonly included in a small arms range complex.

The ROCA layout (Figure 1) is a representative example, and each installation can adapt the location of ROCA facilities to meet site-specific conditions. A distance of 50 feet (15 meters) is required between the Ammunition breakout building and all other occupied buildings. A range flagpole would be required and would have a red "range is hot" light atop the pole, switched from the Range Operations and Control Tower (U.S. Army, 2004). Appendix C provides additional details about these facilities.

In general, the parking area in the ROCA should accommodate approximately three (3) full-size buses and approximately twenty (20) military or private cars. The parking area location must be planned based on the convenience and safety of walking troops.

The ROCA facilities authorized for ranges vary by type of range. Details of ROCA facilities authorized for ranges included in this PEA are provided in Appendix C. The area required for ROCA facilities depends on the number of support facilities provided at a given ranges, and site-specific configuration of those facilities. As a general rule, the area covered by the ROCA facilities for ranges in this PEA varies from approximately 1 to 2 acres.

Table 2: Size of Common Support Facilities

Support Facilities	Size (square foot (sf))
Control Tower	290
Operations and storage	800
General Instruction Building	800
Covered eating area	800*
Ammunition breakout building	405
Bleachers enclosure	726*
Aerated Vault Latrine	200

* Slightly larger at installations with a Training and Doctrine Command mission; covered eating area is 1,413 square foot (sf); enclosed bleachers area is 1,078 sf. Installations with a Training and Doctrine Command mission include: Forts Jackson, SC; Benning, GA; Sill, OK; Leavenworth, KS; Leonard Wood, MO; Eustis, VA; Lee, VA; Gordon, GA, Sam Houston, TX.

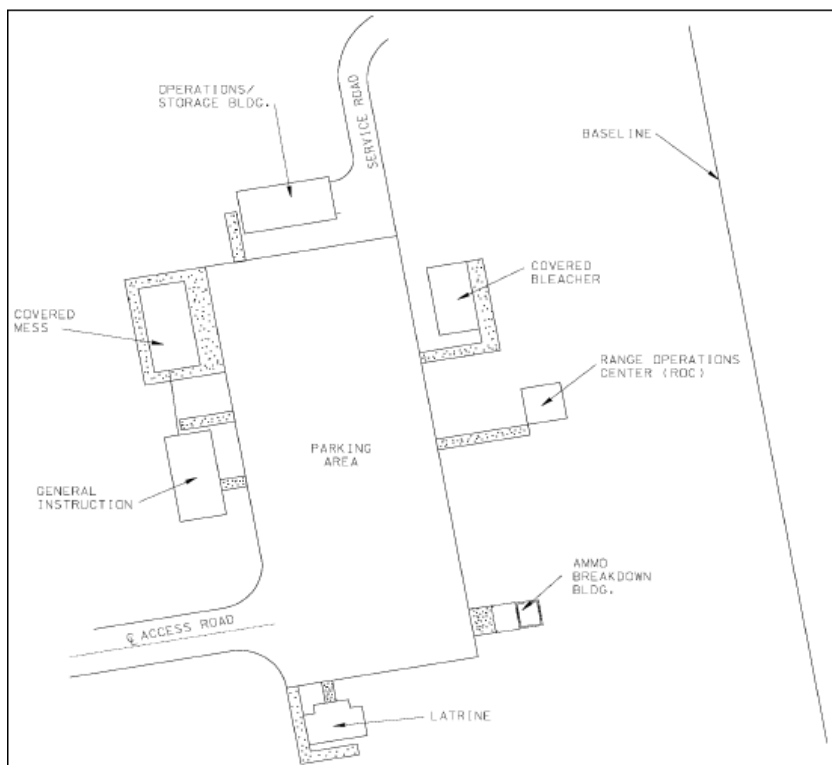


Figure 1: Representative Configuration of Range Operations and Control Area

Reference: Training Circular 25-8, *Training Ranges* (U.S. Army, 2010). Figure D-43. Pg. D-91.

3.3 ARMY RANGE MANAGEMENT

Army Regulation (AR) 350-19, *The Army Sustainable Range Program* (U.S. Army, 2005) assigns responsibilities, and provides policy and guidance for managing and operating U.S. Army ranges and training lands to support their long-term viability to meet national defense needs. The Army's Sustainable Range Program (SRP), Range and Training Land Program (RTLTP) and Integrated Training Area Management Program (ITAM) are integrated to support sustainable ranges, assess range sustainability and manage automated and manual systems that support sustainable ranges.

The RTLTP is the operation, programming, design, and construction portion of the overarching Army Sustainable Range Program (SRP), which deals exclusively with non-live fire and live fire training ranges. The SRP, ITAM and RTLTP programs are mandated in AR 350-19 (U.S. Army, 2005). The RTLTP program standardizes the Army ranges to ensure that a Soldier receives a high level of training at any location worldwide. These standard ranges are defined in Training Circular (TC) 25-8, *Training Ranges* (U.S. Army, 2010). RTLTP has also set standards for land requirements to perform live-fire training (U.S. Army, 2004).

3.3.1 Army Range Sustainment

The U.S. Army codified its range sustainment program in 2005 when it published Army Regulation 350-19, "The Army Sustainable Range Program"(U.S. Army, 2005). The regulation

laid the groundwork and established responsibilities and procedures for the Sustainable Range Program. The goal of the SRP is to maximize the capability, availability, and accessibility of ranges and training lands to support doctrinal requirements, mobilization, and deployments under normal and surge conditions.

SRP is comprised of two programs, the Range and Training Land Program (RTLTP) and Integrated Training Area Management (ITAM). The RTLTP provides for the central management, programming, and policy for modernization of the Army's ranges and their day-to-day operations. ITAM provides Army Range Officers with the capability to manage and maintain training land by integrating mission requirements with environmental requirements and sound land management practices. The Geographic Information Systems (GIS) component of the ITAM program supports range operations and range sustainment by creating, analyzing, and distributing authoritative standardized spatial information, products, and services for the execution of range strategies and missions on Army installations.

3.3.2 Metals on Small Arms Ranges

Operations on small arms ranges produce soil containing metals from the spent rounds. These metal constituents have the potential to create environmental problems during range operation and maintenance. Bullets are often fragmented and pulverized upon impact with the ground, backstops, berms, other bullets fired earlier, or bullet traps located on operational small arms ranges. Antimony, copper, lead, and zinc contribute to small arms munitions constituent soil loading. As with most metals, lead, antimony, copper, and zinc generally tend to adhere to soil grains and organic material and remain fixed in shallow soils. Metals become fixed to soil particles more readily when the pH of the soil is between 6.5 and 8.5 (U.S. Army Environmental Center, 1998).

Lead and copper have the lowest potential for mobility. These metals and their metal salts commonly found on small arms ranges generally have relatively low solubility constants in soil. The normal operation of a range can produce lead concentrations of several percent in soils located behind and adjacent to targets and impact berms. Zinc concentrations are generally one to two orders of magnitude lower (hundreds to high thousands of mg/kg) and antimony is generally found in concentrations of tens to low hundreds of mg/kg of soil. Using risk-based concentrations as a guide, copper and zinc have a relatively low toxicity. Based on this information, copper and zinc, though found in significant concentrations in the soil on the range, generally pose a relatively low risk to migration, exposure in transport pathways off range, or both. Lead, though having low mobility characteristics in soil, is found in far greater concentrations on the range and has a higher potential to be detected in transport pathways off range. Coupled with its relatively high toxicity, lead is believed to be the munitions metal constituent of primary concern with respect to potential off range transport and potential exposure in transport pathways (Fabian and Watts, 2005).

The prevention of lead migration from the range impact area is typically the least expensive and easiest to implement of the actions that may be taken to manage lead issues on active small arms ranges. The selection of the appropriate lead migration prevention method is the key to successful lead management on a range or group of ranges. This is because each firing range, or group of ranges, is unique in terms of lead concentration, climate, soils, physical and chemical properties, and topography. A plan for controlling lead migration must be designed on the basis of these site characteristics. Typically, these plans include designs to control stormwater runoff, which is the predominant transport mechanism for lead.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

The U.S. Army has published Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian and Watts, 2005), which identifies potential best practices to mitigate potential environmental issues arising from operating small arms ranges. This document provides a process to identify the BMPs that would be most effective means to prevent migration of lead from a range. The list of potential mitigation measures are identified in Table 3. The U.S. Army Environmental Center also published a document, "Prevention of Lead Migration and Erosion from Small Arms Ranges (U.S. Army Environmental Center, 1998) that identifies recommended design principles and best management practices to reduce the migration of lead from Army small arms ranges.

In addition to the BMPs discussed above, Fabian and Watts (2005) also address operational methods to mitigate potential of migration of lead or other metals from the range area. Range use and range maintenance practices can reduce the risk of soil erosion and migration of metals from the range area and include such efforts as:

- Evenly distribute/stagger firing lane use on a range
- Minimize or eliminate firing into or over bodies of water or wetlands.

The maintenance practices listed below focus on simple and easily-implemented changes to common range maintenance practices that can decrease environmental concerns from small arms ranges. In addition, stormwater management in the range areas should be included in a routine inspection and maintenance program to ensure their continued effectiveness. Potential changes to range maintenance practices include (Fabian and Watts, 2005):

- Sustain the vegetative cover on and around the range.
- Improve impact berm maintenance and repair practices.
- Implement an inspection and maintenance program for existing BMPs.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

Table 3: Best Management Practice Training Area Suitability Matrix (pg 1 of 2)*

FCC No. Range Type	Lead Migration Prevention																	Pollution Prevention			Lead Removal								
	Operational Changes					Vegetative Solutions					Storm water Management							Berm Design and Structural Enhancements	Geosynthetic Materials	Soil Amendments		Green Ammunition	Bullet Traps						
	Firing Lane Use Management	Minimize/Eliminate Firing into Water Resources	Vegetative Cover Sustainment	Improved Range Maintenance Practices	Existing BMP Inspection and Maintenance	Vegetative Cover Establishment and Sustainment	Aerial Seeding of Inaccessible Areas	Grassed Channels/Swales	Grass Filter Strips	Riparian Buffer Zones	Erosion Control Mats and Mulches	Land Shaping	Diversion Channels and Dikes	Check Dams	Channel Stabilization	Turnouts and Aprons	Sediment Barriers	Dry Detention ponds	Sand Filters	Dust Control		Berm Design	Berm Structural Enhancements	Lime Amendments	Phosphate Amendments				
FCC 17730 Impact Area (Dudded)	-	X	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	-	-		
FCC 17731 Impact Area (NonDudded)	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	X	X	-	X
FCC 17801 Rifle/Machinegun Range	X	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
FCC 17803 Automated Field Fire Range	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	-	X
FCC 17805 Automated Record Fire Range	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	-	X
FCC 17806 Modified Record Fire Range	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	-	X
FCC 17809 Qualification Training Range	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	-	X
FCC 17812 Automated Sniper Field Fire Range	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	X	X	-	X
FCC 17822 Automated Combat Pistol/Military Police Firearms Qualification Course	-	X	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	-	-	X	
FCC 17829 Heavy Sniper Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	-	-	X	
FCC 17833 Multipurpose Machinegun Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	X	X	X	-	-	X	
FCC 17858 Scout/Reconnaissance Gunnery Complex (SCOUT/RECCE)	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-	

* Source: Fabian and Watts, 2005. Table 3-2, pg 45.

Note: X indicates that the BMP method is generally applicable to the range type.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

Table 3: Best Management Practice Training Area Suitability Matrix (pg 2 of 2)*

FCC No. Range Type	Lead Migration Prevention																				Pollution Prevention		Lead Removal					
	Operational Changes					Vegetative Solutions					Storm water Management										Berm Design and Structural Enhancements			Geosynthetic Materials	Soil Amendments		Green Ammunition	Bullet Traps
	Firing Lane Use Management	Minimize/Eliminate Firing into Water Resources	Vegetative Cover Sustainment	Improved Range Maintenance Practices	Existing BMP Inspection and Maintenance	Vegetative Cover Establishment and Sustainment	Aerial Seeding of Inaccessible Areas	Grassed Channels/Swales	Grass Filter Strips	Riparian Buffer Zones	Erosion Control Mats and Mulches	Land Shaping	Diversion Channels and Dikes	Check Dams	Channel Stabilization	Turnouts and Aprons	Sediment Barriers	Dry Detention ponds	Sand Filters	Dust Control	Berm Design	Berm Structural Enhancements				Lime Amendments	Phosphate Amendments	
FCC 17859 Digital Multipurpose Training Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17860 Digital Multipurpose Range Complex	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17865 Multipurpose Training Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17867 Multipurpose Range Complex	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17870 Battle Area Complex	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17879 Live Fire Exercise Shoot House	-	-	-	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	X	X	-	-	-
FCC 17891 Infiltration Course	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	-	-	X	X	-	X	X	X	X	-	X
FCC 17892 Fire and Movement Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17893 Squad Defense Range	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17895 Infantry Squad Battle Course	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-
FCC 17897 Infantry Platoon Battle Course	-	-	X	X	X	X	-	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	X	X	-	-	-

* Source: Fabian and Watts, 2005. Table 3-2, page 2 of 2, pg 46.

FCC = Facility Category Code

T RECCE = Reconnaissance

Note: X indicates that the BMP method is generally applicable to the range type.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

BMP Category/Group	BMP List	Storm water Runoff Transport					Surface Water Transport	Groundwater Transport	Aerial Transport
		Flow Rate Control	Volume Reduction	Erosion Control	TSS Reduction	Metals Reduction (Dissolved)			
Lead migration prevention	Firing lane use management	-	-	X	X	-	-	-	X
Operational changes	Minimize/eliminate firing into water resources	-	-	-	-	-	X	-	-
	Vegetative cover sustainment	X	-	X	X	-	-	-	X
	Improved range maintenance practices	X	-	X	X	-	-	-	X
	Existing BMP inspection and maintenance	X	X	X	X	-	-	-	X
Vegetative solutions	Vegetative cover establishment and sustainment	X	-	X	X	-	-	-	X
	Aerial seeding of inaccessible areas	X	-	X	X	-	-	-	X
	Grassed channels/swale	X	X	X	X	-	-	-	X
	Grass filter strips	X	X	X	X	-	-	-	X
	Riparian buffer zones	X	X	X	X	-	X	-	X
	Erosion control mats and mulches	X	-	X	X	-	-	-	X
Storm water management	Land shaping	X	X	X	X	-	-	-	-
	Diversion channels and dams	X	X	X	X	-	-	-	-
	Check dams	X	-	X	X	-	-	-	-
	Channel stabilization	X	-	X	X	-	-	-	-
	Turnouts and aprons	X	-	X	X	-	-	-	-
	Sediment barriers	X	-	X	X	-	-	-	-
	Dry detention ponds	X	-	X	X	-	-	-	-
	Sand filters	-	-	-	X	X	-	-	-
	Dust control	-	-	-	-	-	-	-	X
Berm design and structural enhancements	Berm design	X	-	X	X	-	-	-	-
	Berm structural enhancements	X	X	X	X	X	-	X	X
Geosynthetic materials		-	-	-	-	-	-	X	-
Soil amendments	Lime amendments	-	-	-	-	X	-	X	-
	Phosphate amendments	-	-	-	-	X	-	X	-
Pollution prevention	Green ammunition	-	-	-	-	X	X	X	X
	Bullet traps	-	-	-	-	X	X	X	X
Lead removal		-	-	-	-	X	-	X	X

* Source: Fabian and Watts, 2005. Table 3-3, pg 47.

FCC = Facility Category Code

RECCE = Reconnaissance

Note: X indicates that the BMP method is generally applicable to the range type.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

Each of the operational and maintenance practices is discussed in detail in the Army Small Arms Training Range Environmental Best Management Practices (Fabian and Watts, 2005).

Additionally, Fabian, et. al (2009) conducted a test of different engineering methods to reduce lead migration from small arms ranges. On-site tests determined that a trench filter resulted in average dissolved lead reduction from all trench filter samples by 94 percent. The average total lead reduction from all trench filter samples was 97 percent. All lead effluent concentrations were below the Environmental Protection Agency (EPA) target maximum contamination level (MCL) of 15 micrograms per liter ($\mu\text{g/L}$). The research concluded there were no detrimental effects from using the phosphate-based reactive media on the effluent. The research also concluded the reactive media filter could be used as an Army-wide BMP in a trench or above-ground filter unit if the filter dimensions and design are adequate to support retention times with the influent (Fabian, et. al 2009, pg. 1-1).

The matrix of BMPs for live-fire ranges includes 13 of the 20 ranges addressed in this PEA. These ranges are listed below:

- Rifle/Machine Gun Range (FCC 17801)
- Automated Field Fire Range (FCC 17803)
- Automated Record Fire Range (FCC 17805)
- Modified Record Fire Range (FCC 17806)
- Automated Sniper Field Fire Range (FCC 17812)
- Automated Combat Pistol Qualification Course (FCC 17829)
- Live Fire Exercise Shoot House (FCC 17879)
- Fire and Movement Range (FCC 17892)
- Squad Defense Range (FCC 17893)
- Infantry Squad Battle Course (FCC 17895)
- Infantry Platoon Battle Course (FCC 17897)

Details about the Known Distance Range (FCC 17810) are provided on page 42. This range is designed for training rifle marksmanship and target engagement techniques. This range is used to train Soldiers on the skills necessary to identify, calculate distance, engage, and hit stationary targets in a static array.

The grenade qualification course (FCC 17882) and Bayonet Assault Course (FCC 17816) are both non-firing ranges.

The urban assault course (FCC 17878) has five stations (details provide on page 42) for Soldier and unit training. Stations 1 and 2 have a total of 16 interior precision human urban targets. Station 3 (grenadier gunnery trainer) uses inert training rounds which are non-dud producing. Live fire is prohibited at station 4 (urban offense/defense training), and smoke and pyrotechnics live-fire are prohibited inside the underground trainer (Station 5) (US Army, 2004, pg. D-24)). Stations 1 and 2 are configured and designed much like a shoot house (FCC 17879), and station 3 has a non-dud producing impact area. Stations 4 and 5 do not use live ammunition. A dud is an explosive item or component of a weapon system that fails to function as intended when fired or detonated (US Army, 2003, p. 14). A non-dud producing impact area is a range impact area where non-dud-producing ammunition is used. This would include small arms ranges and ranges that use simulators in lieu of explosives.

3.4 RANGE DESIGNS AND CHARACTERISTICS

This section provides the range design and layout for the 20 ranges covered in this PEA (See Table 1). It also describes the characteristics of each range (description of the use of the range, size, support facilities for each range, ammunition used on the range, and other considerations). Data is arranged alphabetically by the name of the range. The data was compiled from TC 25-8, *Training Ranges* (U.S. Army, 2004b), and DA PAM 415-28, *Guide to Army Real Property Category Codes* (U.S. Army, 2006). Further details on these ranges can be found in TC 25-8, Appendix C. **Although the total acreage of some of the ranges described in this PEA exceeds 40 acres, the total acreage of disturbed grounds is less than 40 acres for all ranges described within and covered by this EA.**

3.4.1 Field Fire Range, Automated (FCC 17803)

Description: A range designed for training target engagement techniques with rifles. This range is used to train and familiarize Soldiers on the skills necessary to identify, engage, and hit stationary infantry targets. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center.

Size: (512 m x 300 m) (1680 ft x 985 ft) (38 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56 Ball (copper, jacketed lead)

Other: 300 meter maximum depth, 32 firing lanes, 96 stationary infantry targets.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

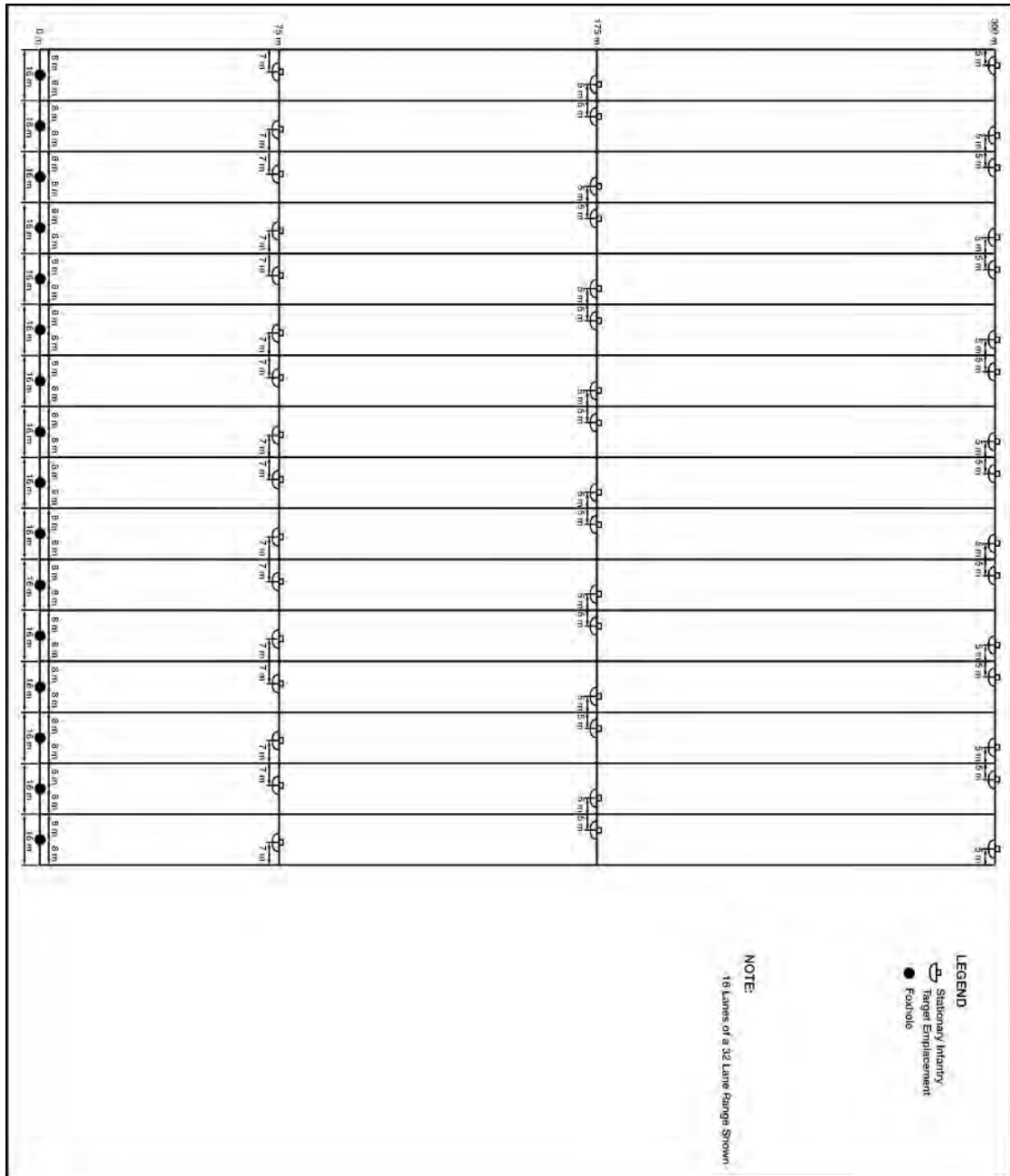


Figure 2: Automated Field Fire Range

3.4.2 Record Fire Range, Automated (FCC 17805)

Description: A range designed for training and day/night qualification requirements with rifles. This range is used to train and test Soldiers on the skills necessary to identify, engage, and hit stationary infantry targets. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center. Standard facilities associated with this range are listed in TC 25–8.

Size: (320m x 300m) (1050ft x 985 ft) (23.7 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56 Ball (copper jacketed lead)

Other: 300 meter maximum depth, 32 firing lanes, 112 stationary infantry targets.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

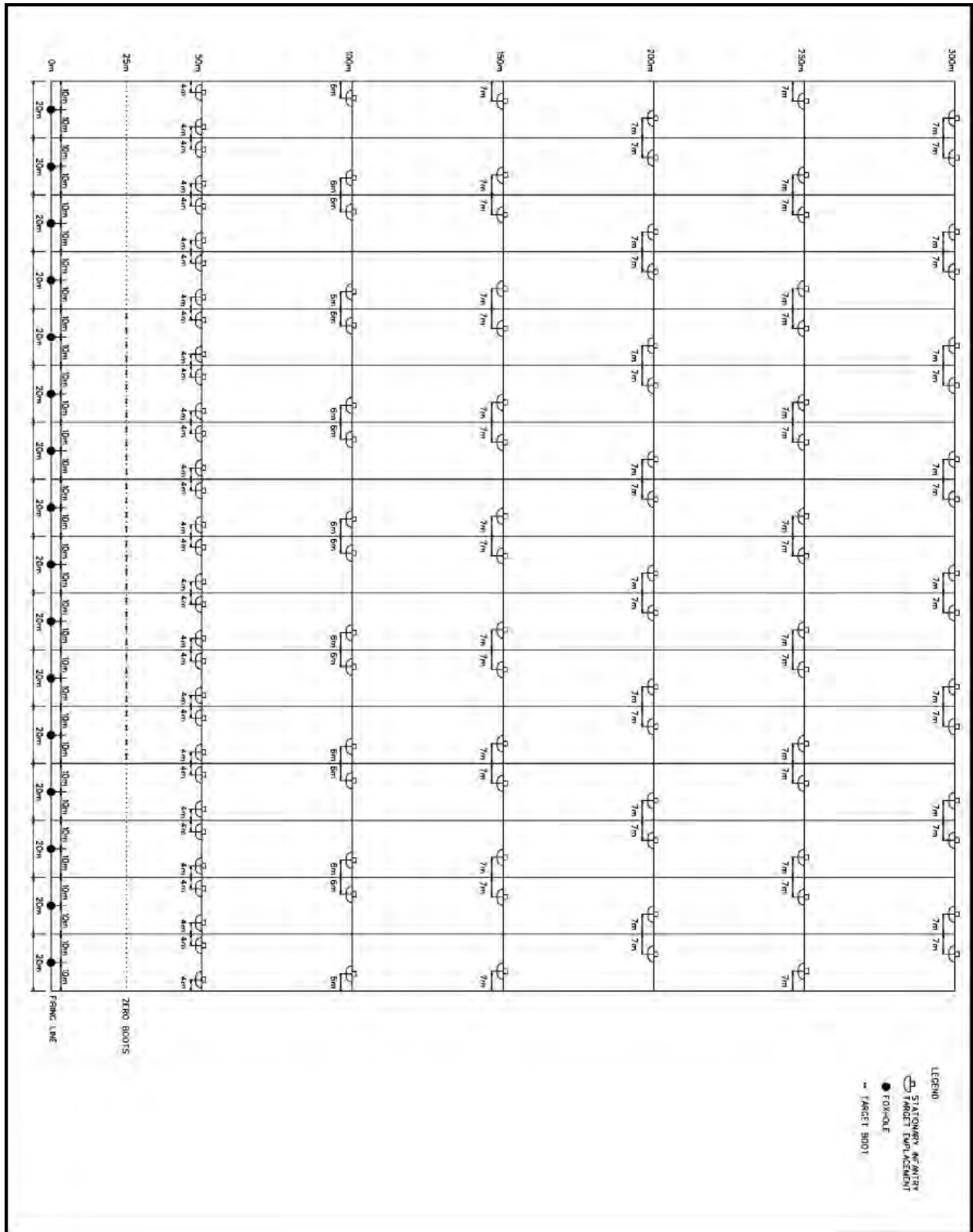


Figure 3: Automated Record Fire Range

3.4.3 Modified Record Fire Range (FCC 17806)

Description: A range designed for training and day/night qualification requirements with rifles. This range combines the capabilities of 17803, Automated Field Fire (AFF) Range; and 17805, Automated Record Fire (ARF) Range to reduce land and maintenance requirements. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center.

Size: (320m x 300m) (1050ft x 985 ft) (23.7 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56 Ball (copper jacketed lead)

Other: 300 meter maximum depth, 32 firing lanes, 114 stationary infantry targets

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Army Training Areas

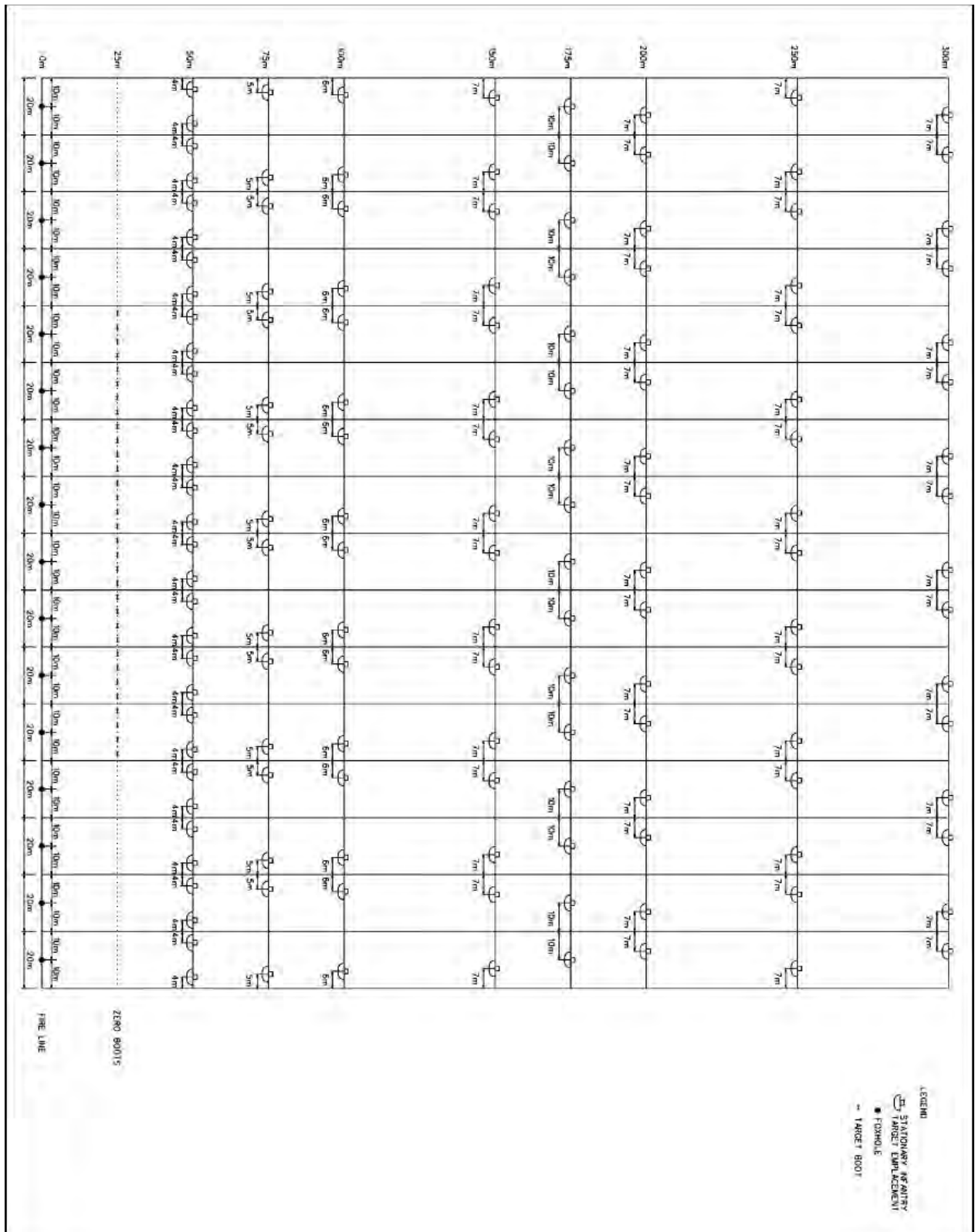


Figure 4: Modified Record Fire Range

3.4.4 Rifle/Machine Gun Zero Range (Basic 10-meter/25-meter Firing Range (zero)) (FCC 17801)

Description: This range is used to train individual Soldiers on the skills necessary to align the sights and practice basic marksmanship techniques against stationary targets. The range is designed for training shot-grouping and zeroing exercises with the M16 and M4 series rifles as well as crew served machine guns.

Size: 75m x 150m) (246ft x 492ft) (2.8 acres)

Support Facilities: Range Tower (FCC 17971)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammo breakdown (FCC 17122)

Ammunition Types: 5.56 Ball (copper jacketed lead)

Primary features: 32 target frames at 25 meters. 16 target frames at 10 meters. 32 foxholes. This range requires no automation. All targets are fixed at 25 meters from the firing line for M16/M4 and fixed at 10 meters for machine gun.

Other: 25 meter maximum range depth, 32 firing lanes

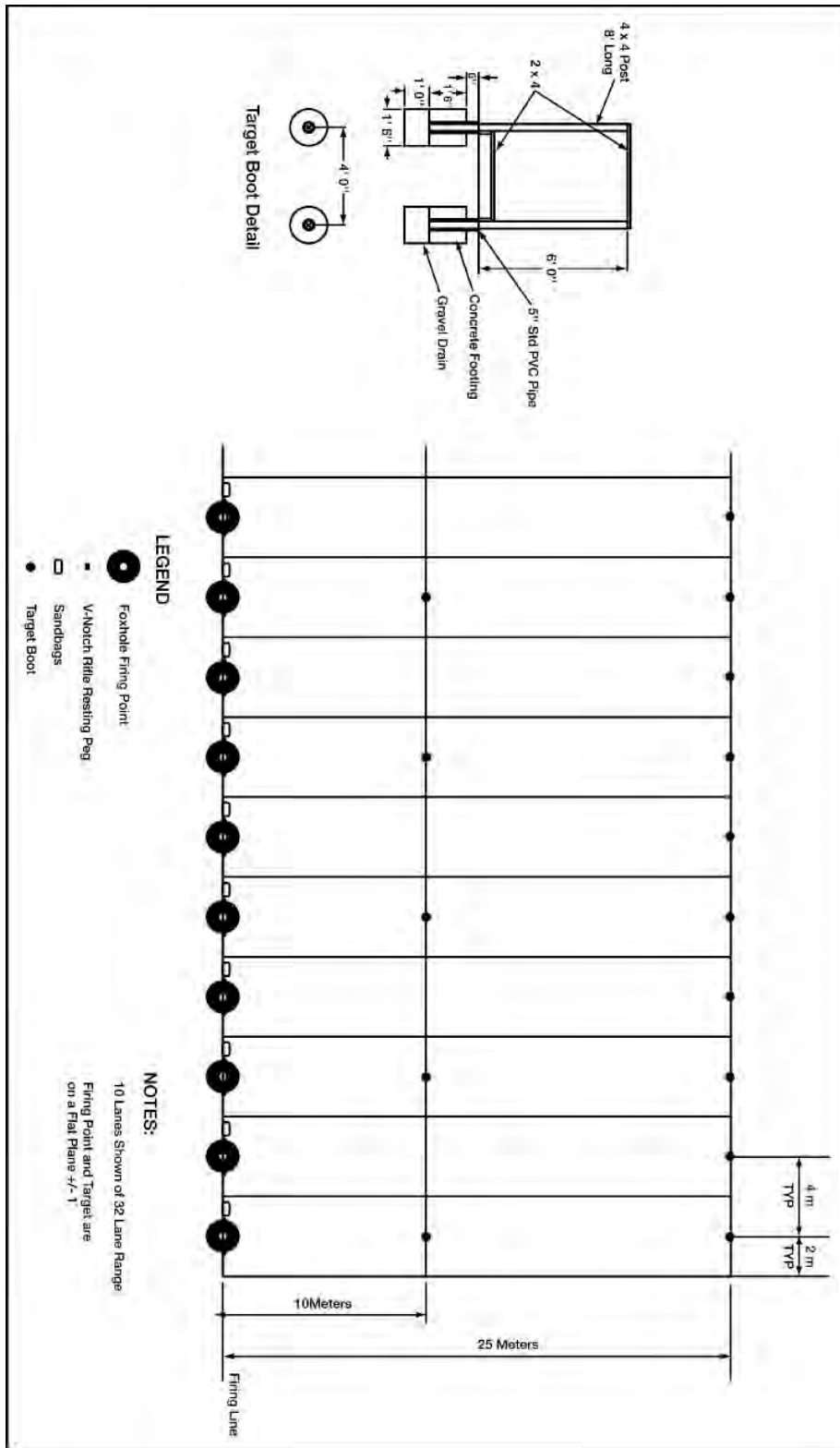


Figure 5: Basic 10-meter/25-meter Firing Range, Zero

3.4.5 Bayonet Assault Course (FCC 17816)

Description: A facility designed for training assault techniques with a rifle and bayonet. These techniques are applied through a series of obstacles. This facility requires no automation. Report the number of lanes as the number of prepared paths or sets of targets in a standard path to be used in training.

Size: Undefined
Support Facilities: Operations Storage (FCC 17122)
 Latrine (FCC 73075)
 Covered Mess (FCC 17139)
Ammunition Types: None
Other: Nine lanes

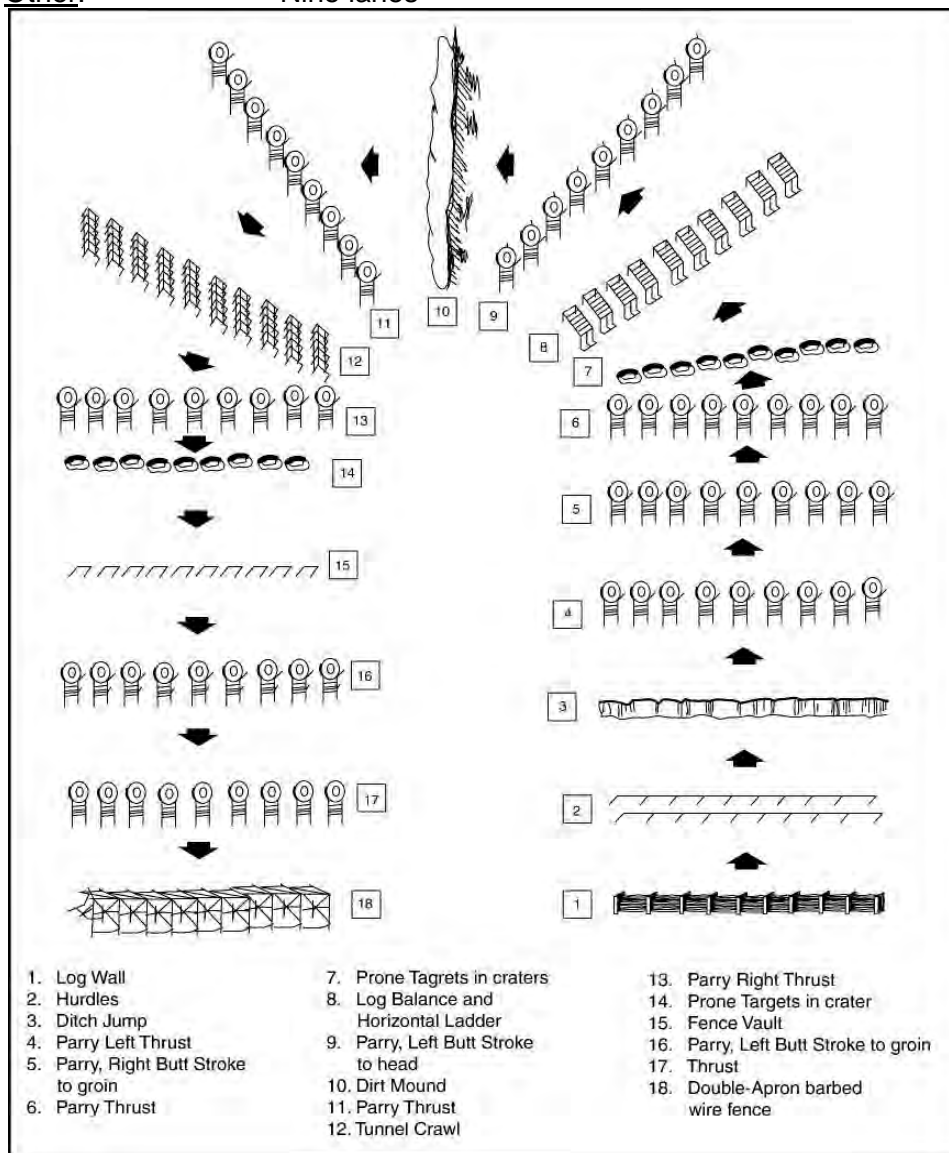


Figure 6: Bayonet Assault Course

3.4.6 Combat Pistol Qualification Course, Automated (FCC 17822)

Description: A range designed to meet training and qualification requirements with combat pistols and revolvers. This range is used to train and test Soldiers on the skills necessary to identify, engage, and hit stationary infantry targets. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center.

Size: (120m x 31m) (394ft x 102ft) (1 acre)

Support Facilities: Range Tower (FCC 17971)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 9 mm and .45 caliber pistol, shotgun

3.4.7 Fire and Movement Range (FCC 17892)

Description: A range designed for training individual and buddy/team fire and movement techniques. The team negotiates maneuver using cover and concealment techniques. Targets are not fully automated and/or the scenarios are not computer driven or scored. Count each path or trail for fire and movement as one lane.

Size: (150m x 215m) (492ft x 705ft) (8.0 acres)

Support Facilities: Range Operations Center, Small (FCC 17123)
Operations/Storage Building (FCC 17122)
Bleacher Enclosure (FCC 75061)
Ammo Breakdown Building (FCC 17129)
Latrine (FCC 73075)

Ammunition Types: 5.56mm blank, 7.62mm, Hand grenade simulators, Artillery simulators

Other: None

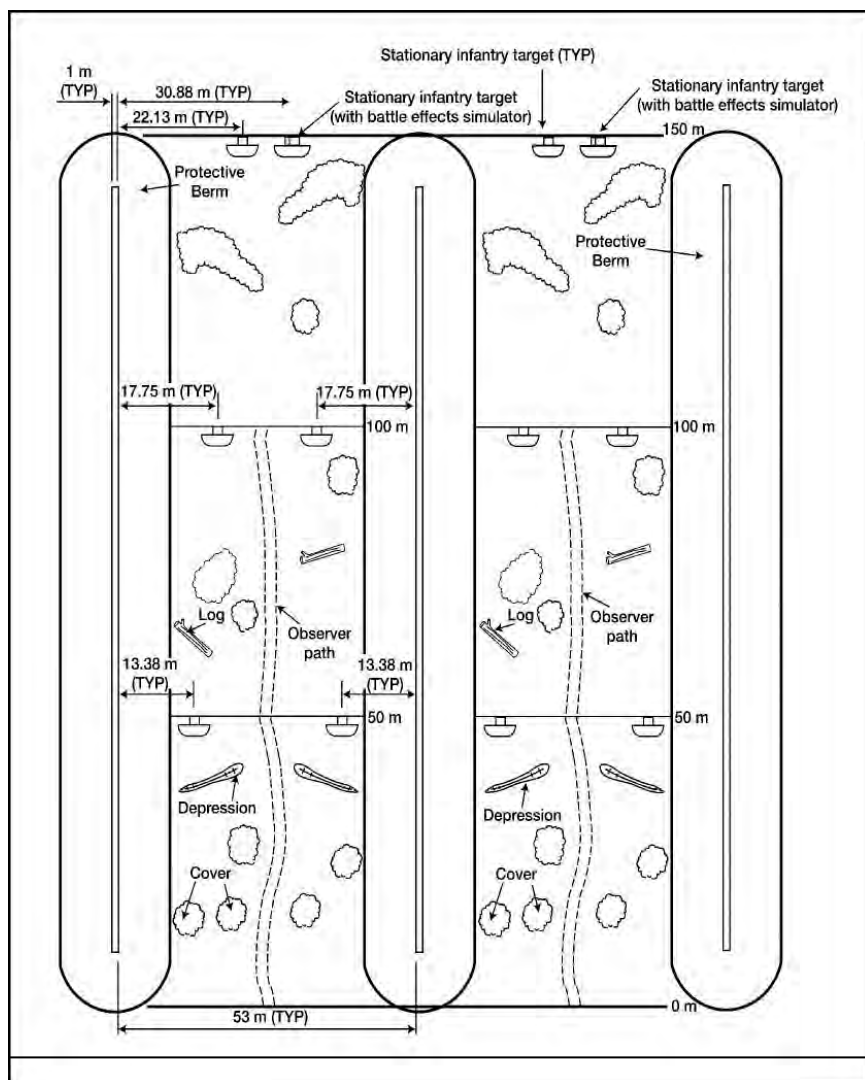


Figure 8: Fire and Movement Range

3.4.8 Grenade Launcher Range (FCC 17884)

Description: A range designed to meet training and qualification requirements of the 40mm grenade launcher. This range is used to train and test Soldiers on the skills necessary to engage and defeat stationary target emplacements with the 40mm grenade launcher. No automation is required for this facility. Count each prepared firing location as one FP.

Size: (100m x 350m) (328ft x 1148ft) (8.6 acres)

Support Facilities: Range Tower (FCC 17971)
 Latrine (FCC 73075)
 Bleachers, Enclosed (FCC 75061)
 Covered Mess (FCC 17139)
 Ammunition Breakdown (FCC 17122)

Ammunition Types: 40mm grenades, M918 and M781.

Other: Max range depth of 350 meters. Four firing stations. Daily clean up of rounds. M781 marking dye used on the range is made from talc.

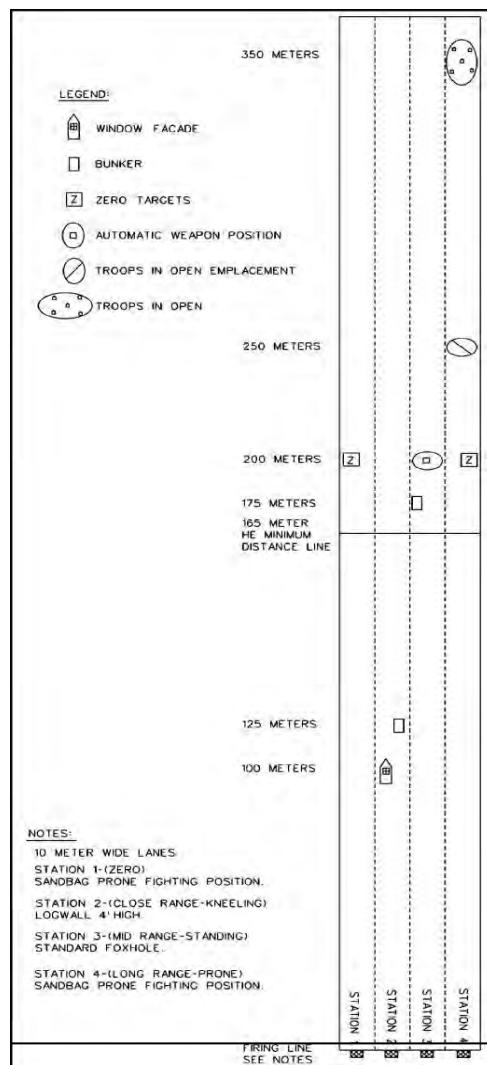


Figure 9: Grenade Launcher Range

3.4.9 Hand Grenade Familiarization Range (FCC 17883)

Description: A range designed to satisfy the training requirement of throwing live fragmentation grenades. This range familiarizes Soldiers with the effects of live fragmentation grenades. No automation is required for this facility. Count each throwing location as one FP.

Size: (25m x 50m) (82ft x 164ft) (0.3 acre)

Support Facilities: Latrine (73075)
Bleachers, Enclosed (75061)
Covered Mess (17139)
Ammunition Breakdown (17122)

Ammunition Types: High explosive fragmentation grenades

Other: Daily clean up of rounds

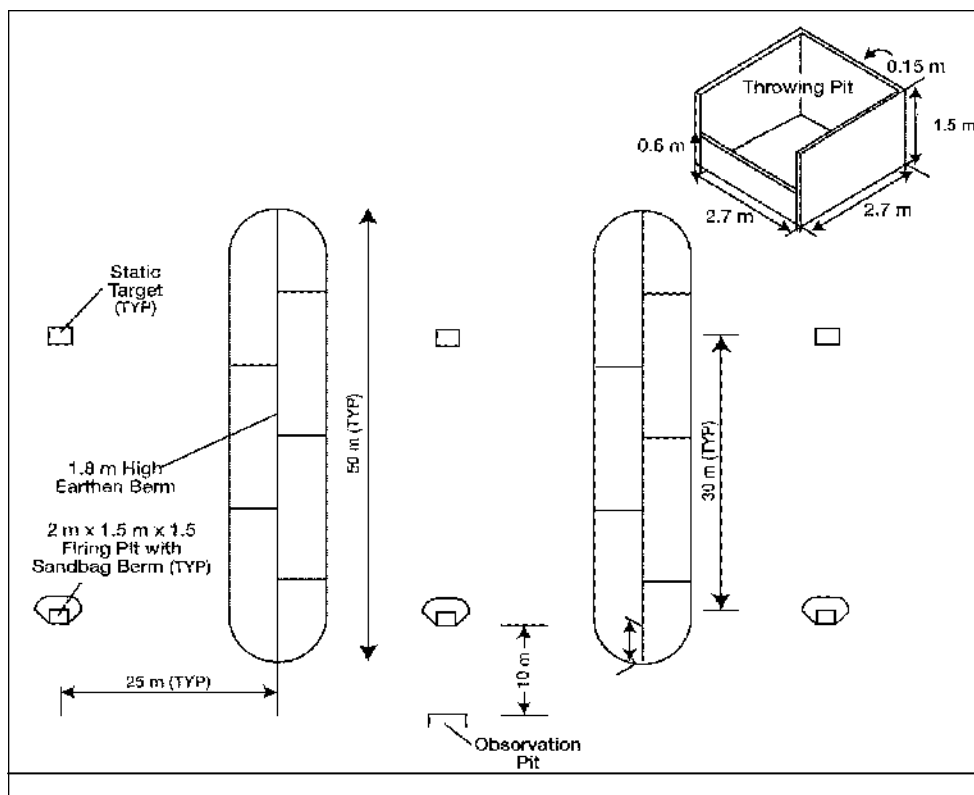


Figure 10: Hand Grenade Familiarization Range

3.4.10 Hand Grenade Qualification Course (non-firing) (FCC 17881)

Description: This range is used to train and qualify Soldiers on the basic skills necessary to employ hand grenades (using practice-fused grenades). These techniques are evaluated against prescribed training objectives. No automation is required for this facility. Count each throwing location as one FP.

Size: Undefined

Support Facilities: Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)

Ammunition Types: None

Other: One course with seven stations. No live grenades are used on this range.

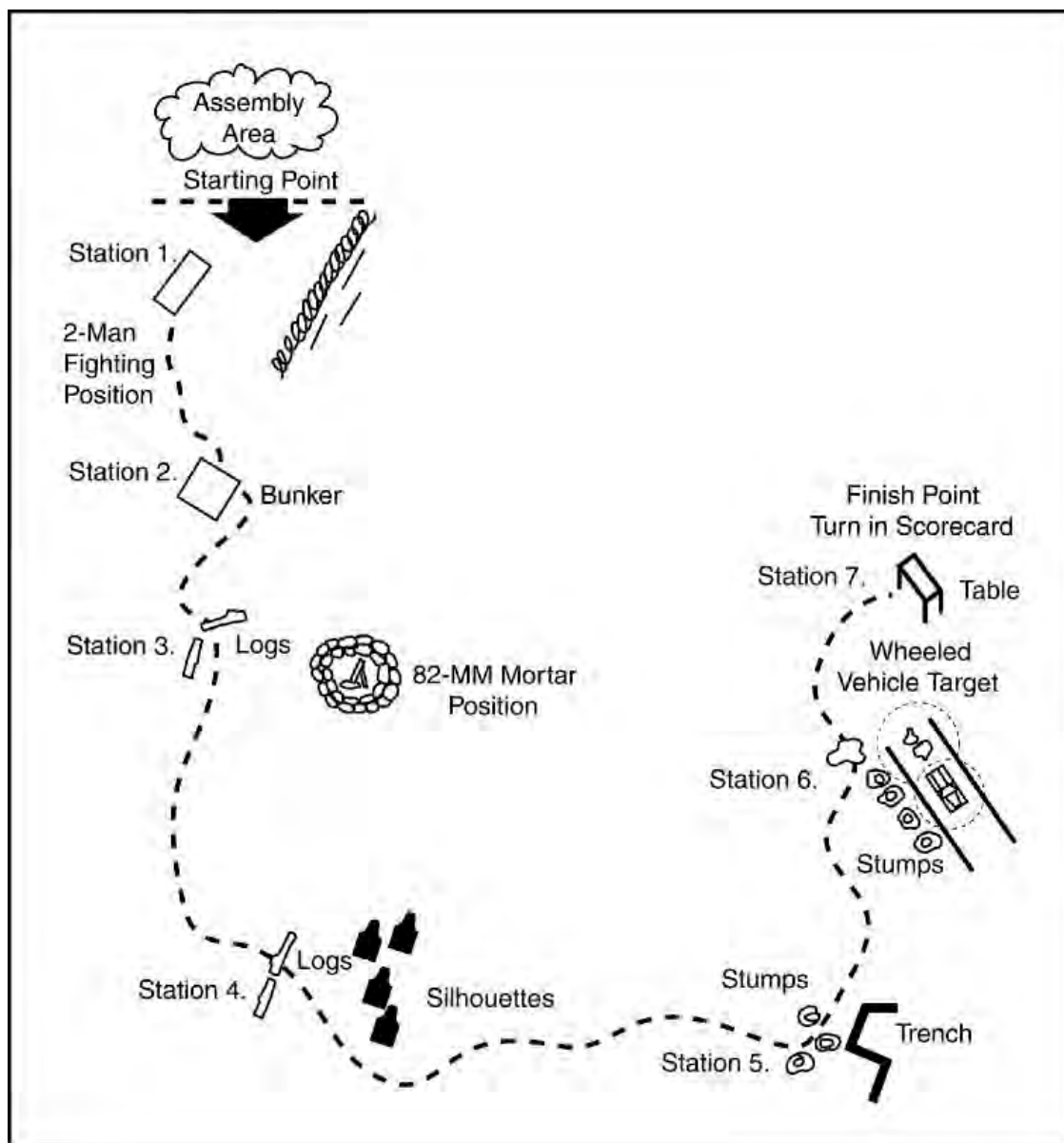


Figure 11: Hand Grenade Qualification Course

3.4.11 Heavy Sniper Range (FCC 17829)

Description: A range designed to meet training and qualification requirements with the heavy sniper rifle. This range is used to train and test Soldiers on the skills necessary to detect, identify, engage, and hit stationary and moving infantry and material targets in a tactical array in accordance with applicable field manuals. All targets, except iron maidens, are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center.

Size: (120m x 1,700m) (394ft x 5578ft) (50.4 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 7.62 mm and .50 cal (lead jacketed)

Other: One firing lane. Maximum depth of 1,775 meters. Natural vegetation is required in the target area to provide realistic natural obstacles for the sniper to negotiate.

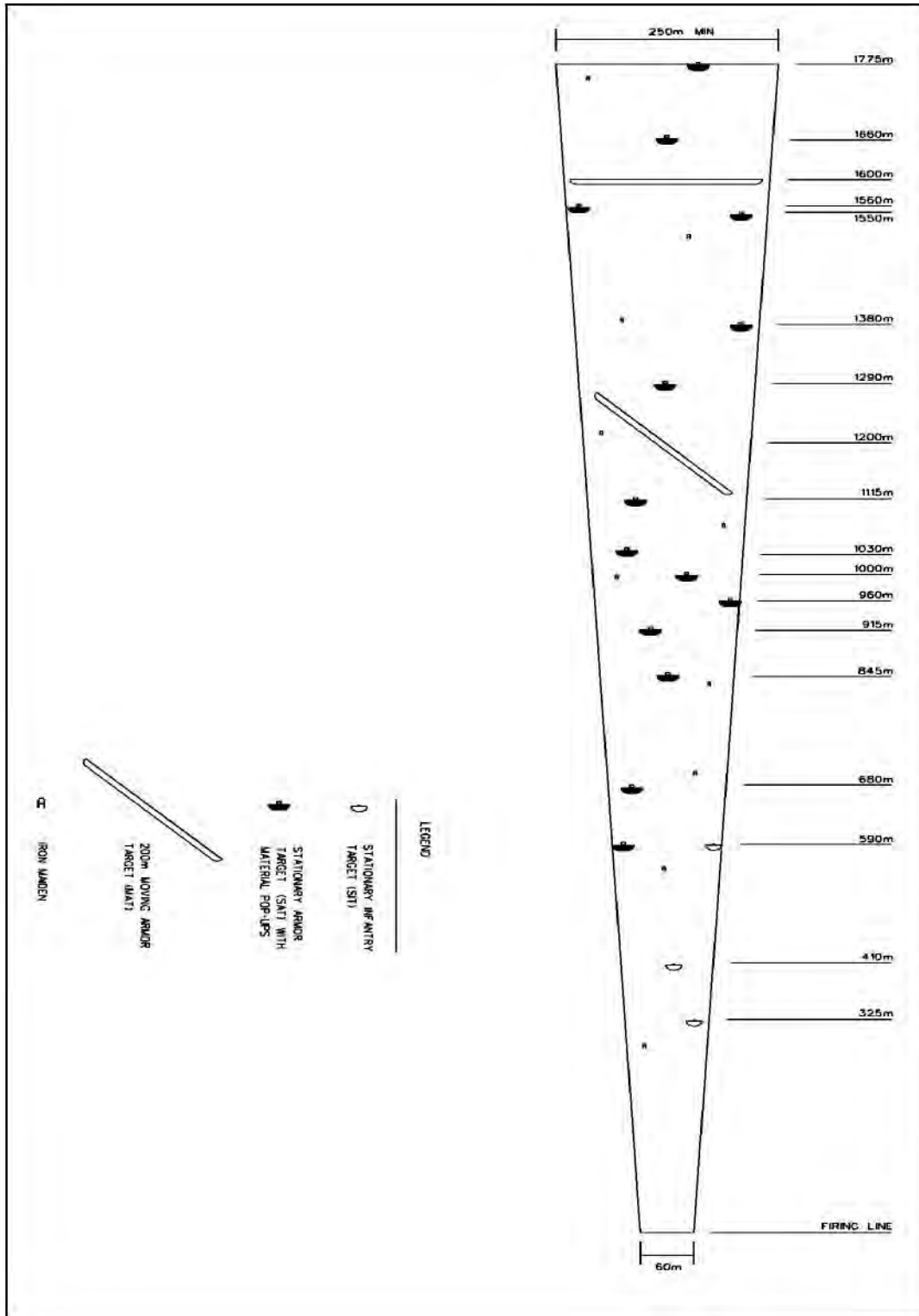


Figure 12: Heavy Sniper Range

3.4.12 Infantry Platoon Battle Course, Automated (FCC 17897)

Description: A complex designed for the training and qualification requirements of infantry platoons, either mounted or dismounted, on movement techniques and operations. This complex is used to train and test platoons on the skills necessary to conduct tactical movement techniques and to detect, identify, engage, and defeat stationary and moving armor and infantry targets in a tactical array. Targets are not fully automated and/or the scenarios are not computer driven or scored. The standard range has four firing points counted as the four objective areas: intermediate, final, counterattack-1 and counterattack-2 objectives.

Size: Overall, a trapezoid 50m at the base and 1500m at the top over a distance of 4000 meters, with a total area of approximately 720 acres.

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56mm, 7.62mm, Hand grenade simulators, Artillery simulators

Other: Within the 720 acres in this range, this range consists of five distinct target areas that Soldiers maneuver to without vehicles. These five target area vary in size as follows: 50m x 50m, 75m x 150m (2 each), and 75m x 400m (2 each). The total disturbed land area associated with this range is approximately 28 acres.

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Army Training Areas

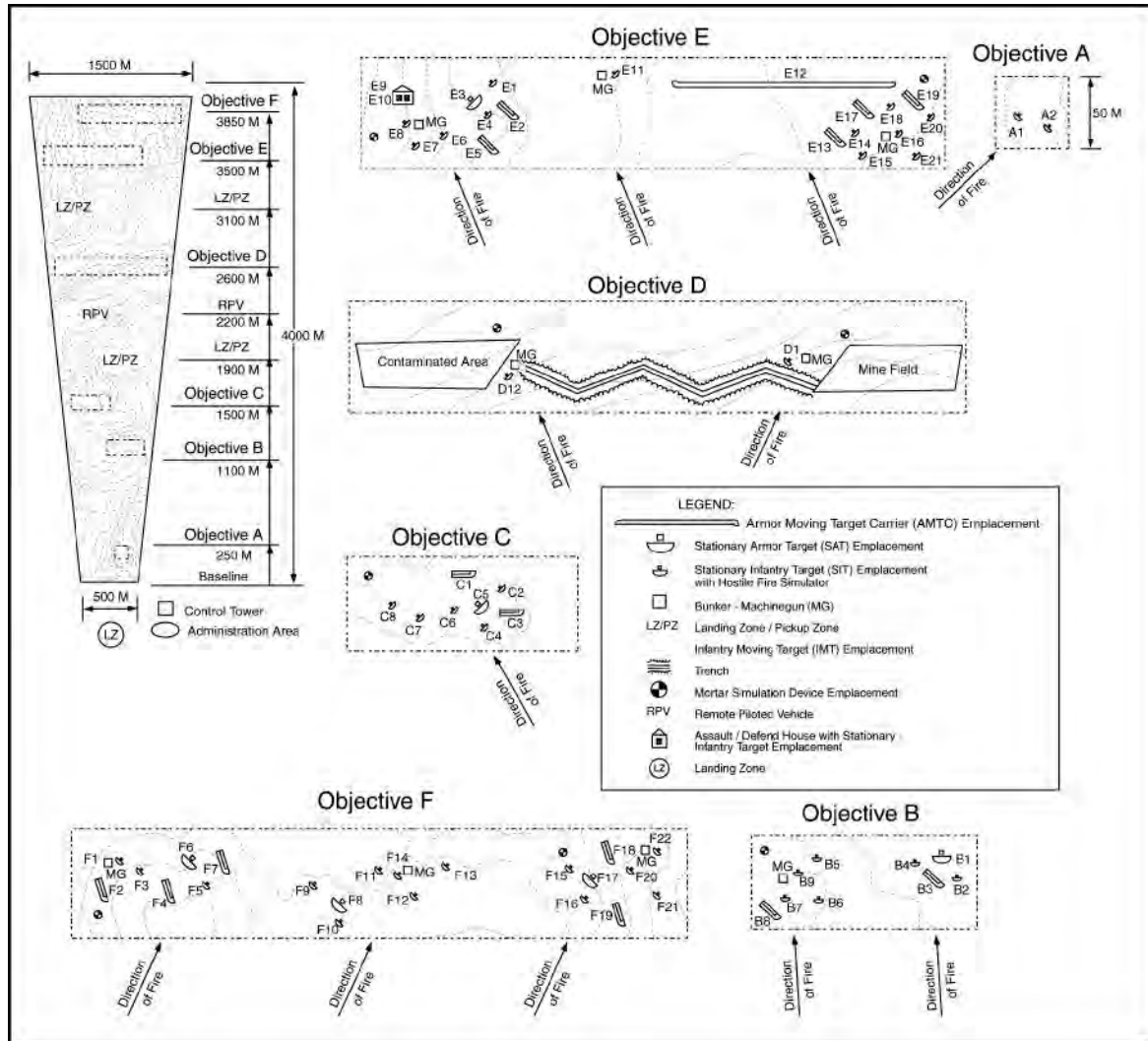


Figure 13: Infantry Platoon Battle Course

3.4.13 Infantry Squad Battle Course (FCC 17895)

Description: A complex designed for the training and qualification requirements of teams and squads on individual and collective tactics, techniques, procedures, and employment in tactical situations. This complex is used to train and test teams and squads on the skills necessary to conduct tactical movement techniques and to detect, identify, engage, and defeat stationary and moving armor and infantry targets in a tactical array. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center. Count each path or trail as one LN.

Size: Trapezoid in shape, with a base of 500m, and 1000m at the top over a length of 1000m, with a total area of 185 acres.

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56mm, 7.62mm, Hand grenade simulators, Artillery simulators

Other: Within the 185 acres in this range, this range consists of five distinct target areas that Soldiers maneuver to without vehicles. These five target area vary in size as follows: 100m x 100m (3 each), 125m x 200m, and 100m x 250m. The total disturbed land area associated with this range is approximately 20 acres.

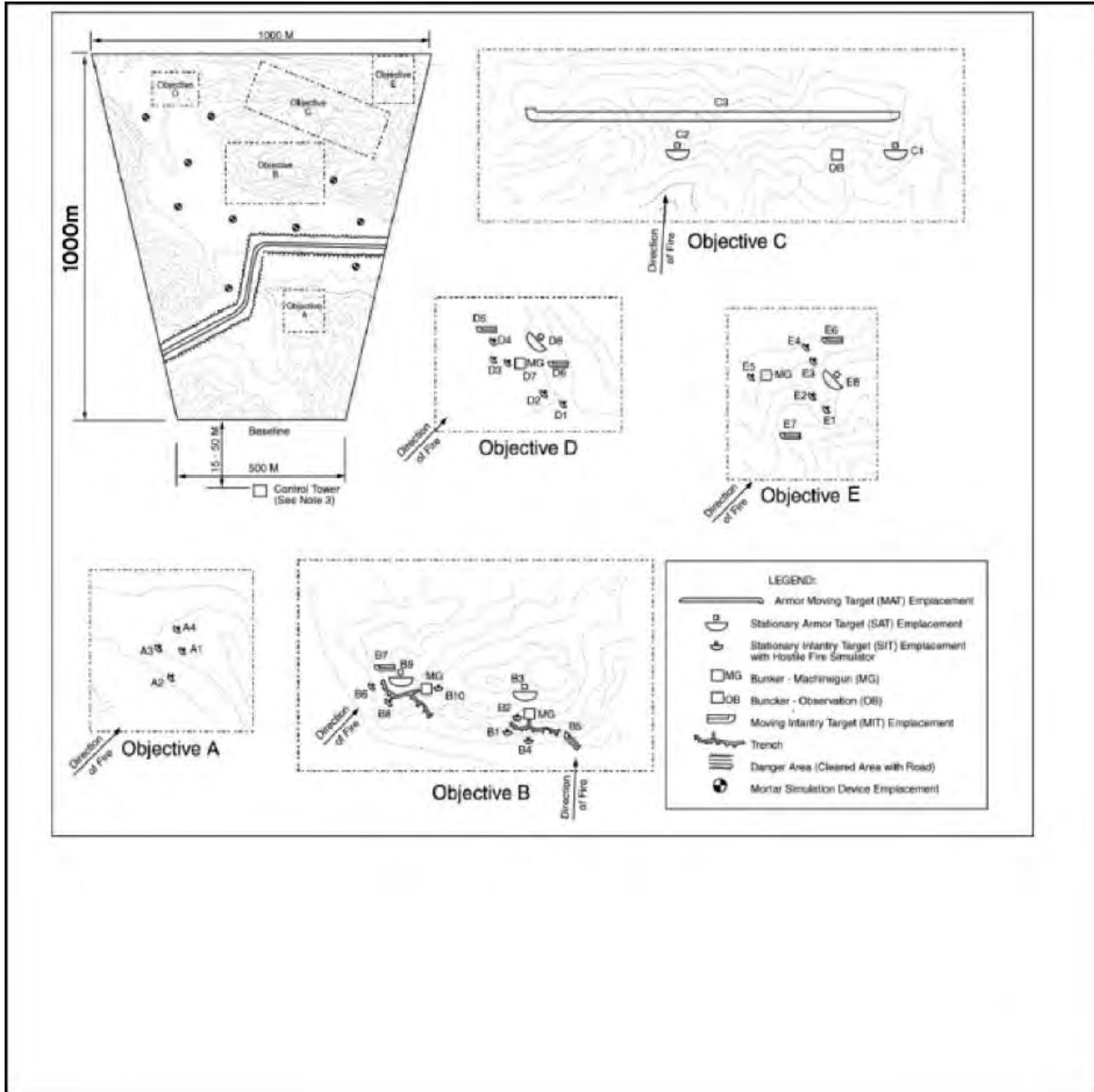


Figure 14: Infantry Squad Battle Course

3.4.14 Infiltration Course (FCC 17891)

Description: A range designed for training individual infiltration and combat movement techniques and then executing them while subject to live fire. No automation is required for this facility. Count each path or trail for a single Soldier as one lane (LN). Standard facilities associated with this range are listed in TC 25–8.

Size: (30m x 100m) (98.4ft x 928ft) (0.7 acre)

Support Facilities: Range Tower (FCC 17971)
 Operations Storage (FCC 17122)
 Latrine (FCC 73075)
 Bleachers, Enclosed (FCC 75061)
 Covered Mess (FCC 17139)

Ammunition Types: 7.62mm tracer ammunition, artillery simulators (Black Powder)

Other: Movement area is 50m by 100m.

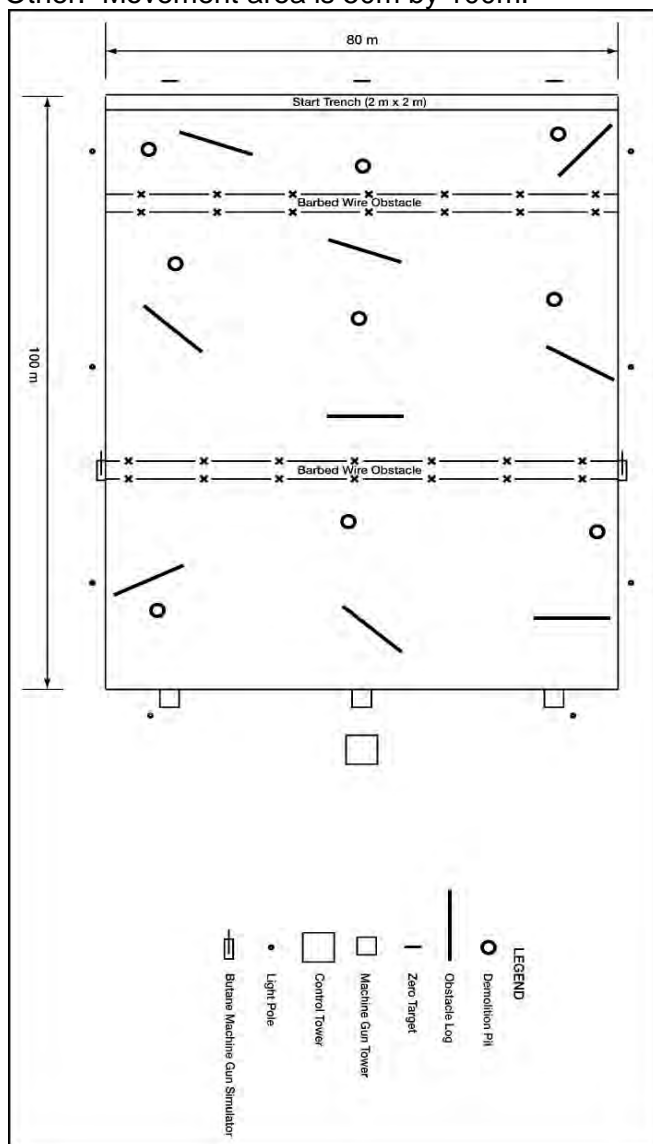


Figure 15: Infiltration Course

3.4.15 Known Distance Range (FCC 17810)

Description: A range designed for training rifle marksmanship and target engagement techniques. This range is used to train Soldiers on the skills necessary to identify, calculate distance, engage, and hit stationary targets in a static array. This range requires no automation. Standard facilities associated with this range are the same as those for the Automated Field Fire (AFF) Range.

Size: (150m x 1000m) (492ft x 3281ft) (37 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56mm

Other: 1,000 meter max depth, 32 lanes

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

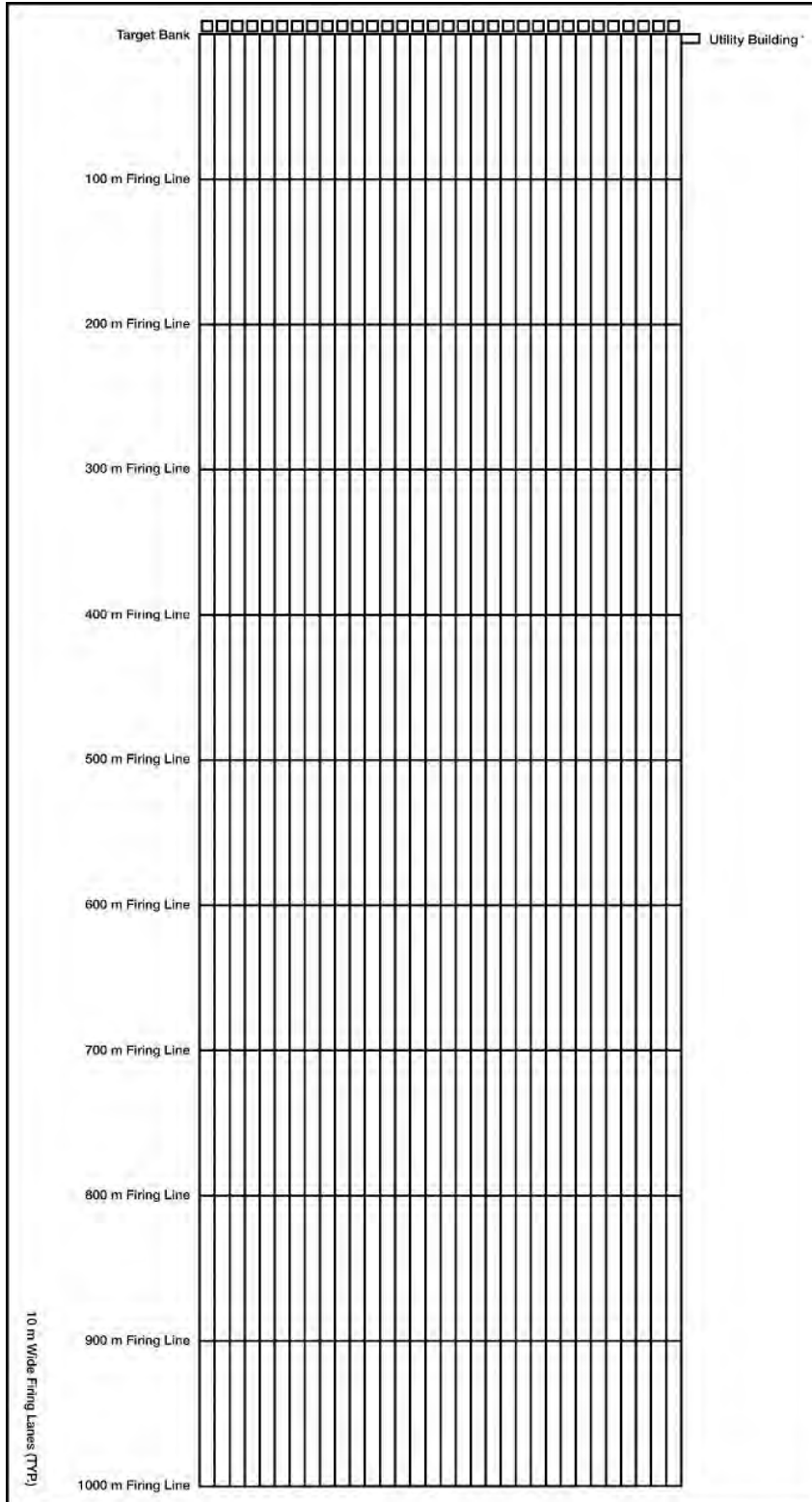


Figure 16: Known Distance Range

3.4.16 Live Fire Exercise Breach Facility (FCC 17880)

Description: A facility designed for training breaching tasks associated with urban areas. This facility is used to train individual Soldiers and squads on the skills necessary to employ breaching techniques against hardened structures. No automation is required for this facility. No standard facilities are associated with this range. Report this category in AC within the facility boundary and FP where each station (for example, door breach, window breach, or wall breach) counts as one FP.

Size: (20m x 20m) (66ft x 66ft) (0.1 acre)

Support Facilities: Latrine (FCC 73075)

Ammunition Types: 12 gauge shotgun, demolition cord, small explosive blocks of TNT or C4 (RDX)

Other: Clean up of demolition cord immediately after use. Few exercises use demolition cord. Predominance of entries are with 12 gauge shotgun that is carried for entries and personal defense weapon. Demolition cord is detonated above the ground on a door. Few misfires occur; all are cleared immediately in accordance with safety procedures

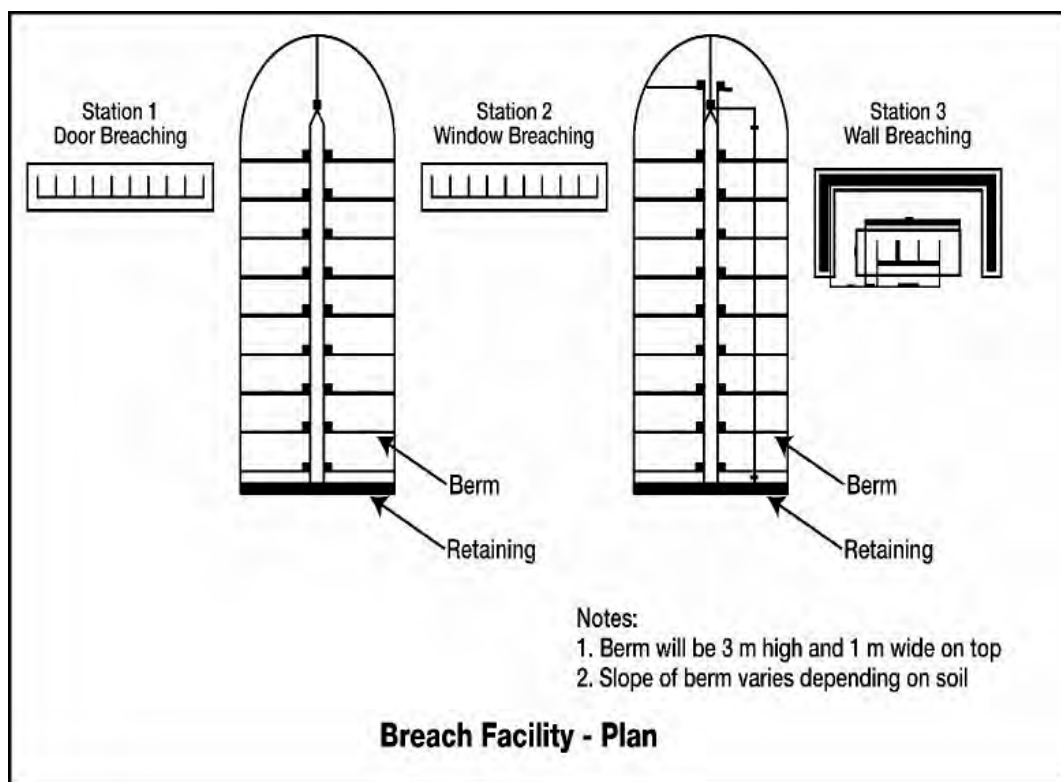


Figure 17: Live-fire Exercise Breach Facility

3.4.17 Live Fire Shoothouse (FCC 17879)

Description: A facility designed for training building clearing tasks associated with urban areas. This range is used to train and test individuals, teams, sections, or squads on the skills necessary to conduct individual and collective tasks of building clearing/occupying. All targets are fully automated, and the event-specific target scenario will be computer driven and scored from the range operations center. Standard facilities associated with this range are listed in TC 25–8. Report this category in AC within the facility boundary and in FP where each room in a standard nine-room shoothouse represents one FP.

Size: (30m x 20m) (98ft x 66ft) (0.1 acre)

Support Facilities: Operations Storage (FCC 17122)
Latrine (FCC 73075)
Ammunition Breakdown (FCC 17122)
After Action Review Facility, Small (FCC 17123)

Ammunition Types: 5.56 and 7.62 ball ammunition

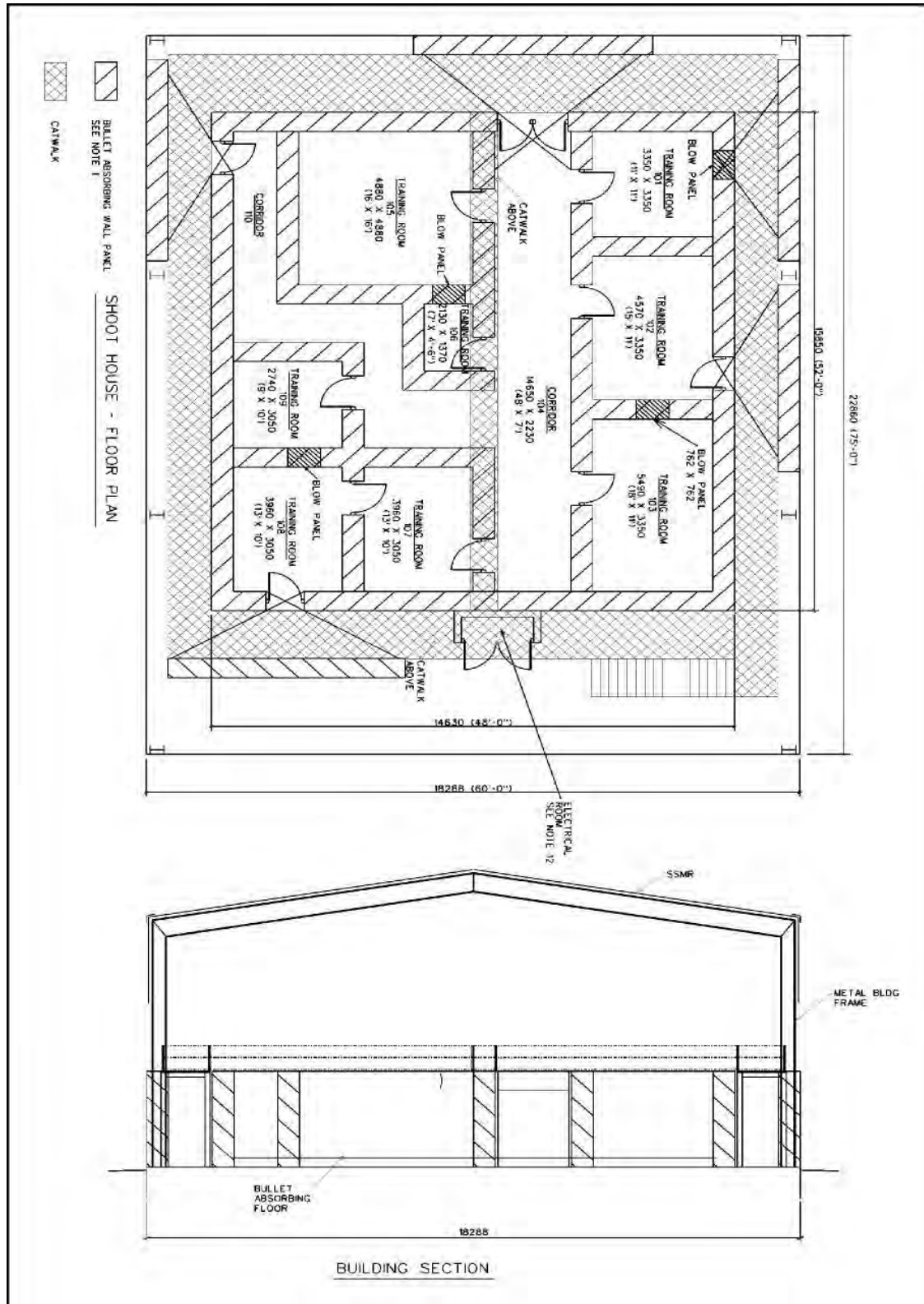


Figure 18: Live-fire Exercise Shoot House

3.4.18 Squad Defense Range (FCC 17893)

Description: A range designed for training individuals and squads on defensive engagement techniques and mutually supporting fires. This range is used to train Soldiers on the skills necessary to designate sectors of fire and to identify and provide suppressive fire on stationary infantry targets. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center. Count each foxhole or firing point as one firing point.

Size: (300m x 400m) (984ft x 1312ft) (29.7 acres)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 5.56mm

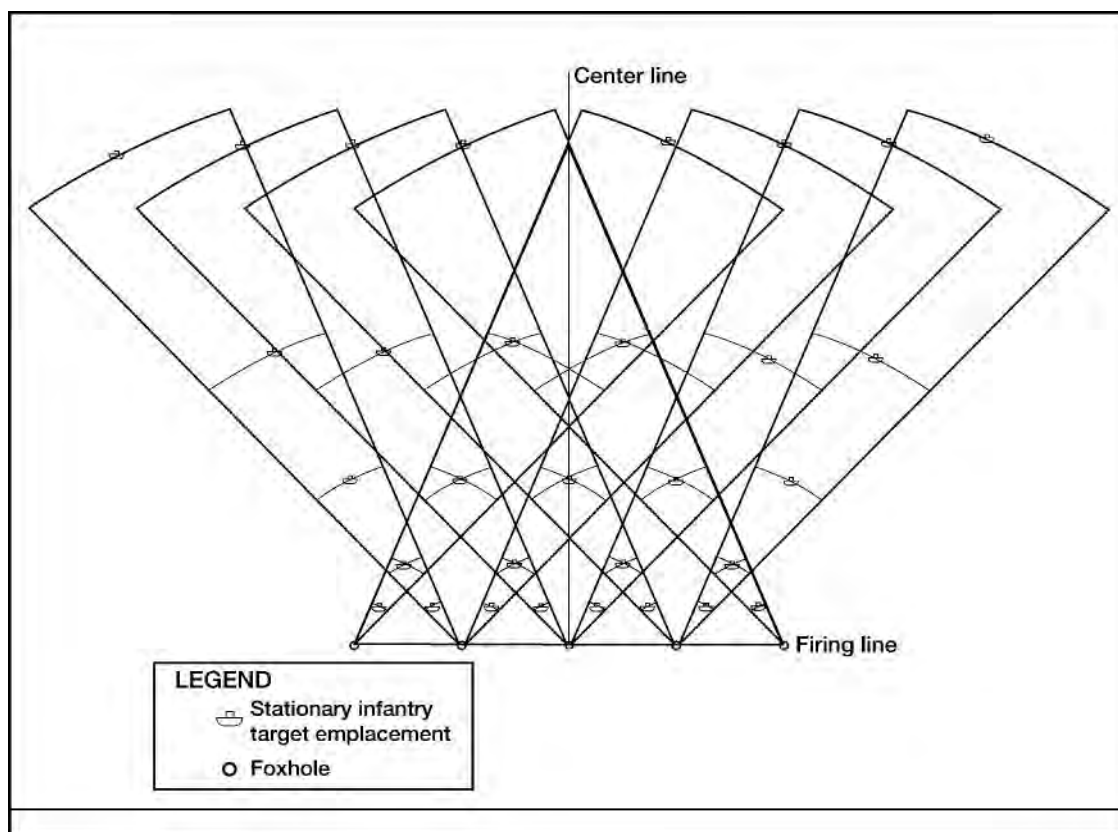


Figure 19: Squad Defense Range

3.4.19 Sniper Field Fire Range, Automated (FCC 17812)

Description: A range designed to meet training and qualification requirements with the sniper rifle. This range is used to train and test Soldiers on the skills necessary to detect, identify, engage, and hit stationary and moving infantry targets in a tactical array in accordance with applicable field manuals. All targets are fully automated, and the event-specific target scenario is computer driven and scored from the range operations center.

Size: (600m x 1,000m) (1,950ft x 3,280ft)

Support Facilities: Range Tower (FCC 17971)
Operations Storage (FCC 17122)
Classroom Facility (FCC 17123)
Latrine (FCC 73075)
Bleachers, Enclosed (FCC 75061)
Covered Mess (FCC 17139)
Ammunition Breakdown (FCC 17122)

Ammunition Types: 7.62mm, .50 caliber

Other: 1,000 meter maximum depth, 4 firing lanes, 16 moving targets, 40 stationary targets

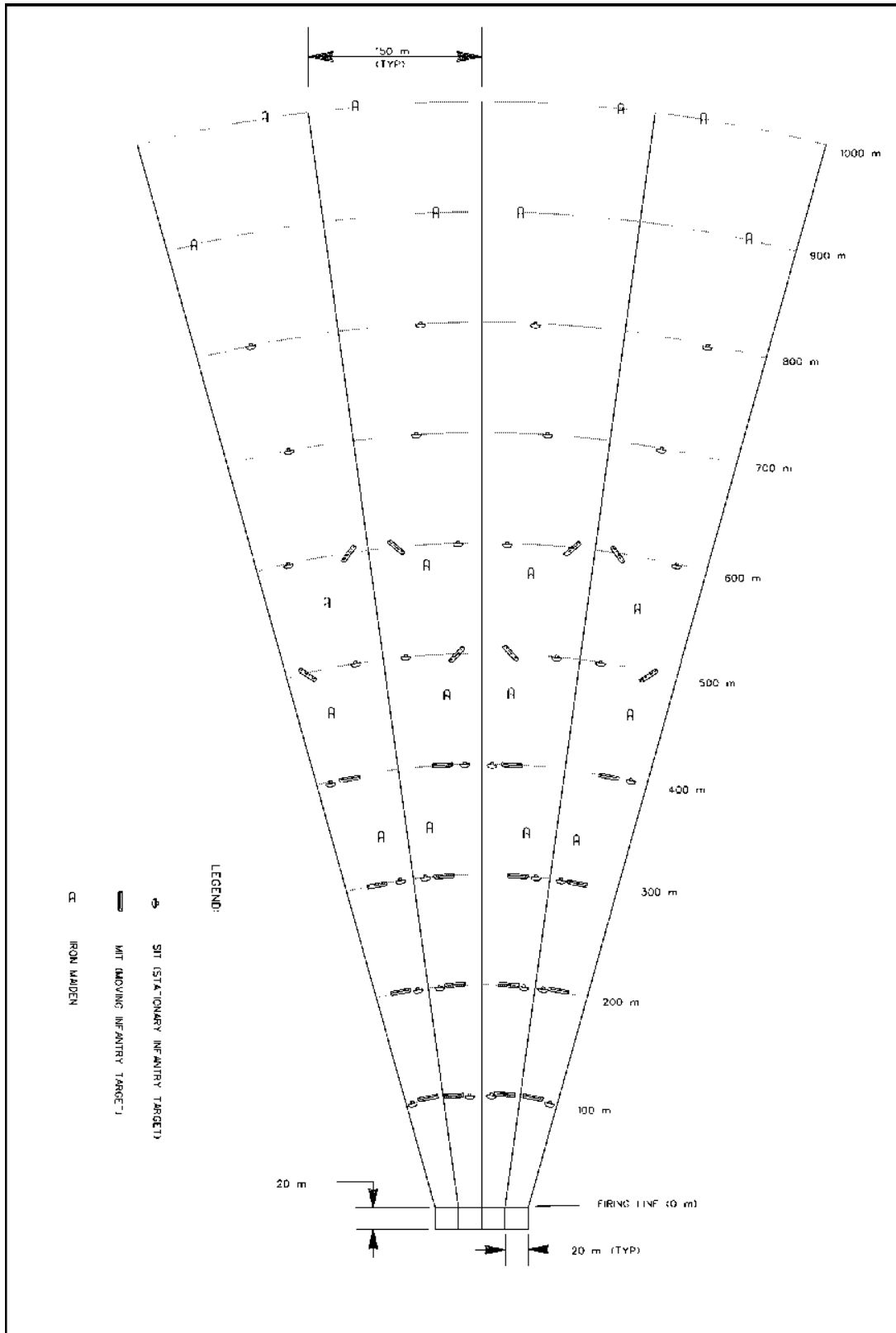


Figure 20: Automated Sniper Field Fire Range

3.4.20 Urban Assault Course (FCC 17878)

Description: A facility consisting of five separate stations designed for small unit training in urban operations. This range is used to train and test individuals, teams, squads, and/or platoons on individual and collective tasks associated with military operations in urban terrain (MOUT). Station 1 is individual and team task technique; station 2 is squad and platoon task technique; station 3 is grenadier gunnery; station 4 is urban offense/defense building; station 5 is an underground trainer and is optional. 40mm high explosive (HE) grenades are not authorized on station 3, and live firing is not authorized at station 4. All targets are fully automated, computer driven, and scored from the range operations center. Report this category in acres (AC) within the course boundary and firing points (FP) where each station represents one FP regardless of the number of places to fire at each station. Standard stations that count as one FP each within this category are the individual/team trainer, squad/platoon trainer, grenadier gunnery station, urban offense/defense building, and an underground trainer.

Size: (150m x 300m) (492ft x 984ft) (11.2 acres)

Support Facilities: Operations Storage (17122)
Latrine (73075)
Ammunition Breakdown (17122)

Ammunition Types: 5.56mm

Other: Ten stationary infantry targets, 26 human urban targets

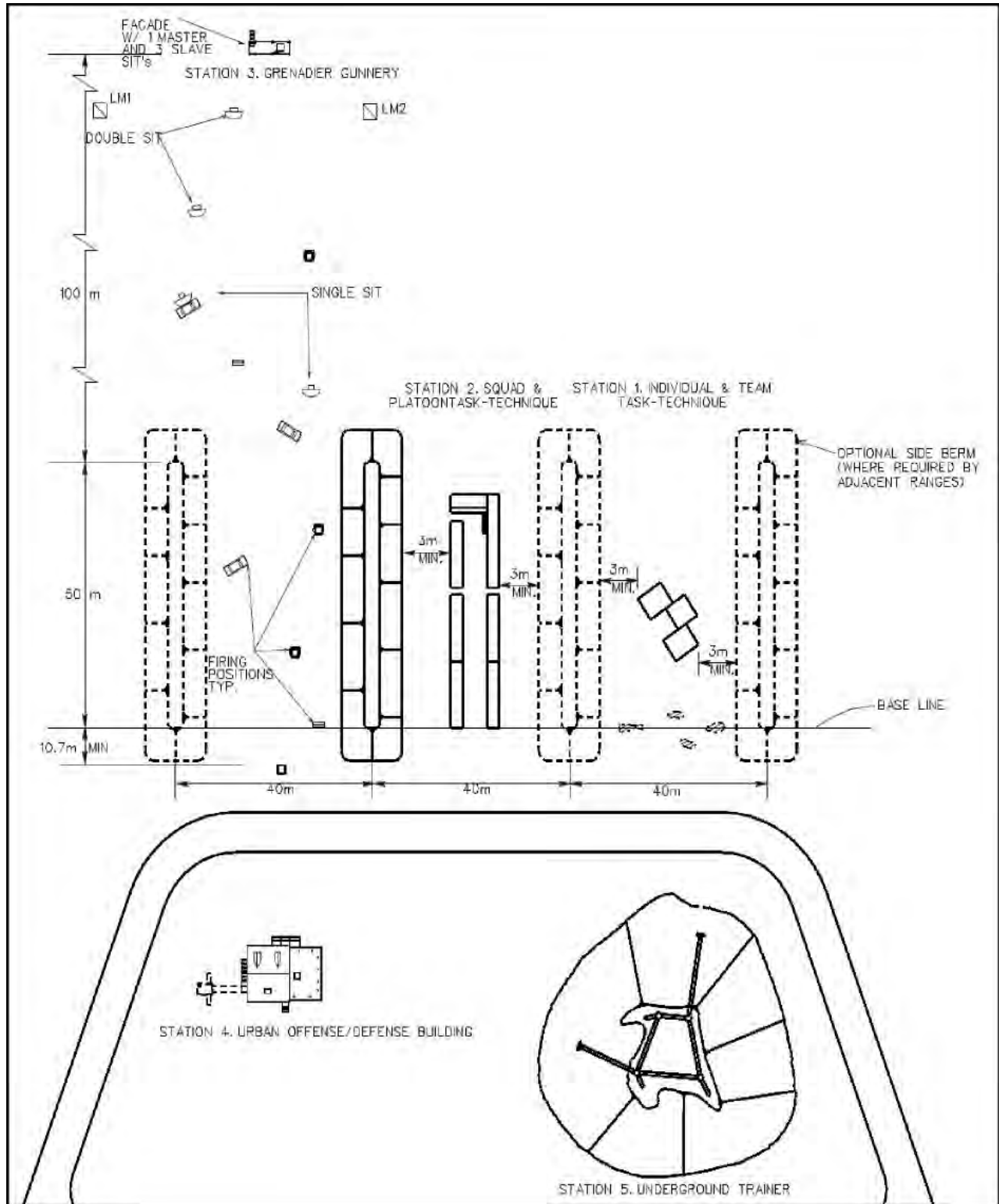


Figure 21: Urban Assault Course

SECTION 4 ENVIRONMENTAL CONDITIONS AND CONSEQUENCES

4.1 INTRODUCTION

This PEA evaluates the potential environmental effects of the alternatives being considered and incorporates provisions for installation-level environmental professionals to determine if any site-specific requirements require more detailed analyses.

Existence of an effect. An “effect” is defined as a noticeable change in a resource from the existing environmental baseline conditions caused by an action. The degree of change is determined by measuring the difference between the baseline conditions and the conditions that result following the assessed action. Any difference between the baseline conditions and the site conditions following an action suggests that the action has an impact on that resource. The terms “effect” and “impact” are used interchangeably in this document.

This PEA will incorporate the evaluation of direct, indirect, and cumulative effects on the environment from the proposed action. The definition of these effects is provided below.

- **Direct effects.** Direct effects are those which are caused by the action and occur at the same time and place (40 CFR Part 1508.7(a)).
- **Indirect effects.** The effects which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems (40 CFR 1508.8(b)).
- **Cumulative effects.** The effect on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7).

Intensity of Effect. Once an effect is identified, the subject matter expert (SME) also must determine if an impact approaches a level of significance. “Significance”, requires consideration of both the context and intensity of the impact evaluated (40 CFR 1508.27). Significance can vary in relation to the context of the proposed action, and thus, where significance is not defined by regulation or policy it must be evaluated in several contexts. These contexts vary with the setting of the proposed action, and can include consideration of effects across both time (short vs. long-term effects) and space (local vs. regional scale).

As per CEQ regulations (40 CFR 1500-1508) and Army NEPA regulations (32 CFR 651), an EA is only required to determine if an impact is significant or not. Thus, this document describes the intensity of an impact only as no impact, non-significant impact, or significant impact.

4.2 VALUED ENVIRONMENTAL COMPONENTS (VECs) ELIMINATED FROM FURTHER CONSIDERATION

Analysis of potential environmental effects associated with a PEA typically addresses numerous VECs that may be affected by implementing a proposed action. In the case of construction, or major renovation, and operation of live-fire ranges, certain VECs that typically are addressed have been examined and determined not to warrant further analysis.

The determination to eliminate these VECs from detailed analysis is based on review and analysis of other NEPA documents prepared for proposed construction and operation of Army ranges on previously disturbed sites. Appendix B provides summaries of the anticipated environmental effects from construction and operation of 33 ranges at Army installations in the U.S (Table B.2, Appendix B). Appendix B also provides summaries of 17 previously completed environmental assessments (EAs) prepared for the ranges identified in Table 5. These EAs provide a survey of typical environmental impacts resulting from range construction/modernization and operation. Some of the proposed actions analyzed in the EAs exceeded 40 acres of new ground disturbance. As noted above, this PEA analyzes the modernization and operation of ranges built on existing rangeland. The impacts analyzed in these 17 EAs represent and are typical of the types of impacts from the range projects covered in this PEA (listed in Table 1). The ranges that were analyzed in these 17 EAs (listed in Table 5) include precursors to the modernized ranges analyzed in this PEA and listed in Table 1, and resulted in similar impacts.

Based on NEPA documents prepared for the ranges listed above, the valued environmental components (VECs) of energy and socioeconomics to include environmental justice and protection of children are eliminated from detailed discussion in this Programmatic EA.

4.2.1 Energy

There would be a minor short-term increase in energy consumption to construct the range. Most of this energy consumption would be petroleum based for heavy construction equipment required to construct the range. Range automated systems for targets require electric power only when the range is in use. Of the six support facilities most commonly included with Army training ranges (see Table 2), only the control tower (290 sf), operations and storage building (800 sf), and classroom facility (800 sf) require heating and air conditioning, and these are occupied only when the range is in use. Energy consumption for heating/air conditioning for 1,890 sf of buildings that are only occupied when the range is in use is negligible. Energy consumption for targetry operations on a range is negligible. This conclusion is reflected in the NEPA documents prepared for these ranges, and indicated in Table B.2, Appendix B.

Table 5: Matrix of Range Environmental Assessments at Army Installations

Paragraph Number (See Appendix B)	Installation (Installation, Year of EA)	Type of Range																			
		10m Machine Gun zero	25-m rifle zero	Anti-Armor Tracking	Breach Facility	Combined Arms Collective Training Facility (CACTF)	Combat Pistol	Infantry Squad Battle Course	Infantry Platoon Battle Course	Known Distance Course	Military Operations in Urban Terrain (MOUT)	Modified Record Fire (MRF)	Multi-purpose Machine Gun	Night Infiltration Course (NIC)	Offense/Defense Station	Qualification Training Range (QTR)	Shoothouse	Small Arms & Shotgun	Standard Sniper Range	Trench, Live-Fire Course	Urban Assault Course (UAC)
1	Fort Carson, 2004				X	X															X
2	Fort Carson, 2005														X						
3	Fort Dix, 2002									X											
4	Fort Drum, 1996			X				X													
5	Fort Eustis, 1993																X				
6	Fort Hood, 2004															X					X
7	Fort Hunter-Liggett, 2005									X						X					X
8	Fort Hunter-Liggett, 2006	X	X				X				X	X									
9	Fort Jackson, 2009										X		X								
10	Fort Polk, 2005					X															
11	Fort Riley, 2003				X	X								X		X					X
12	Fort Riley, 2005					X	X														
13	Fort Riley, 2007									X										X	
14	Fort Riley, 2008														X	X					
15	Fort Riley, 2009								X												
16	Fort Stewart, 2005																				X
17	Fort Stewart, 2009																	X			

4.2.2 Socioeconomics

Economic development and sociological environment are often affected by Army actions insofar as proposed actions may alter economic development (employment and income), population, housing, public health and safety, school enrollment, social services, recreational and community facilities, and visual and aesthetic resources within a region of influence. Construction, or major renovation, of a training range within a land area dedicated to live-fire of weapons and to Soldier training would have little or no effect on elements of socioeconomics listed above. There could be some short-term beneficial effect from the salaries for the workforce working on the range and some additional input to the local economy from purchase of building materials and supplies. This conclusion is reflected in the NEPA documents prepared for these ranges, and indicated in Table B.2, Appendix B.

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low Income Populations (Executive Office of the President, 1994) requires the Army to make achieving environmental justice part of its mission by identifying and addressing disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority or low-income populations. This PEA evaluates the construction or major renovation, and operation of live-fire ranges on land previously used for military ranges. These ranges are in the designated training area on military installations, far removed from any population center. This proposed action would have no effect on minority or low-income populations. This conclusion is reflected in the NEPA documents prepared for these ranges, and indicated in Table B.2, Appendix B.

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (Executive Office of the President, 1997) requires the Army to identify and assess environmental health and safety risks that may disproportionately affect children. This PEA evaluates the construction or major renovation of live-fire ranges that have the sole purpose of training Soldiers for combat. Children are not permitted on these sites either during their construction or during their operation. Neither constructing nor operating a military training range poses risks to the health or safety of children. This conclusion is reflected in the NEPA documents prepared for these ranges, and indicated in Table B.2, Appendix B.

4.3 PROGRAM RESOURCE AREAS

A program resource area is an environmental category that is applicable for most, if not all of the condition where construction or major renovation and operation of a range of up to approximately 40 acres could exist. Resource areas in this category are air quality; airspace; cultural resources; facilities and infrastructure; hazardous material and hazardous waste; land use; natural resources; noise; soils and topography; solid waste; threatened and endangered species; traffic and transportation; water resources; and wetlands.

4.3.1 Air Quality

4.3.1.1 Affected Environment

The Clean Air Act (CAA) has historically regulated air pollution sources through three primary programs: (1) ambient air quality regulation of new and existing sources through emission limits contained in state implementation plans (SIPs); (2) more stringent control technology and permitting requirements for new sources; and (3) specific pollution problems, including hazardous

air pollution and visibility impairment. The Clean Air Act Amendments of 1990 (CAAA-90) not only modified these three programs but also addressed new air pollutants and added a fourth category—a comprehensive operating permit program. The comprehensive operating permit program helps to establish in one place all CAA requirements that apply to a given stationary source of air emissions.

The CAA is the primary federal statute regulating air emissions and applies to the Army and all its activities. The CAA categorizes regions of the United States as nonattainment areas if air quality within those areas does not meet the required ambient air quality levels set by the National Ambient Air Quality Standards (NAAQS). The NAAQS consist of primary and secondary standards for “criteria air pollutants”: sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, lead, and particulate matter.

States have the authority to establish emission source requirements to achieve attainment of the NAAQS. These requirements may be uniform for all sources or may be specifically tailored for individual sources. To be approved as federally enforceable measures in a State Implementation Plan (SIP), the requirements must be consistent with the CAA. Source emission requirements in a SIP may be established for stationary and mobile sources. Implementation of the Clean Air Act’s requirements, for purposes of achieving NAAQS, is achieved primarily through the SIP and various federal programs. The CAA requires states to develop a SIP that establishes requirements for the attainment of NAAQS within their geographic areas. A SIP must identify major sources of air pollution, determine the reductions from each source necessary to attain NAAQS, establish source-specific and pollutant-specific requirements as necessary for the area, and demonstrate attainment of NAAQS by the applicable deadlines established in the CAA. If a state fails to submit a SIP that attains the NAAQS, then U.S. Environmental Protection Agency (EPA) imposes a federal implementation plan for that region.

In addition to ambient air standards, the CAA establishes standards and requirements to control other air pollution problems. Standards for hazardous air pollutants (HAPs), an acid rain reduction program, and a program to phase out the manufacture and use of ozone-depleting chemicals are the other major programs regulating emissions of air pollutants. The prevention of accidental release and minimization of consequences of any such release of extremely hazardous substances including, but not limited to, the substances published under the Emergency Planning and Community Right-to-Know Act of 1986 are also required under the CAA.

The Army has broad compliance responsibilities under the CAA. It must comply with all federal, state, interstate, and local requirements; administrative authorities; and processes and actions in the same manner and to the same extent as any nongovernmental entity. This compliance requirement includes any reporting, recordkeeping, permitting requirements, and payment of service charges and fees set forth in regulations or statutes. It also includes cooperating with the EPA or state inspections. Federal facilities must comply with the applicable provisions of a valid automobile inspection and maintenance program, although military tactical and combat vehicles are exempt.

Under Section 176(c) of the CAA, the Army is prohibited from engaging in, supporting, providing assistance for, or approving activities (e.g., issuing a license or permit) that are inconsistent with SIP requirements. This is known as the General Conformity Rule. According to Section 176(c), activities must conform to an implementation plan’s purpose of “eliminating or reducing the severity and number of violations” of NAAQS and achieving “expeditious attainment” of such standards. Such activities must not cause or contribute to a new violation; increase the frequency or severity of an existing violation; or delay timely attainment of any standard, required interim

emission reduction, or other milestone. As a result, conformity determinations are required to ensure that state air quality standards would not be exceeded and that the action would comply fully with the SIP. The proponent compares the emission levels of the proposed action to current baseline emissions. Where increases in emission levels exceed thresholds established in the General Conformity Rule, a conformity determination must be prepared. In support of the conformity determination, additional air quality modeling may be required to illustrate the proposed action's impacts on air quality in the region.

Installations must consider the effects that planned projects and activities would have on air quality both on and off post. There are two independent legal requirements that address air quality management: (1) NEPA and (2) the general conformity provision of the CAA Section 176(c), including EPA's implementation, of the General Conformity Rule. Depending on the action and the air quality conformity attainment status of the installation (or other affected property), an installation might have to complete a separate conformity analysis in addition to the NEPA analysis. Applicability of the two requirements must be considered separately. Exemption from one requirement does not automatically exempt the action from the other requirement, nor does fulfillment of one requirement constitute fulfillment of the other. Although installations should integrate compliance efforts to save time and resources, the two requirements are very different, necessitating separate analyses and documentation.

The DoD strategy for air quality compliance includes prevention, control, and abatement of air pollution from stationary and mobile sources. The CAAA-90 provides the framework for the majority of air quality regulations and guidelines with which Army installations must comply. The CAAA-90 is implemented by detailed federal, state, and local regulations. The Army's air resources policy is to (1) comply with applicable Federal, State and local air quality regulations, permit requirements and Overseas Final Governing Standards, (2) identify and implement cost-effective pollution prevention measures that will reduce toxic or criteria air emissions, and (3) eliminate dependency on ozone depleting substances. The goal of the Army's air quality program is to achieve and maintain air quality standards to protect human health and the environment, while minimizing mission impacts (U.S. Army, 2007a).

4.3.1.2 Threshold level of significance

Activities that would cause an exceedance of regulatory air quality thresholds or a violation of an installation's Title V Operating Permit.

4.3.1.3 Alternative 1. The Preferred Alternative - Modernizing and Operating a Range Facility on Disturbed Land using a Programmatic Environmental Analysis Approach

The following summarizes the anticipated potential impacts on air quality from modernizing and operating training ranges on previously disturbed ground at Army installations in the U.S.

The proposed action would have non-significant, temporary effects on air quality. Construction of an Army training range may generate some dust resulting from earth-moving operations during construction. This effect would be localized to the construction site and immediate surroundings and last for the duration of construction. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

This effect would be non-significant, localized to the construction area and would occur during daylight hours on weekdays during the construction period. Effects on air quality from operating

an Army training range would largely result from vehicles travelling to and from the range, and would have *de minimus* (negligible) effect on air quality.

Analysis of air quality for range construction at several installations, for several types of ranges, indicate the potential effect is almost entirely due to the dust generated when the range is being constructed and emissions generated by construction vehicles. The effects were determined to be minor, localized and short-term – occurring during daylight hours on weekdays for the period of construction. (Fort Stewart, 2005; Fort Stewart, 2009; Fort Carson, 2004; Installation Management Command, 2006; Fort Eustis, 1993; Fort Dix, 2002; Fort Hood, 2004; Fort Jackson, 2009; Fort Riley 2005; Fort Drum, 1996). Fort Riley determined there could be indirect adverse effects to air quality if dust and/or vehicle emissions traveled off the installation (Fort Riley, 2008).

In general, it is highly unlikely that any range modernization project covered within the preferred alternative in this PEA would result in significant increases to greenhouse gas (GHG) emissions. There would be short-term increases to GHG emissions during the actual construction of modernized ranges, and possible slight increases during the operation of modernized ranges, but these effects would probably add only a small amount of net GHG emissions to any given installation. The potential impact of range modernization projects covered by this PEA on climate change is expected to be extremely small.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.1.4 Alternative 2. The No Action Alternative: Conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.2 Airspace

4.3.2.1 Affected Environment

Airspace is a finite resource that can be defined vertically, horizontally, and temporally when describing its use for aviation purposes. The Federal Aviation Administration (FAA) manages airspace in the United States and has established a number of airspace categories to ensure the safety of aircraft. One category of FAA-defined airspace is Special Use Airspace (SUA). SUA is airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft that are not part of those activities. The types of SUA areas are: Prohibited Areas, Restricted Areas, Military Operations Areas (MOA), Warning Areas, Alert Areas, Controlled Firing Areas (CFA), and National Security Areas (NSA) (Federal Aviation Administration, 2008). Military Operations Areas are volumes of airspace with specific vertical and lateral limits. These areas (MOAs) are used to separate/segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for visual flight rules (VFR) traffic the area in which these activities occur. A CFA is established to contain activities that, if not in a controlled environment, would be hazardous to nonparticipating aircraft. CFA's are not depicted on aeronautical charts because the user terminates the activities when required to prevent endangering nonparticipating aircraft.

Activities for which restricted areas are normally designated must be considered non-compatible with or hazardous to nonparticipating aircraft. Those activities include, but are not limited to (U.S. Army, 2007b, p. 12):

- Firing field artillery, mortars, rockets, lasers or similar weapons or similar activities;
- Drone or Unmanned Aircraft System operations when flights cannot be accomplished with a certificate of authorization;
- Some types of laser activity; chemical and nuclear measure;
- Dropping of chaff and some electronic countermeasures;
- Certain ordnance/explosive demolition activities.

Small arms range safety areas (SARSA) are not SUA, but are similar to a CFA. SARSA are Army-established areas to contain small arms range activities that if not conducted in a controlled environment, could be hazardous to nonparticipating aircraft.

Due to the nature of military training and operations (e.g. firing artillery, mortars and lasers, and flights of both manned and unmanned aircraft) the airspace above the training areas of installations with these activities is restricted. Small arms ranges are within the training areas that have SUA designations.

4.3.2.2 Threshold level of significance

Activities that are inconsistent with the airspace classification over the proposed range site would exceed the threshold level of significance for airspace. The airspace above the proposed site for the proposed range must be classified SUA if in fact live fire weapons are to be employed on the range.

4.3.2.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on airspace from modernizing and operating training ranges on previously disturbed ground at Army installations in the U.S.

The proposed action would have no effect on airspace. The effects of operating an Army training range on airspace are negligible if it is identified as Special Use Airspace (SUA). This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

Installations without SUA above their training ranges would need to coordinate with the FAA to obtain SUA status during live fire training periods. These temporary periods of SUA could affect private or commercial flight paths in the area around the installation boundary.

Several Environmental Assessments determined that constructing and operating a range would have no effect on airspace use (Fort Carson, 2004; Fort Carson, 2005; Fort Dix, 2002; Fort Jackson, 2009). Several other environmental assessments for constructing and operating ranges did not address airspace (Fort Drum, 1996; Fort Eustis, 1993; Fort Hood, 2001; Fort Hood, 2004; Installation Management Agency, 2006; Installation Management Command, 2007; Fort Polk, 2005; Fort Riley, 2007; Fort Riley, 2003; Fort Riley, 2008; Fort Stewart, 2005; Fort Stewart, 2009).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.2.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.3 Cultural Resources

4.3.3.1 Affected Environment

A wide variety of cultural resources are found on Army installations. Cultural resources are prehistoric and historic sites, structures, districts, objects, or any other physical evidence of human activity considered important to a culture, subculture, or a community for scientific, traditional, and religious reasons (36 CFR Part 60). For the purpose of this Programmatic EA, and based on statutory requirements, the term cultural resource is defined to include:

- Historic properties, as defined in the National Historic Preservation Act (NHPA) of 1966, as amended
- Cultural items, as defined in the Native American Graves and Repatriation Act (NAGPRA)
- Archaeological resources, as defined in the Archeological Resources Protection Act (ARPA)
- Historic and paleontological resources, as defined by the Antiquities Act of 1906, as amended
- Sites that are scientifically significant, as defined by the Archeological and Historic Data Preservation Act (AHPA)
- Sacred sites, as defined in EO 13007, to which access and use is permitted under the American Indian Religious Freedom Act (AIRFAA), or
- Collections, as defined in 36 CFR part 79, Curation of Federally-owned and Administered Collections.

Installations with historic or cultural resources operate under an Integrated Cultural Resources Management Plan (ICRMP), a five-year plan for compliance with the requirements of Army Regulation 200-1, Environmental Protection and Enhancement (U.S. Army 2007a). The ICRMP is an internal Army compliance and management plan that integrates the entire installation's cultural resources management program with ongoing mission activities. Army Regulation (AR) 200-1 (U.S. Army, 2007a) addresses Army compliance with the National Historic Preservation Act (NHPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the American Indian Religious Freedom Act (AIRFA), the Archeological Resources Protection Act (ARPA), the Archeological and Historic Preservation Act (AHPA) and other federal and state regulations.

4.3.3.2 Threshold level of significance

Activities, in accordance with the PEA, that result in unmitigated adverse effects to any cultural resource, or that result in a historic district or National Landmark losing its National Register of Historic Places (NRHP) designation.

4.3.3.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on historic and cultural resources from modernizing and operating training ranges on previously disturbed ground at Army

installations in the U.S. If any doubt exists about the potential presence of historic or cultural resources at a potential range construction site, the installation staff should implement their ICRMP and coordinate with the State Historic Preservation Officer before construction begins.

The proposed action will be reviewed at each installation in accordance with the NHPA Section 106 process in order to evaluate the presence or absence of cultural resources that may be affected by the proposed action. The Cultural Resources Manager will be notified of the proposed activity associated with the PEA and will be responsible for coordinating with both internal and external stakeholders, as required by the NHPA Section 106 to determine the effects, if any, to cultural resources as a result of the action. This includes notifying the State Historic Preservation Officer (SHPO) and other necessary consulting parties (including any Federally-recognized Tribes with an affiliation to the installation) about the proposed action. The notification should include information about the presence or absence of known cultural resources, any applicable constraints regarding the identification and evaluation for cultural resources due to the presence of UXO, and the installation's determination of effect in accordance with 36 CFR 800.5. Although an installation may have an Integrated Cultural Resources Management Plan (ICRMP), it does not replace the installation's responsibility to consider the effects of its actions on cultural resources in accordance with the NHPA.

An analysis of EAs prepared prior to constructing and operating training ranges at selected US Army installations shows that most sites for proposed range construction were previously disturbed and were the site of a previously-used Army range. The following discussion provides examples of the various types of cultural resources issues and materials found on installations and how they were considered in the installations' EAs. In some cases, a survey for cultural resources had been conducted, while in others a survey was not conducted due to the risk of unexploded ordnance. The examples further demonstrate the necessity for an installation-to-installation consideration of cultural resource issues prior to implementing actions under this PEA. (Appendix B).

Surveys were conducted and no historic or cultural resources were found on the proposed range sites at Forts Dix, Drum, Jackson, Polk and Hood (Fort Dix, 2002; Fort Drum, 1996; Fort Jackson, 2009; Fort Polk, 2005; Fort Hood, 2004).

Fort Eustis coordinated with the State Historic Preservation Officer (SHPO) and determined there were no historic or cultural resources within the proposed project area (Fort Eustis, 1993).

The small arms impact area at Fort Carson had been off-limits to cultural resources surveys since prior to the legal requirement for such surveys. The area had not been surveyed, nor was a survey required due to the possibility of unexploded ordnance. Since the downrange area of the proposed range site was used for small arms firing for over 50 years and since the areas near the firing lines had been disturbed (parking, firing lines, target emplacements), the analysis concluded that constructing and operating the proposed range at the site would not likely have any effect on cultural resources (Fort Carson, 2004; Fort Carson, 2005).

At Fort Hunter Liggett nine of ten historic/cultural sites were 600 feet or more from the sites of the preferred alternative facilities and would not be affected by construction of ranges. Given the high level of cultural resource sensitivity for the El Piojo Valley in conjunction with a high potential for buried cultural deposits, associated ground disturbing work for range construction would require an onsite archeological monitor (Installation Management Agency, 2005).

Prior to constructing a proposed trench complex within an impact area, Fort Riley surveyed the site for archeological resources. The project area had not been previously surveyed because

unexploded ordnance (UXO) in the impact area presented a safety hazard. Before the trench complex was constructed, qualified Explosive Ordnance Disposal technicians removed hazards, allowing the installation to survey for archeological resources and complete a formal consultation with the SHPO. No direct or indirect adverse impacts to cultural resources are anticipated from constructing and operating a live-fire trench training complex (Fort Riley, 2007; Fort Riley, 2008).

Fort Riley proposed constructing five range facilities, including a CACTF, Urban Assault Course, Shoot House, Breach Facility and Offense/Defense Station. There were three previously recorded historic farmsteads within the proposed CACTF village construction area that were being evaluated for inclusion into the National Register. The installation initiated formal Section 106 consultation with the SHPO and implemented standing procedures for protecting and documenting historic or cultural resources as prescribed in the installation's Integrated Cultural Resource Management Plan (Fort Riley, 2003).

At Fort Riley there was potential that buried intact prehistoric archeological resources could exist within the potential construction area for an ISBC.. Both a document search and physical inventory of the site revealed no evidence of cultural resources at the proposed site for the ISBC at Fort Riley. The installation implemented BMPs in the event of unearthing potential items or property of cultural or historic significance (Fort Riley, 2005).

At Fort Stewart the surface danger zone (SDZ) of a proposed sniper range encompassed an historic family cemetery. Over 3,000 meters of standing timber, vegetation and foliage separated the cemetery and firing lines, and acted as a buffer to reduce/stop the travel distance of fired munitions. After consulting with the SHPO, the installation proposed implementing BMPs at the range to minimize the risk of munitions striking the cemetery. In addition, a family cemetery located near the site of a proposed Urban Assault Course was marked with a 200-foot buffer around the cemetery to ensure the area would be avoided and left undisturbed. The installation consulted with the SHPO for both ranges and received concurrence based on the proposed mitigation measures (Fort Stewart, 2005).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.3.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.4 Facilities and Infrastructure

4.3.4.1 Affected Environment

Facilities are buildings, structures, and other improvements, to include ranges, to support the Army mission. Infrastructure is the combination of supporting systems, such as roadways, bridges and utilities (e.g., water, sewer, natural gas, electricity), which enable the use of this land and resident facilities.

Army ranges are by necessity located in the remote portions of the installation, and in many cases many miles from the installation's cantonment area. The land on which any of these ranges would be constructed has previously been used for weapons or maneuver training, and the adjoining lands are used for weapons or maneuver training.

Training ranges require a variety of support structures. Table 2 provides list of the range support facilities commonly included in range construction that are discussed in this PEA. Appendix C provides a description of each range addressed in this PEA, and also provides a listing of the support structures required for each range. These facilities are all relatively small, the largest of which is a 1,413 square-foot covered eating area, which is similar in nature to a covered picnic pavilion. Appendix C provides information on utilities and infrastructure associated with the Army Ranges addressed in this PEA.

Army ranges require electrical power for lights, range targetry control, computer systems, and heating and air conditioning. The standard practice is to run power lines on poles from the nearest existing power supply. Alternatively, if electrical service is too far, ranges can, by exception, be operated by an on-site electric generator. If used, an electric generator will cause some quantity of emissions and consume fuel that must be transported to the site.

Telecommunications between a training range and the installation cantonment area is optional. Ranges must have two alternative means of communication with range control, which could be hand-held radio, vehicle radio, telephone, or cell phone. If telecommunications lines are run to the range they would likely use the same poles used for electricity.

Water and sewer service to a range site is a rare occurrence. Even though water and sewer services make for a more conventional and comfortable latrine facility, the remoteness of ranges from the installation's existing infrastructure make their construction impractical. The volume of use of a range latrine versus the distance to a sewage processing plant is normally too far for efficient waste management. Some installations use wells and septic fields. The designer must ensure that the range can comply with local septic field regulations. Due to these issues, most ranges use dry-vault latrines, septic tank, or contract for portable latrines.

Propane/Natural gas is normally only provided by refillable tanks on a range site. This is a customer decision and should be coordinated with the DPW for any installation regulations. The designer must ensure that the gas tanks are located in positions where they cannot be hit by tactical vehicles or accidentally struck by a stray round.

4.3.4.2 Threshold level of significance

Activities that would create a need for a major expansion of facilities or infrastructure on the installation or that would create a major impact on regional development plans.

4.3.4.3 Alternative 1. Preferred Alternative

The following summarizes the anticipated potential impacts on facilities from constructing and operating training ranges on previously disturbed ground at Army installations in the U.S.

The proposed action requires little in the form of facilities and infrastructure support from the installation, and as such would have no impact on facilities. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

Almost all ranges used dry vault latrines, septic tank system, or contract for portable latrines. Drinking water was commonly provided by the units using the range. Ranges require nominal electric power to control targetry and provide lighting, and heating/air conditioning for up to three small buildings, and basic lighting requirements for two more, as well as telephone service (Fort Carson, 2005; Fort Drum, 1996; Installation Management Command, 2006; Fort Eustis, 1993; Fort Jackson, 2009).

Operating ranges commonly use dry-vault latrines, contract portable latrines, or septic systems, (Fort Dix, 2002; Fort Drum, 1996; Installation Management Command, 2006; Fort Jackson, 2009) and by exception connect to the installation's sewer system (Fort Carson, 2004).

Using units commonly supplied their own drinking water at the training range (Fort Drum, 1996; Fort Eustis, Installation Management Agency, 2005; Installation Management Command, 2006; Fort Jackson). One installation indicated it would provide a 25,000 gallon above-ground storage tank for a training range (Fort Carson, 2004). Constructing and operating a range would have minimal effect on facilities and infrastructure.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.4.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.5 Hazardous Materials/Waste

4.3.5.1 Affected Environment

This category evaluates the proposed action's potential impact on all aspects of transporting or generating hazardous materials or hazardous waste. These materials, when not properly transported, stored, or disposed, could adversely affect human health and the environment.

Constructing any of the ranges discussed in this PEA would require heavy equipment, such as earthmovers, bulldozers, front end loaders, backhoes, dump trucks and similar equipment. During range construction each would require routine preventive maintenance and would be re-fueled on-site. The risk of a spill or release that would threaten human health or the environment is low. Any risk is mitigated by the Army and Federal regulations requiring installations to develop and implement spill prevention and response plans (U.S. Army, 2007a, p. 36) and to conduct training to ensure proper response to spills or releases. This includes annual spill response exercises for the spill response organization (U.S. Army, 2007a, p. 37).

Construction of range facilities associated with each range (e.g., control tower, ammunition breakout, see Table 2) is generally metal and wood frame construction (See Appendix C). These efforts would require some heavy equipment, but largely require hand tools powered either by on-site electrical power or a portable generator. Except for the oil and gasoline required for a generator, there is little or no hazardous material associated with constructing range support facilities. There is no hazardous waste anticipated to be generated from constructing range

support facilities. Range construction contracts require the contractor to properly store POL products and provide for spill management and clean up in the event of a POL spill.

Operations on small arms ranges produce soil containing metals from the spent rounds. These metal constituents have the potential to create environmental problems during range operation and maintenance. Bullets are often fragmented and pulverized upon impact with the ground, backstops, berms, other bullets fired earlier, or bullet traps located on operational small arms ranges. Antimony, copper, lead, and zinc contribute to small arms munitions constituent soil loading. As with most metals, lead, antimony, copper, and zinc generally tend to adhere to soil grains and organic material and remain fixed in shallow soils. Metals become fixed to soil particles more readily when the pH of the soil is between 6.5 and 8.5 (U.S. Army Environmental Center, 1998).

Lead and copper have the lowest potential for mobility. These metals and their metal salts commonly found on small arms ranges generally have relatively low solubility constants in soil. The normal operation of a range can produce lead concentrations of several percent in soils located behind and adjacent to targets and impact berms. Zinc concentrations are generally one to two orders of magnitude lower (hundreds to high thousands parts per million (ppm) or mg/kg) and antimony is generally found in concentrations of tens to low hundreds of mg/kg in soil. Using risk-based concentrations as a guide, antimony, copper and zinc have a relatively low toxicity. Based on this information, antimony, copper and zinc, though found in significant concentrations in the soil on the range, generally pose a relatively low risk to migration, exposure in transport pathways off range, or both. Lead, though having low mobility characteristics in soil, is found in far greater concentrations on the range and has a higher potential to be detected in transport pathways off range. Coupled with its relatively high toxicity, lead is believed to be the munitions metal constituent of primary concern with respect to potential off-range transport and potential exposure in transport pathways (Fabian and Watts, 2005).

The prevention of lead migration from the range impact area is typically the least expensive and easiest to implement of the actions that may be taken to manage lead issues on active small arms ranges. The selection of the appropriate lead migration prevention method is the key to successful lead management on a range or group of ranges. This is because each firing range, or group of ranges, is unique in terms of lead concentration, climate, soils, physical and chemical properties, and topography. A plan for controlling lead migration must be designed on the basis of these site characteristics. Typically, these plans include designs to control stormwater runoff, which is the predominant transport mechanism for lead.

The U.S. Army has published Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian and Watts, 2005), which identifies potential best practices to mitigate potential environmental issues arising from operating small arms ranges. This document provides a process to identify the BMPs that would be most effective means to prevent migration of lead from a range. The list of potential mitigation measures are identified in Table 3. The U.S. Army Environmental Command (AEC), formerly Army Environmental Center, also published a document, Prevention of Lead Migration and Erosion from Small Arms Ranges (U.S. Army Environmental Center, 1998) which identifies recommended design principles and best management practices to reduce the migration of lead from Army small arms ranges.

Since there is no intent to formally close the range, there is no requirement to clean up contaminated soils on existing active or inactive ranges. Contaminated soils found on a range during construction would be used in the construction process, such as creating berms, or removed from the construction site IAW appropriate disposal processes.

During the process of siting the construction of a range, an unexploded ordnance (UXO) survey is conducted to determine whether or not UXO exists on the site. In the event UXO is discovered on the site, pre-construction phase, UXO clearance is conducted as a part of the range construction preparation process prior to commencement of the actual beginning of construction. In the event UXO is discovered during the actual construction, the Army's explosive ordnance disposal detachment has the responsibility to safely remove or blow in place the UXO. The potential to find UXO on small arms ranges is very low.

4.3.5.2 Threshold level of significance

Activities that violate applicable regulations or that seriously threaten or cause exposure to hazardous substances capable of causing substantial endangerment to human health and the environment or that are in non-compliance with an installation's hazardous waste permit.

4.3.5.3 Alternative 1. Preferred Alternative

The following summarizes the anticipated potential impacts of hazardous material/waste from modernizing and operating training ranges on previously disturbed ground at Army installations in the U.S.

The presence of heavy construction equipment may increase the risk of a release of hazardous material, such as oil, hydraulic fluid, or diesel fuel. This risk is small and the potential threat to human health and the environment is not significant. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in *Appendix B*.

Metals, such as lead, antimony, copper, and zinc generally tend to adhere to soil grains and organic material and remain fixed in shallow soils. These metals, through soil erosion, can migrate off the range and into surface water (e.g., streams, creeks, rivers, ponds, lakes) and/or wetlands. The potential effects of metals from spent ammunition can be mitigated to less-than-significant by implementing and sustaining BMPs to control the accumulation of spent ammunition, storm water runoff, and soil erosion.

Selected BMPs and/or maintenance actions should be based on the potential for the metals to be transported out of the range area and their potential to reach receptors at levels that exceed established criteria. The U.S. Army published a guidance manual (Fabian and Watts, 2005) to help installation range management personnel to identify and implement BMPs to reduce the risk of metal constituents, particularly lead, migrating off the range area. Section 2.6.7 discusses the risk of metals migration. Table 3 provides matrices of BMPs that would be applied to small arms ranges that are listed in this PEA as appropriate and applicable. Application of the BMPs described in Table 3 will help to ensure that impacts are less than significant.

Contractors would be responsible for avoiding releases of hazardous materials, such as oil, hydraulic fluid or diesel fuel and implementing cleanup actions, if needed, in accordance with the installation's Spill Prevention, Control, and Countermeasures Plan. The potential impact of hazardous materials and hazardous waste from constructing and operating an Army range within the purview of this PEA is not significant.

Constructing a range could pose a potential hazard due to the presence of heavy machinery during the construction period, relative to the potential risk for accidental spills of fuel or other contaminants associated with construction equipment. Contractors would be responsible proper management and control of any hazardous materials used and hazardous waste generated in

accordance with state and Federal laws and regulations. Constructing the proposed support facilities (e.g., general instruction building, covered eating area, ammunition breakout building) would not impact the installation's hazardous waste program.

The volume, type, classification and sources of hazardous waste associated with operating and maintaining the range complex would be similar to that generated at other training ranges on the installation (Fort Carson, 2004; Fort Dix, 2002; Fort Eustis, 1993; Fort Hood, 2004; Fort Riley, 2005; Fort Stewart, 2005; Fort Jackson, 2009; Installation Management Command, 2006), and would not pose a significant risk to human health or the environment.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.5.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.6 Land Use

4.3.6.1 Affected Environment

Land use refers to the planned development of property to achieve its highest and best use to ensure compatibility among adjacent uses. In the civilian sector, land-use plans guide the type and extent of allowable land use in an effort to control and limit growth, maintain and improve social, cultural and physical amenities; promote a stable economy; preserve agricultural lands; maintain scenic areas; supply adequate housing; ensure the availability of necessary public services and utilities; and protect specially designated or environmentally sensitive areas. Except for economic growth these concepts also apply to Army land use planning. In the Army, land use planning is the mapping and planned allocation of the use of all installation lands based on established land use categories and criteria.

While the number may vary slightly among installations, there are 12 general land use categories on Army installations. These roughly parallel the types of designations used by municipalities. Like designations used in municipalities, the Army's land use classifications identify the principal types of facilities and activities found in particular areas of an installation. Table 6 identifies the land use and the normal type of activities associated with each commonly present at Army installations. Not all of the land uses identified in Table 6 may be present at every installation.

Increasingly, the local communities adjacent to many Army installations have seen population growth and shown evidence of urban sprawl. At many installations in the U.S., population growth and urban sprawl in adjoining communities has created a condition referred to as encroachment. Encroachment is the cumulative result of any and all outside influences that inhibit normal military training and testing (U.S. General Accounting Office, 2002, p.1). Three encroachment issues have specific connections to land use. First, requirements of the Endangered Species Act result in training restrictions on and off the installation. This reduces the amount of land available for Soldier and unit training. Second is the legacy of unexploded ordnance and munitions constituents on military lands, which can also constrain and limit the amount of land available for training. Third is the unplanned or incompatible commercial or residential development on land

adjoining or near Army training lands. Each of these affects land use on military installations, and more specifically land use in an installation’s training and maneuver area.

Table 6: Land Uses Common on U.S. Army Installations

Land Use	Land Use Description
Airfield Land Use	Landing and takeoff area, aircraft maintenance, airfield operational and training facilities, and navigational and traffic aids.
Maintenance Land Use	Depot maintenance, installation maintenance, Table of Organization and Equipment (TOE) unit maintenance.
Industrial Land Use	Production; research, development, and test facilities; potable water supply, treatment, and storage; electric power source, transmission, distribution, substations, and switching stations; heat sources, transmission lines, and distribution lines; sewage and industrial waste treatment and disposal; sewage and industrial waste collection; and parking areas.
Supply/Storage Land Use	Installation ammunition storage, depot ammunition storage, cold storage, general-purpose warehouse, controlled-humidity warehouse, flammable materials storehouse, fuel storage, engineer material storage, medical warehouse, unit storage, and salvage and surplus property storage.
Administration Land Use	Installation command and control, directorates, tenants, organizational, and special.
Training/Ranges Land Use	Training facilities, buildings; training grounds and facilities other than buildings; firing ranges, training; and firing ranges, research, development, testing, and evaluation.
Unaccompanied Personnel Housing Land Use	Officer unaccompanied personnel housing, enlisted unaccompanied personnel housing, and visiting officers and Soldiers quarters.
Family Housing Land Use	Family housing
Community Land Use	Commercial and services.
Medical Land Use	Hospital, dental clinic, clinic without beds, electric power source, heat source, parking areas.
Outdoor Recreation Land Use	Recreation building, outdoor swimming pool, tennis courts, multiple court areas, baseball field, softball field, football field, and soccer field.
Open Space	Unoccupied land, buffer and easement, and greenbelt.

Reference: U.S. Army Environmental Command, 2007. Table 4.12-1, p.279.

4.3.6.2 Threshold level of significance

Activities that would alter the existing land use in such a manner as to cause severe incompatibility with adjacent land uses.

4.3.6.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on land use from modernizing and operating training ranges on previously disturbed ground at Army installations in the U.S. As

stated throughout this document, the modernized ranges proposed in this PEA would be constructed on already-existing Army ranges.

The proposed action would not have significant impacts on land use. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

In almost every instance, the proposed range was to be constructed on previously disturbed land that was the site of an Army training range that was either obsolete or no longer met the installation's training requirements. Army training ranges were commonly sited on lands that have for decades been used exclusively for live-fire and maneuver training for individual Soldiers and Army units.

Constructing live-fire training ranges on a site previously used for a training range disturbed ground was anticipated to cause no effect on land use, regardless of the type of range being constructed (Fort Carson, 2004; Fort Carson, 2005; Fort Dix, 2002; Fort Drum, 1996; Fort Hood, 2004; Installation Management Activity, 2005, Installation Management Command, 2006; Fort Polk, 2005; Fort Riley, 2003; Fort Riley, 2005; Fort Riley, 2007; Fort Riley, 2008; Fort Riley, 2009; Fort Stewart, 2005; Fort Stewart, 2009). Table 5 provides a matrix of the types of ranges proposed in the Programmatic Environmental Assessments cited here.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.6.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.7 Natural Resources

4.3.7.1 Affected Environment

This discussion and analysis of the proposed action focuses on natural resources conditions in the maneuver and training areas of an Army installation. This would include specifically the potential affects the proposed action may have on vegetation and wildlife. Consideration of the potential effects on threatened and endangered species are discussed and evaluated separately in this document.

The conditions and setting of the natural environment regionally vary across the United States. Bailey (1995) provides general descriptive information on soils, climate, flora and fauna for all of the ecosystem provinces in the United States. Ramos (2006) provided similar information and identified a number of Army installations in selected ecological provinces.

Military installations have a responsibility, and are required under The Sikes Act, to promote natural resources conservation and rehabilitation on military land. The required strategy is described in an installation's Integrated Natural Resource Management Plan (INRMP), which is developed in collaboration with the U.S. Fish and Wildlife Service and state agencies. The plan

identifies possible conflicts and required actions for an installation to meet federal and state natural resource-related regulations and integrating the strategy with the military mission.

While wildlife in general would not be purposely targeted or killed, the potential does exist for direct mortality of bird species from weapons fire. The Migratory Bird Treaty Act (MBTA), 16 USC 703-712, is the primary federal legislation established to conserve migratory birds, and it generally prohibits the unauthorized take of migratory birds. The Defense Authorization Act of 2003, Public Law 107-314, allows the Department of Defense to unintentionally take migratory birds, with limitations, during military readiness activities. Take is defined in the MBTA to include, by any means or in any manner, any attempt at hunting, pursuing, wounding, killing, possessing or transporting of any migratory bird, nest, egg, or part thereof. Bird mortality incidental to live fire training exercises constitutes unintentional take under the MBTA. It is difficult to quantify the probability or number of occurrences of this type of impact, however, by integrating and following bird conservation strategies and related Best Management Practices (BMPs) in installation INRMPs, the Army can strive to minimize the number of takes to the greatest extent possible without jeopardizing the military readiness activity. An example of one such procedure could be to avoid, when possible, vegetation clearing activities during 1 May through 15 July to protect migratory bird nesting habitat.

4.3.7.2 Threshold level of significance

Activities that: result in the permanent loss or degradation of sensitive or rare species; result in a large scale introduction of prevalence of non-native species plants; or, are anticipated to result in a long term loss or impairment of a substantial portion of local habitat (species dependent).

4.3.7.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on natural resources from modernizing and operating training ranges previously disturbed ground on Army installations in the U.S.

The proposed action would not have significant impact on natural resources. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

Constructing an Army range on an existing range frequently requires earth moving and causes some removal of vegetation, and in some instances trees. In some occasions it requires relocation of some wildlife to another site on the installation.

In each analysis, the potential impact on flora and fauna was identified as minimal (see Table C.2). Minor, direct, short-term and long-term adverse effects on vegetation were anticipated from constructing a range on previously disturbed ground in the training area (Fort Hood, 2004; Fort Jackson, 2009; Fort Riley, 2003; Fort Riley, 2005; Fort Riley, 2008; Fort Riley, 2009; Fort Stewart, 2005; Installation Management Agency, 2005).

Several installations anticipated minor, direct and indirect short-term and long-term effects on wildlife from constructing and operating a training range on previously disturbed ground in the training area. Construction activity would damage vegetation that could result in some habitat loss, which could displace wildlife (Fort Carson, 2004; Fort Hood, 2004; Fort Jackson, 2009; Fort Riley, 2005; Fort Riley, 2008; Fort Riley, 2009; Fort Stewart, 2005; Installation Management Agency, 2005).

Construction of a MOUT and UAC on Fort Dix required clearing approximately 20 acres of pine forests, which represented approximately 0.08 percent of the 25,810 acres of pine forests on the installation. The total project footprint was approximately 41 acres. Given the small area of effect, coupled with the abundance of similar vegetation communities locally, the impact of constructing these range facilities was considered negligible (Fort Dix, 2002).

Construction activities routinely require limited clearing of vegetation. Vegetative areas to be cleared constitute a relatively small percentage of the existing similar habitats near the proposed Infantry Platoon Battle Course (IPBC) or the Armor Tracking and Live Fire Range and the surrounding areas at Fort Drum. Best management practices, such as hay bales, silt fences, and seeding would be used during construction activities to avoid soil erosion and silting of any down-gradient water systems. After construction, non-vegetated areas would be graded and planted with a native seed mix approved by the Natural Resource Conservation Service (NRCS). Construction of an IPBC, and Armor Tracking and Live Fire Range would have minor impacts on vegetation during construction (Fort Drum, 1996).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.7.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.8 Noise

4.3.8.1 Affected Environment

Noise is unwanted or unwelcome sound usually caused by human activity and added to the natural acoustic setting of a locale. It is further defined as sound that disrupts normal activities or that diminishes the quality of the environment. Community response to noise is generally not based on a single event, but on a series of events over time. Factors that have been found to affect the subjective assessment of the daily noise environment include the noise levels of individual events, the number of events per day, and the times of the day at which the events occur.

The following metrics are used to quantify training sounds:

- The decibel (dB) is a unit used to represent the acoustic energy of sound on a logarithmic scale. Humans can detect sound levels of approximately 0 dB and begin to feel discomfort or pain as levels approach 120 dB.
- A-weighted sound levels are adjusted levels of measured or predicted sound that correspond to the frequency sensitivity of the human ear. A-weighted levels of sound are measured in dB, often expressed as dBA, and are used to measure community response to noise. The Army uses dBA to assess the effects of aviation noise.
- C-weighted sound levels are adjusted levels of measured or predicted sound that correspond to frequencies perceived by more than the human ear. Impulsive sounds

that may rattle windows or cause vibrations that are felt in humans are measured this way. C-weighted levels of sound are measured in dB, often expressed as dBC, and are used to assess the effects of large caliber weapons firing, explosions, or impacts.

Predicted average noise levels express the average daily noise projected for training operations over the period of one year. Periods of projected quiet are averaged with periods of projected loud noise. While a predicted average noise level represents the “mean” or “normal” noise level for projected training sounds at a garrison, the predicted average underestimates the severity of single noise events. The following metrics are used to quantify predicted average sound levels:

- Day-night average sound level (DNL) is a prediction of noise that accounts for the intrusive nature of sound at night. For a given day, DNL is calculated by applying a 10-dB penalty to noise events predicted between 10:00 pm and 7:00 am, and then calculating the average of all predicted noise events over the 24-hour period. For this EA, DNL represents a one-year period.
- A-weighted DNL (ADNL) is the predicted day-night average sound level computed for A-weighted noise created by projected garrison activities. The Army uses ADNL to assess community and aviation noise.
- C-weighted DNL (CDNL) is the predicted day-night average sound level computed for C-weighted noise that results from projected large caliber weapons firing, explosions, or impacts.

Sound is usually measured using the decibel (dB). The descriptor of a 24-hour noise environment is the day-night average sound level (DNL). DNL is an average measure of sound, taking into account the loudness of a sound-producing event, the number of times the event occurs and the time of day. Night noise is weighted more heavily because it is assumed to be more annoying. The DNL descriptor is accepted by federal agencies as a standard for estimating impact and establishing guidelines for compatible land uses.

To assess firing noise from small arms, the Army uses a sound level metric known as PK15 (met). PK15 (met), expressed in dBs, is a peak sound level from multiple identical noise sources that accounts for weather-related variations in perceived noise. PK15 (met) is the predicted peak sound level expected to be exceeded by only 15 percent of all single noise events from an identical source. In other words, factoring in the effect of weather, PK15 (met) characterizes the predicted maximum sound level of 85% of single noise events from an identical source. For non-identical weapons fired from one location, and for weapons firings from multiple locations, PK15 (met) uses the loudest sound level that occurs at each noise receptor site.

The use of average noise levels over a protracted time period generally does not adequately assess the probability of community noise complaints. The metric PK 15(met) accounts for statistical variation in received single event peak noise level that is due to weather. It is the calculated peak noise level, without frequency weighting expected to be exceeded by 15 percent of all events that might occur. If there are multiple weapon types fired from one location, or multiple firing locations, the single event level used should be the loudest level that occurs at each receiver location. Installations assess noise from small arms ranges using a single event metric, either PK 15(met) or A-weighted sound exposure level (ASEL). Installations use the land use planning zone (LUPZ) contour to better predict noise impacts when levels of operations at air fields or large caliber weapons ranges are above average. Installations also manage noise-sensitive land uses, such as housing, schools, and medical facilities, as being acceptable within the LUPZ and noise zone I, normally not recommended in noise zone II, and not recommended in

noise zone III (Table 7) (U.S. Army, 2007a). Tables 8, 9 and 10 provide data on noise levels at various distances for weapons commonly used on the types of ranges included in this PEA.

Table 7: Department of the Army Noise Limits for Land Use Zones

Noise Zone	Noise limits (dB)		
	Aviation ADNL	Impulsive CDNL	Small Arms PK 15 (met)
LUPZ	60 - 65	57 – 62	N/A
I	< 65	< 62	< 87
II	65 – 75	62 – 70	87 – 104
III	> 75	> 70	> 104

Reference AR 200-1, Table 14-1, page 44, (U.S. Army 2007a)

Table 8: Maximum Noise Levels (dBA) for M16, 5.56 mm Rifle

Direction of fire (degrees)	Distance		
	1,000m (3,281 ft)	2,000m (6,562 ft)	3,000m(9,842 ft)
0	65	55	48
45	63	53	46
90	58	48	40
180	46	36	29

Reference: Fort Carson, 2003, Table 4.4.2a, p. 21.

Table 9: Maximum Noise Levels (dBA) for M60, 7.62mm Machine Gun

Direction of fire (degrees)	Distance			
	500m (1,640 ft)	1,000m (3,281 ft)	2,000m (6,562 ft)	3,000m(9,842 ft)
0	71	62	54	49
45	70	61	53	48
90	67	57	48	42
180	56	46	36	30

Reference Fort Carson, 2003, Table 4.4.2a, p. 21.

Table 10: Maximum Noise Levels (dBA) for M2 (.50 caliber Machine Gun)

Direction of fire (degrees)	Distance					
	50m (164 ft)	100m (328 ft)	200m (656 ft)	500m (1,640 ft)	1000m (3,281 ft)	2000m (6,562 ft)
0	104-116	95-109	86-102	74-92	65-85	56-78
45	102-114	93-107	84-100	72-90	63-83	54-76
90	97-109	88-102	79-95	67-85	58-78	49-71
135	92-104	83-97	74-90	62-80	53-73	44-66
180	90-102	81-95	72-88	60-78	51-71	42-64

Reference Fort Carson, 2003, Table 4.4.2a, p. 21.

A Swedish study of annoyance caused by noise from shooting ranges (Sorensen and Magnusson 1979) showed the annoyance for this type of noise is low up to a certain threshold, after which it increases relatively quickly. For the A-weighted, this threshold is approximately 63 dBA. At levels below this threshold, less than 2 percent of the population exposed to the noise consider themselves to be highly annoyed. At the threshold level, the percent highly annoyed increases to 10 percent and continues to increase as the noise level increases (Sorensen and Magnusson, 1979).

Table 11 indicates the percentage of population highly annoyed from small arms range noise. Noise from transportation sources (e.g., vehicles and aircraft) and from continuous sources (e.g., generators) is assessed using the A-weighted DNL. Impulsive noise resulting from firing armor or artillery weapons and demolition activities are assessed in terms of the C-weighted DNL (CDNL).

Table 11: Annoyance Effects from Firing Small Arms

Noise Level (dBA)	Percent of people highly annoyed
<63	2
63	10
65	13
70	21
75	29
80	38

Reference: Sorensen and Magnusson, 1979

Table 12: Munitions Used at Training Ranges in this Programmatic EA

Range		Ammunition Used										
		5.56mm ball	7.62mm ball	9mm ball	.45 caliber ball	.50 caliber	shotgun	Hand grenade	40mm grenade	Hand grenade simulator	Artillery simulator	High Explosives
1	Automated Field Fire Range (AFF)	X										
2	Automate Record Fire Range (ARF)	X										
3	Automated Sniper Field Fire Range		X		X							
4	Bayonet Assault Course*											
5	Combat Pistol Qualification Course			X	X	X						
6	Fire and Movement Range	X	X						X	X		
7	Grenade Launcher Range							X				
8	Hand Grenade Familiarization Range						X					
9	Hand Grenade Qualification Course*											
10	Heavy Sniper Range			X	X							
11	Infiltration Course		X							X		
12	Infantry Platoon Battle Course (IPBC)	X	X						X	X		
13	Infantry Squad Battle Course (ISBC)	X	X						X	X		
14	Known Distance Course	X										
15	Live Fire Exercise Breach Facility					X						X
16	Live Fire Exercise Shoot house	X	X									
17	Modified Record Fire	X	X									
18	Rifle/Machinegun Zero Range	X										
19	Squad Defense Range	X	X						X	X		
20	Urban Assault Course	X	X					X				

* No live ammunition used on the Bayonet Assault Course or Hand Grenade Qualification Course.

The A-weighted scale is oriented towards the frequencies heard by the human ear, whereas the C-weighted scale measures the low-frequency components that cause buildings and windows to rattle and shake. Table 12 provides information on the types of munitions used on each of the ranges included in this Programmatic Environmental Assessment.

4.3.8.2 Threshold level of significance

Activities that cause construction noise resulting in an hourly equivalent sound level of 75dBA (based on USEPA data for construction noise) at a sensitive receptor (on- or off- post residences, schools, hospitals, etc.) or activities that place a noise zone III contour over a sensitive receptor.

4.3.8.3 Alternative 1. Preferred Alternative

The following summarizes the anticipated potential impacts of noise from modernizing and operating training ranges on previously disturbed ground at Army installations in the U.S.

The noise generated from the proposed action would have non-significant effect on the installation and local community. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These

EAs are summarized in Appendix B. Noise from heavy equipment and construction vehicles would be localized, limited to daylight hours on weekdays and short-term, and its anticipated effects minimal. Noise generated from weapons firing would be limited to small arms and simulators (See Table 12), and used in areas previously used for similar purposes. The overall effect of noise from range operations is anticipated to be minor.

Noise-related impacts from constructing the range caused by heavy equipment and construction vehicles would be for a short term, localized, and limited to daylight hours on weekdays (Fort Carson, 2004; Fort Drum, 1996; Fort Jackson, 2009; Fort Hood, 2004; Fort Hood, 2001; Fort Riley, 2005; Fort Riley, 2008; Fort Stewart, 2005; Fort Stewart, 2009; Installation Management Command, 2006). There would be minimal effect from construction noise generated from constructing an Army training range.

The noise generated from operating the range could affect humans if the noise for the 57-62 dB noise-level contour reached sensitive land uses, such as family housing, health care facilities or schools. However, ranges that generate noise from firing weapons have historically been located a significant distance from sensitive land uses. Operating and conducting training on an Army range would likely have a minor effect on noise with a low risk of creating excessive noise in sensitive land use areas, such as family housing health care facilities or schools.

Noise generated on Army ranges would be compatible with surrounding land use which consist of military weapons ranges and maneuver training areas. Noise from small arms firing at the proposed ranges may be audible at low levels in adjoining communities, and existing range lands would contain all areas of noise zones II and III (see Table 7). The potential impact of noise from weapons firing on a range within an Army training and maneuver area minimized due to the site's distance from housing or noise-sensitive land use areas (Fort Dix, 2002; Fort Carson, 2004; Fort Drum, 1996; Fort Hood, 2001; Fort Hood, 2004; Fort Riley, 2005; Fort Jackson, 2009; Fort Polk, 2005; Fort Stewart, 2005)

Noise from construction, operation, or maintenance of a range was anticipated to have no effects (Fort Riley, 2003; Fort Stewart, 2009). Noise contours and noise volumes were not expected to change, however this range would be used more often than its predecessor (Fort Eustis, 1993).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.8.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.9 Soils and Topography

4.3.9.1 Affected Environment

The classifications and interpretations of the natural environment are taken from Description of the Eco-regions of the United States (Bailey, 1995). These are general classification of soil types in the United States. Specific soils at installations will vary among installations, and in some cases from one portion of the installation to another. Some soils are more susceptible to erosion

than others, indicating a requirement for differing engineering applications or best management practices to control erosion at any given range.

Entisols are soils with little or no evidence of soil formation. They are either young soils, or their parent material has not yet reacted to soil forming factors. They may be formed on fresh lava flows or recent alluvium for which there has been too little time for soil formations to take place. They are found in extremely dry areas with too little water and vegetation to facilitate soil formation, or on steep slopes, where the rates of erosion may exceed the rate of soil formation, preventing soil horizon development. Management needs vary, depending on climate and topography, but in most cases they are erodible, and should be maintained with natural vegetation.

Aridisols are dry soils, and are characterized by a subsurface accumulation of salts such as calcium carbonate, gypsum, other soluble salts, or sodium. Overgrazed aridisols are often left bare and are subject to wind erosion. They are found in the western United States.

Alfisols are developed under forests, in cool to warm humid areas, and are characterized by a subsurface horizon in which silicate clay has accumulated. These soils are often found on sloping to steep land, and are susceptible to soil erosion. Alfisols display moderate movement of soil materials, either in a downward or horizontal direction, caused by excessive water in the soil, and fairly high base status.

Mollisols are the dark soils of grasslands. They have high organic matter, and are productive agricultural soils. Management issues deal with use of fertilizers and the maintenance of crop or vegetative cover to prevent erosion.

Ultisols are developed primarily in forested, humid-tropical, and subtropical areas, found in the southeastern United States. These soils are characterized by acidic, highly weathered layers with accumulations of silicate clays in subsurface layers that usually form in tropical and subtropical climates. In some ultisols the topsoil has been eroded, leaving the red-colored B horizon at the surface. Soil conservation practices are needed to prevent further soil deterioration. In areas with significant slope, any exposed land must be re-vegetated.

Oxisols are highly weathered soils, found mostly in tropical areas. An easily recognized subsurface layer of iron and aluminum may be evident.

Inceptisols are in the early stages of soil profile development, after entisols. Management requirements vary, depending on climate and topography.

Spodosols are acidic, sandy, forest soils. They are characteristic of cold, moist to wet climates. Spodosols drain well and are less susceptible to erosion than more finely textured soils. The presence of a forest cover can help moderate peak stream flows.

Vertisols have a high content of sticky or swelling and shrinking type clays to a depth of one meter or more. In dry seasons, these soils develop deep wide cracks, diagnostic for this soil order. Also typical is an uneven surface with micro basins and knolls. They are found most frequently in sub-humid to semiarid environments, and can erode easily.

4.3.9.2 Threshold level of significance

Activities that would result in uncontrolled and/or irreparable erosion.

4.3.9.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on soils and topography from modernizing and operating training ranges previously disturbed ground on Army installations in the U.S.

The proposed action could affect soils and soil erosion. While the effects of soil erosion can be mitigated through the effective implementation and maintenance of selected best BMPs specifically designed to reduce the risk of soil erosion. Fabian and Watts (2005) identify a number of BMPs specifically addressing their role in controlling or reducing erosion on Army small arms ranges. Range construction will likely require compliance with the National Pollutant Discharge Elimination System (NPDES) permit and may require a site-specific Erosion Control Management Plan, or equivalent. Approval of the Erosion Control Management Plan may be required by government officials at the County or State level.

Constructing an Army range involves earth moving to establish lines of sight and firing lanes. Earth moving operations like these frequently require a sediment and erosion control plan and implementing BMPs to prevent or control erosion, and maintaining those BMPs until a suitable vegetative cover has been established.

Areas disturbed by construction could experience soil losses by water and wind erosion, unless such disturbance is mitigated by using soil erosion best management practices (BMPs). Much of this disturbance would be on soils already disturbed from former activities. Proposed construction would have only minimal effects on soils beyond construction sites (Fort Carson, 2005).

The soils at a proposed range site have been disturbed by the original construction of the range and several decades of intensive military training activities. Soils in these disturbed areas have been turned over and no longer represent the soil types described in the USGS soil surveys. Constructing a range at this site would have minimal effect on soils in such previously disturbed areas.

The NPDES Permitting Program requires a construction permit for range construction. That permit would include identification and implementation of BMPs such as minimization measures to reduce dust on roads and minimize erosion from stormwater runoff in the construction area. The proposed action's impact on soil in the construction areas would be minor and short-term. (Fort Carson, 2003; Fort Dix, 2002; Fort Drum, 1996; Fort Hood, 2004; Fort Polk, 2005; Installation Management Agency, 2005; Installation Management Command, 2006; Fort Stewart, 2005; Fort Stewart, 2009)

Constructing a range requiring large-scale earth moving activities would require the construction contractor to prepare and implement a soil erosion control plan or sediment control management plan (Fort Drum, 1996; Fort Hood, 2004).

The soils on the proposed site for range construction at Fort Jackson are sandy soils with high potential for erosion. Best management erosion control practices would be required before and during construction (Fort Jackson, 2009).

Operation of live-fire ranges would affect soils through the impact of small arms munitions within range firing fans. These rounds would not be explosive, so effects would be very small (Fort Carson, 2004).

The Army has developed a comprehensive list of best management practices tailored to specific types of ranges (Table 3) to control soil erosion (Fabian and Watts, 2005).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.9.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.10 Solid Waste

4.3.10.1 Affected Environment

Solid waste management is primarily concerned with the availability of landfills to support a population's residential, commercial, and industrial needs, and the quantity of solid waste associated with a proposed action. Alternative means of waste disposal may involve waste-to-energy programs or incineration. Recycling programs for various waste categories (e.g., glass, metal, and paper) reduce reliance on landfills for disposal.

Construction or major modification of a range routinely involves four components: (1) earth moving (2) demolition of existing structures on the range, (3) construction of targets, and (3) construction of support facilities.

Earth moving routinely involves establishing a line-of-sight between the firing positions and the targets, and grading to provide for adequate storm-water runoff. Other earth-moving might involve creating a level area for vehicle parking and building construction. The only solid waste generated during this phase of construction may be from tree or stump removal.

Construction of modernized ranges on previous range sites may include a requirement to demolish existing structures on the range. Demolition of non-historic buildings, structures, or other improvements and disposal of debris thereon, including removal of asbestos, polychlorinated biphenyls (PBCs), lead based paint, and other special hazard items is permitted under 32 CFR 651-2 as a Categorical Exclusion.

The Military Munitions Rule states that used or fired munitions are considered a solid waste only when they are removed from their landing spot (USEPA, 2010). Since each range is an active range and the munitions are used for their intended purposes and are left where they land, the spent munitions are not considered solid waste.

4.3.10.2 Threshold level of significance.

Activities that would violate local or state regulations or laws governing management and disposal of solid waste.

4.3.10.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential solid waste impacts from modernizing and operating training ranges on previously disturbed ground on Army installations in the U.S.

The proposed action would have less than significant solid waste impact on solid waste. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

Constructing an Army training range would generate some solid waste, but would have a minimal effect on human health and the environment.

Constructing target emplacements generates very little solid waste. Similarly, constructing a range's support facilities would generate a relatively small quantity of solid waste. Table 2 provides a list of common range support facilities and their size. As indicated by the information in Appendix C, these facilities are constructed with standard construction materials from slab on grade. Solid waste would consist of waste concrete, drywall, metals (conduit, wiring, piping), lumber, packaging and cardboard.

Operating these ranges would generate solid waste from ammunition packaging, and metal cartridges and links. The management of solid waste is normally accomplished through the installation recycling program. Using units are required to collect and recycle all ammunition cartridges and links generated during weapons firing. Using units are also required to collect, and properly dispose of all other solid waste they generate on a range. This waste is a minor contribution to the total volume of solid waste an installation generates and would not affect the installation's solid waste management program or put the installation at risk of violating solid waste regulations. Constructing and operating Army training ranges is not expected to have any effect on solid waste (Fort Dix, 2002; Fort Drum, 1996; Fort Hood, 2004; Installation Management Agency, 2005; Installation Management Command, 2006; Fort Jackson, 2009; Fort Stewart, 2005; Fort Stewart, 2009).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.10.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.11 Threatened and Endangered Species

4.3.11.1 Affected Environment

The Army is required by the Endangered Species Act (ESA) to conserve the federally-listed threatened and endangered (T&E) species that occur on its lands, and to ensure that any action authorized, funded, or carried out by the Army does not jeopardize the continued existence of a listed species or result in the destruction or adverse modification of critical habitat. As of October 1, 2006, the Army has recorded 174 federally-listed T&E species on 99 installations. The Army has 13 installations with designated critical habitat occurring for one or more species, and two of these installations have unoccupied critical habitat (Rubinoff, et al., 2007).

Due to their importance and sensitivity, impacts to T&E habitats are, as much as practicable, avoided and/or minimized. The Army consults with the U.S. Fish and Wildlife Service (USFWS) or the National Oceanic and Atmospheric Administration - National Marines Fisheries Service

(NMFS) on actions that may affect federally listed species or for their assistance in assessing impacts of actions on listed species. The results of each consultation and the required actions are then incorporated in the installation's Endangered Species Management Component (ESMC) of the Integrated Natural Resource Management Plan (INRMP). The INRMP supports the Sustainable Range Program (SRP) and Installation Training Area Management (ITAM) program, which are mandated to sustain Army training and maneuver areas (Army Regulation 350-19; U.S. Army, 2005). These programs implement the conservation and recovery measures identified in the ESMC to avoid or minimize impacts on T&Es and their habitat to ensure compliance with the ESA and promote mission sustainability. Installation ESMCs are the Army's primary means of ensuring compliance with the Endangered Species Act and balancing mission requirements (U.S. Army, 1995, pp. 20).

4.3.11.2 Threshold level of significance

Activities that violate the Threatened and Endangered Species Act by constituting a "take"; cause extirpation of threatened and endangered plant or animal species; cause permanent loss of habitat to a level below that required to achieve long-term Federally-listed species population recovery objectives; cause a violation of federal-listed species requirements identified in a biological opinion; or, are in conflict with an existing U.S. Fish and Wildlife Service jeopardy opinion.

4.3.11.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on threatened and endangered species from modernizing and operating training ranges on previously disturbed ground on Army installations in the U.S

The proposed action would have non-significant impact on threatened and endangered species. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B. The following is a summary of anticipated effects on threatened and endangered species from range construction projects.

While there were no federally-listed threatened or endangered plant species on Fort Carson, the installation had seven Colorado species of Special Concern. Approximately 250 and 70 acres of habitat would be directly damaged from range construction, less than 15 acres would be permanently denuded (building and targetry footprints). However, the permanent loss of even this small acreage would somewhat fragment habitat. These are common habitat types on Fort Carson and would not significantly affect wildlife species. The combination of fires caused by range operations and possibly prescribed burning to minimize fire escape risks would affect native wildlife habitat to some degree since it would be at levels higher than naturally occurring. Operations of the facilities would create disturbance around these facilities. Most wildlife species would reasonably well adapt to this disturbance as has been shown by similar types of disturbances on Fort Carson. There is the potential for inadvertent mortality of wildlife from live-fire operations. Experiences on other military installations, including Fort Carson, indicate that this type of mortality would not be significant (Fort Carson, 2004).

There were no threatened or endangered vegetation species within the construction area for the Infantry Platoon Battle Course, but two rare plant species are located within two miles of the site. Suitable habitat for one plant species existed on the proposed site for the new range and would not be disturbed during the proposed construction. The proposed range construction posed no threat to the species or its potential for population expansion. There had been no recorded

sightings of threatened or endangered species on the site of the proposed range. The Northern Harrier has been seen in the area and may use this site for foraging, but the habitat on this site was not suitable for nesting. No impacts to rare, threatened or endangered plant or animal species would result from constructing the range at Fort Drum. Constructing a range on this site would not affect any rare, threatened or endangered species (Fort Drum, 1996).

There were five endangered bird species on Fort Hood. Known areas of the black-capped vireo and the golden-cheeked warbler habitat in the vicinity of the proposed Urban Assault Course and Shoot House would be avoided. Because the area for the proposed action area was already used for live-fire training exercises, the operation phase of the proposed action would result in no net increase in noise from vehicles or weapons that might disturb populations of either species that might use that habitat. The proposed action was not expected to have any significant short- or long-term impacts on threatened or endangered species (Fort Hood, 2004).

Six federally-listed threatened or endangered species occurred on Fort Hunter Liggett. In addition, 33 plants listed by the California Native Plant Society (CNPS) and 43 wildlife and crustacean species of concern have the potential to occur on the installation. Many species protected under the Migratory Bird Treaty Act were found on the installation. Bald Eagles, protected under the Bald Eagle and Golden Eagle Protection Act were also found on the installation. Based on distances from the action area to the listed species locations, there were no anticipated adverse effects to listed species and no known locations of CNPS listed plants would be adversely affected. Constructing an Urban Assault Course, Shoot House and a MOUT course would result in a loss of up to 9.3 acres of grassland or oak woodland or savanna, which could potentially affect birds, to include species of concern. Native plant and animal species would be disturbed at construction sites, however, the area of potential effect was small and surrounded by unaffected habitat. In the short-term, particularly during construction and when the range is in use, wildlife in the project area could experience some displacement. It is expected, however, that once the course is completed, wildlife composition and distribution would generally remain similar to that which currently exists in and utilizes the project area. The Preferred Alternative would not result in fragmented populations of plants, animals or rare natural communities (Installation Management Agency, 2005).

The EA prepared to consider the potential effects of constructing a Combat Pistol Qualification Course, Modified Record Firing Range, 25-meter Rifle Zero Range, 10-meter Machine Gun Zero Range, and upgrade an existing multi-purpose machine gun range at Fort Hunter Liggett determined there would be minor short- and long-term impacts to biological resources. The installation initiated informal ESA section 7 consultation with the Fish and Wildlife Service. The U.S. Fish and Wildlife Service issued a programmatic biological opinion which allowed for very limited loss of one plant species when avoidance was not possible (Installation Management Command, 2006).

There were several threatened or endangered species on Fort Jackson. The red cockaded woodpecker (RCW) was the only species sighted close to the proposed site for new ranges. The nearest RCW cavity tree was 1.0 and 0.5 miles from the proposed range sites, respectively. None of the proposed construction sites served as RCW forage habitat. Overall the impacts of constructing and operating the MRF and NIC on existing or potentially suitable RCW habitat would be minimal (Fort Jackson, 2009).

There were 13 federal- and/or state-listed threatened or endangered species on Fort Riley. Twenty three rare species and nine other listed or rare species could occur on the installation but have not been observed. Some minor direct short-term and long-term adverse impacts would occur to plant and wildlife communities from construction of a trench-live-fire facility. Re-seeding

would replace a portion of the grassland on the project area, but the loss of grassland would displace wildlife using that area. There would be no anticipated effects to threatened or endangered species (Fort Riley, 2007).

Fort Riley proposed constructing and operating a CACTF, Urban Assault Course, Live-Fire Shoot House, Breach Facility and Offense/Defense Station. No rare threatened or endangered plant or animal species were expected to be affected by constructing and operating these ranges (Fort Riley, 2003).

Fort Riley proposed constructing and operating an Infantry Squad Battle Course (ISBC). Training restrictions in sensitive areas protect habitats and minimize disturbance to populations of designated T&E species. Due to the proposed location of the ISBC, and its considerable distance from the bald eagle “no disturbance” buffer zones along riparian habitat, there were no anticipated impacts to the bald eagle or its habitat. Further study determined that constructing and operating this range would not likely adversely affect any threatened or endangered species (Fort Riley, 2005).

Three listed endangered species and two listed threatened species occurred on Fort Stewart. Of the five, only the red-cockaded woodpecker and the frosted flatwoods salamander (FFS) may be impacted by constructing and operating a sniper field fire range. Constructing this range was expected to have a minor adverse impact on the red-cockaded woodpecker resulting from removal of trees and other vegetation at the site of the preferred alternative. No FFS have been detected in the area affected by constructing and operating the sniper field fire range, therefore the FFS would not likely be adversely affected by the proposed action (Fort Stewart, 2009).

Constructing an urban assault course would require clearing 2.9 acres of trees that were not suitable habitat for the threatened or endangered species known on Fort Stewart. The proposed action would not affect other species under consideration because habitat in the project area is not suitable for those species and historical observations indicated they would not occur in the project area. No impacts were anticipated to any threatened or endangered species from constructing and operating an Urban Assault Course (Fort Stewart, 2005).

Since the ranges in this PEA would be constructed on previous range sites, the likely hood of finding T&E species or its habit on the range is low. In cases where a T&E species or its habit is found on a range, the Army would consult with the USFWS. In this event the Army would either mitigate for the species or its habitat or opt to not construct the range on the site.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.11.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.12 Traffic and Transportation

Transportation systems are the organized means of moving people and commodities. Principal transportation systems include commercial air carriers, waterway and maritime shipping, railroads

and trucking. Movement of people by privately owned vehicles on a local or regional scale is related to traffic and circulation. The smooth flow of traffic and adequacy of on-post and off-post road networks to move people efficiently contribute materially to the quality of the human environment in the vicinity of the installation. Installation activities can cause, or adversely affect traffic congestion; or can occur in locations with an inadequate, or only marginally adequate, supporting road network.

4.3.12.1 Affected Environment

The affected environment for a proposed action on traffic and transportation normally includes the public roadways on the installation and can extend to the roadways leading to the installation's access control points, and possibly beyond to nearby or adjoining communities.

4.3.12.2 Threshold level of significance

Activities that would cause significant traffic delays, cause discernible degradation of existing road ways, cause an increase in traffic volume that would reduce the level of service (LOS) to LOS E or F, or that would interrupt rail operations.

4.3.12.3 Alternative 1. The Preferred Alternative

The following summarizes the anticipated potential impacts on traffic and transportation from constructing and operating training ranges on previously disturbed ground on Army installations in the U.S.

The proposed action could have non-significant impact on traffic and transportation. This conclusion is supported by the analyses of EAs that were prepared prior to constructing and operating training ranges at U.S. Army installations. These EAs are summarized in Appendix B.

During modernization of the proposed ranges, increases in local traffic would occur resulting from moving heavy equipment in during the initial phases of construction, their removal after completion, and daily commuting by the workforce during the construction period. These effects would be temporary and vary from insignificant (Fort Hood, 2004; Fort Stewart, 2005; Fort Stewart, 2009) to minor (Fort Drum, 2006; Installation Management Activity, 2005, Installation Management Command, 2006; Fort Jackson, 2009). Since the proposed ranges covered by this PEA would be located on existing range land, there would be negligible impacts to traffic from Soldiers utilizing the ranges.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.12.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.13 Water Resources

4.3.13.1 Affected Environment

Water resources include all surface water bodies, such as streams, rivers, ponds, lakes within the area of potential affect of the proposed action as well as potential groundwater resources. Army installations, and Army operations on training ranges and maneuver areas must comply with provisions of the Clean Water Act, as well as Executive Orders (EO) governing protection of wetlands (EO 11990) and floodplains (EO 11988), and off-road vehicles on public lands (EO 11644).

A basic issue for water resources associated with the proposed action is the potential for construction activities or range operations to contaminate either surface or groundwater on, near or underneath the training range.

Construction or major renovation of a range would involve, to varying extents, earth moving. Soil-disturbing activities damage or destroy vegetation and increase the risk of erosion and soil sediments being carried to surface water bodies by rain or snow run-off.

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a stream, pond, river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion.

The NPDES stormwater program requires construction site operators engaged in clearing, grading, and excavating activities that disturb one acre or more, including smaller sites in a larger common plan of development or sale, to obtain coverage under an NPDES permit for their stormwater discharges. Installations may be required to apply for a new site-specific NPDES permit, or coordinate with the NPDES permit issuing authority to ensure the proposed range construction is within the scope of the installation's existing general NPDES permit.

To the maximum extent possible, surface waters are protected during construction and demolition through the implementation of BMPs to preclude erosion into surface waters, impaired streams, and ground-waters. Sedimentation controls are required of the contractor doing the construction. These sedimentation requirements are written into the contract for the construction of the range.

The Under Secretary of Defense issued a memorandum with guidance on implementing new requirements for controlling stormwater in accordance with the Energy Independence and Security Act (EISA, Title 42 U.S.C. § 17094. Section 438 of the EISA establishes into law new stormwater design requirements for Federal development and redevelopment projects. Federal facility projects over 5,000 square feet must, "maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume and duration of flow (Office of the Under Secretary of Defense, 2010). When applicable and appropriate, proponents for any range project analyzed in this PEA would comply with the requirements of EISA.

4.3.13.2 Threshold level of significance

Activities resulting in the introduction of pollutants that directly degrade water quality standards of a surface water body, or that alter patterns of or increase the intensity of flood water movement, or violate federal or state discharge permits.

4.3.13.3 Alternative 1. Preferred Alternative

The following summarizes the anticipated potential impacts on water resources from modernizing and operating training ranges on previously disturbed ground on Army installations in the U.S.

The proposed action could affect the quality of water resources resulting from potential for erosion from the range site. The scope of the potential affect is largely dependent on the quality of the design and implementation of best management practices used to control erosion and the migration of metals from spent ammunition on the range (see section 2.6.7). Fabian and Watts (2005) identifies a number of BMPs specifically addressing their role in controlling or reducing erosion on Army small arms ranges. Erosion control BMPs from Fabian and Watts' publication is discussed in Section 2.6.7 and listed Table 3.

Review and analysis of EAs prepared before range construction anticipated the most common risk to the quality of water resources was sedimentation caused by erosion of exposed and disturbed soils during range construction. At each installation where soil erosion was identified as a potential risk to water quality, soil erosion control BMPs were required as mitigating actions to reduce or eliminate this risk (Fort Carson, 2004; Fort Carson, 2005; Fort Dix, 2002; Fort Riley, 2003; Fort Riley, 2005; Fort Riley, 2008; Fort Riley, 2009; Fort Hood, 2004; Fort Jackson, 2009; Installation Management Agency, 2005; Installation Management Command, 2006; Fort Stewart, 2005; Fort Stewart, 2009).

Long-term minor adverse impacts could occur through increased stormwater runoff as a result of an increase of impermeable surfaces, such as buildings and paved areas (Fort Dix, 2002). Range support facilities (e.g., control tower, classroom facility, latrine, covered mess, and enclosed bleachers) collectively increase the impervious surface area by approximately 4,970 square feet, or approximately 0.11 acre. This minimal amount of impervious surface would have negligible impact on stormwater runoff or impact groundwater recharge.

Range operations would not affect groundwater. No groundwater pumping is required for constructing or operating any of the ranges identified in this PEA. No noticeable impacts to groundwater were anticipated with constructing the Urban Assault Course and MOUT facility at Fort Dix. Due to the expected low and intermittent use of the facility there would be minimal impact on groundwater. Hard-packed gravel roads and buildings would create some impervious surfaces, but there would be negligible impacts to groundwater recharge in the area associated with range construction (Fort Dix, 2002; Fort Drum, 1996; Fort Hood, 2004; Fort Riley, 2003; Fort Stewart, 2005; Fort Stewart, 2009).

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.13.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.3.14 Wetlands

4.3.14.1 Affected Environment

Wetlands is the collective term for swamps, marshes, bogs, wet meadows, and similar areas that are often located between open water and dry land. Wetlands are a valuable natural resource that helps to improve water quality, reduce flood and storm damage, provide important fish and wildlife habitat, and support outdoor recreation activities, such as hunting and fishing. Wetlands are defined by the Natural Resources Conservation Service as (USDA, 2010):

Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances does support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

There are four types of wetlands: marshes, swamps, bogs, and fens as discussed below (USEPA, 2010).

Marshes are defined as wetlands frequently or continually inundated with water, characterized by emergent soft-stemmed vegetation adapted to saturated soil conditions. There are many different kinds of marshes, ranging from the prairie potholes to the Everglades, coastal to inland, freshwater to saltwater. All types receive most of their water from surface water, and many marshes are also fed by groundwater. Nutrients are plentiful and the pH is usually neutral leading to an abundance of plant and animal life. For the purposes of this publication, we have divided marshes into two primary categories: tidal and non-tidal.

Tidal marshes can be found along protected coastlines in middle and high latitudes worldwide. They are most prevalent in the United States on the eastern coast from Maine to Florida and continuing on to Louisiana and Texas along the Gulf of Mexico. Some are freshwater marshes, others are brackish (somewhat salty), and still others are saline (salty), but they are all influenced by the motion of ocean tides.

Non-tidal marshes are the most prevalent and widely distributed wetlands in North America. They are mostly freshwater marshes, although some are brackish or alkaline. They frequently occur along streams in poorly drained depressions, and in the shallow water along the boundaries of lakes, ponds, and rivers. Water levels in these wetlands generally vary from a few inches to two or three feet, and some marshes, like prairie potholes, may periodically dry out completely. Prairie potholes, playa lakes, vernal pools, and wet meadows are all examples of non-tidal marshes. Due to their high levels of nutrients, freshwater marshes are one of the most productive ecosystems on earth. They can sustain a vast array of plant communities that in turn support a wide variety of wildlife within this vital wetland ecosystem. As a result, marshes sustain a diversity of life that is way out of proportion with its size. In addition to their considerable habitat

value, non-tidal marshes serve to mitigate flood damage and filter excess nutrients from surface runoff.

A swamp is any wetland dominated by woody plants. There are many different kinds of swamps, ranging from the forested Red Maple, swamps of the Northeast, to the extensive bottomland hardwood forests found along the sluggish rivers of the Southeast. Swamps are characterized by saturated soils during the growing season, and standing water during certain times of the year.

Bogs are one of North America's most distinctive kinds of wetlands. They are characterized by spongy peat deposits, acidic waters, and a floor covered by a thick carpet of sphagnum moss. Bogs receive all or most of their water from precipitation rather than from runoff, groundwater or streams. As a result, bogs are low in the nutrients needed for plant growth, a condition that is enhanced by acid forming peat mosses. Bogs in the United States are mostly found in the glaciated northeast and Great Lakes regions (northern bogs), but also in the southeast (pocosins).

Fens are peat-forming wetlands that receive nutrients from sources other than precipitation: usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens differ from bogs because they are less acidic and have higher nutrient levels. They are therefore able to support a much more diverse plant and animal community. These systems are often covered by grasses, sedges, rushes, and wildflowers. Some fens are characterized by parallel ridges of vegetation separated by less productive hollows. The ridges of these patterned fens form perpendicular to the down slope direction of water movement. Over time, peat may build up and separate the fen from its groundwater supply. When this happens, the fen receives fewer nutrients and may become a bog. Like bogs, fens are mostly a northern hemisphere phenomenon -- occurring in the northeastern United States, the Great Lakes region, the Rocky Mountains, and much of Canada -- and are generally associated with low temperatures and short growing seasons (USEPA, 2010).

The U.S. Fish and Wildlife Service (USFWS) is the principal Federal agency that provides information to the public on the extent and status of the Nation's wetlands. The agency has developed a series of topical maps to show wetlands and deepwater habitats. This geospatial information is used by Federal, State, and local agencies, academic institutions, and private industry for management, research, policy development, education and planning activities.

Section 404 of the Clean Water Act (CWA) establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Activities in waters of the United States that include fill for development, water resource projects (such as dams and levees) and infrastructure, are regulated by the U.S. Army Corps of Engineers. The basic premise of the program is that no discharge of dredged or fill material may be permitted if: (1) a practicable alternative exists that is less damaging to the aquatic environment or (2) the nation's waters would be significantly degraded. Section 404 applications these activities must show, that to the extent practicable:

- Steps Taken to avoid wetland impacts;
- Minimized potential impacts on wetlands; and
- Provided compensation for any remaining unavoidable impacts.

4.3.14.2 Threshold level of significance

Activities that result in an unpermitted loss of jurisdictional wetland function, or the non-mitigated loss of one (1) or more acres of wetlands.

4.3.14.3 Alternative 1. Preferred Alternative

The following summarizes the anticipated potential impacts on wetlands from modernizing and operating training ranges on previously disturbed ground on Army installations in the U.S.

The proposed action could affect the quality of wetlands resulting from potential for erosion from the range site. The scope of the potential affect is largely dependent on the quality of the design and implementation of best management practices used to control erosion and the migration of metals from spent ammunition on the range (see section 2.6.7). Fabian and Watts (2005) identifies a number of BMPs specifically addressing their role in controlling or reducing erosion on Army small arms ranges. Erosion control BMPs from Fabian and Watts' publication is discussed in Section 2.6.7 and listed Table 3.

Fort Carson was included in the National Wetlands Inventory (NWI) with an estimated 1,076 acres. One small riparian area occurred within the boundaries of the proposed QTR firing fan. This small drainage way crosses the firing fan about halfway downrange. There would be no effects on wetlands (Fort Carson, 2005). There was a wetland area about one mile from the proposed site of the Urban Assault Course at Fort Carson. The only impacts would be non-explosive small arms rounds landing in this riparian wetland system. There were no wetlands near the proposed sites for the CACTF or Breach Facility (Fort Carson, 2004).

Constructing a MOUT and Urban Assault Course on the proposed site at Fort Dix would not occur within the 300-foot buffer required by the New Jersey Pinelands Commission, and therefore would have no impact on wetlands (Fort Dix, 2002).

Approximately 23,143 acres of wetlands occur on Fort Drum. Wetland impacts from constructing the Infantry Platoon Battle Course would be minor, consisting of the placing telephone/power poles in wetlands adjacent to the roadway. Wetland impacts from constructing the Anti-Armor Tracking Live Fire Range would be greater, involving a total of 37.5 acres of wetlands. Wetlands to be impacted by range upgrade construction activities account for 0.1 percent of the installation's total inventory of wetlands. At the completion of construction activities, all cleared areas would be seeded with an approved native seed mixture at a rate such that soils would be stabilized. Seeding disturbed areas would create new edge and grassland habitat for the areas wildlife. Impacts on wetlands for Infantry Platoon Battle Course would not require mitigation. Impacts on wetlands for the Anti-Armor Tracking Range will be mitigated an Individual Permit under Section 404 of the Clean Water Act. Wetland-related impacts occurring at this range will be mitigated either through the construction of new wetland areas in an area that is currently upland, or through enhancement of existing poor-quality wetlands within the same watershed, or a combination of both (Fort Drum, 1996).

Filling wetlands was not anticipated for constructing the small arms range at Fort Eustis. Several wetlands areas were located adjacent to the proposed site of a small arms range on Fort Eustis. No wetlands would be filled and special design considerations would be implemented to avoid sedimentation in the wetlands. Overall potential impact to wetlands is low (Fort Eustis, 1993). Fort Hood does not have any known jurisdictional wetlands, but has some potential wetlands which have been mapped as part of the National Wetlands Inventory (NWI). There would be no construction in any wetland areas as part of constructing a MOUT facility, or for upgrading existing analog ranges to create a Digital Multi-Purpose Range Complex on Fort Hood (Fort Hood, 2004; Fort Hood, 2001).

The proposed site for the Urban Assault Course, Shoot House and MOUT facility were outside the 100-year floodplain and no known wetlands occurred on the site at Fort Hunter Liggett. There

would be no impact to wetlands (Installation Management Agency, 2005). The proposed sites for constructing a proposed Combat Pistol Range, MRF, 25-meter zero range, 10-meter machine gun zero range, and upgrade the existing multi-purpose machine gun range at Fort Hunter Liggett did not contain wetlands. There were wetlands down range from the proposed construction sites, but not in the construction areas or live-fire areas. The action would have no impact on wetlands (Installation Management Command, 2006).

Wetlands did not occur on the proposed sites for the modified record fire and night infiltration course projects at Fort Jackson and no impacts were anticipated (Fort Jackson, 2009).

There were no wetlands or other waters of the U.S. within the footprint of the proposed CACTF at Fort Polk. To protect water bodies from sedimentation, the installation implements large-scale structural sedimentation control measures. Constructing the CACTF would not impact wetlands (Fort Polk, 2005).

There were 1,533 acres of wetlands on Fort Riley, and there were no wetlands areas at the proposed site of the live-fire trench training complex, and no wetlands on the proposed sites for the CACTF, Urban Assault Course, Shoot House, Breach Facility or Offense/Defense Station, and no wetlands on the proposed site of the QTR or Shoot House (Fort Riley, 2007; Fort Riley, 2003; Fort Riley, 2008).

The National Wetlands Inventory (NWI) data indicated about 91,960 wetland acres on Fort Stewart, which was approximately 30 percent of the Installation; however, only on-site field delineation could determine their true extent and status (jurisdictional, isolated, etc.). Constructing the sniper range on the preferred location would involve filling approximately 6.7 acres of wetlands. The wetlands consisted of a bottomland hardwood type typical for this area of Fort Stewart with a mix of mature and semi-mature trees to scrubs/shrubs. Total acreage of all five wetland areas in the vicinity of the proposed alternative is 23.8 acres; however, only approximately 6.7 acres will be impacted by this alternative location. Overall, this alternative would have a minor effect on wetlands, because it removed only 6-7 acres of the installation's 90,000 acres of managed wetlands (Fort Stewart, 2009). No wetlands existed in the proposed area for constructing an Urban Assault Course on Fort Stewart. There were isolated wetlands adjacent to the proposed range, but no adverse impacts were anticipated (Fort Stewart, 2005).

The Army's policies and programs on planning and designing ranges recognizes the Army's legal and moral obligation to protect these ecosystems, and aggressively plans and designs ranges to avoid impacts on wetlands. Evidence from other range construction NEPA documents reaffirms the steps taken to avoid, reduce, and mitigate as necessary, potential impact to wetlands. Constructing and operating an Army range on previously disturbed ground would have little or no impact on wetlands.

Based on this analysis, the preferred alternative would not result in exceedance of the threshold level of significance described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.3.14.4 Alternative 2. The No Action Alternative. The Army would retain outdated ranges on Army installations and conduct project-specific NEPA analyses for each new range construction project.

The potential environmental effects of this alternative would be the same as the preferred alternative.

4.4. OTHER RANGES

4.4.1 Introduction

This section provides an analysis of seven types of ranges for which there were no previous Environmental Assessments. This section provides an analysis for the:

- Automated Field Fire Range (AFF);
- Automated Record Fire Range (ARF);
- Squad Defense Range
- Heavy Sniper Range
- Bayonet Assault Course (BAC);
- Hand Grenade Qualification Course; and,
- Hand Grenade Familiarization Range

4.4.2 Rifle Ranges

The Automated Field Fire (AFF) Range, Automated Record Fire (ARF) Range and Squad Defense Range (SDR) are similar in concept and overall design. Details about their characteristics are provided in Section 3.5.1, 3.5.2, and 3.5.18. Each range is designed for use by Soldiers using their M16 or M4 rifle firing at stationary targets. They are similar to the Modified Record Fire (MRF) range, in that both the AFF and ARF training can be conducted on the Modified Record Fire Range.

Three environmental assessments were prepared for construction of modified record fire ranges at Army installations (See Table B.1, Appendix B). A matrix of the anticipated environmental effects of constructing a MRF at Fort Hunter-Liggett, and at Fort Jackson is provided in Table B.2, page 2 of 3, page B-6 (Appendix B).

With one exception, those EAs determined that constructing a MRF range had negligible or minor effect on all valued environmental components addressed in this Programmatic EA. The EA for constructing the MRF at Fort Jackson determined there could be moderate effect on soils due to potential risk for erosion. The EA for Fort Hunter Liggett identified soil erosion as a minor effect. Both EAs recommended the installation require standard erosion-control BMPs be implemented. Cumulative effects for the range at both installations was identified as negligible (Fort Hunter Liggett) or minor (Jackson).

4.4.3 Heavy Sniper Range

Details about this range are provided in Section 3.4.11. An environmental assessment was prepared before constructing an Automated Sniper Field Fire Range at Fort Stewart, GA (Fort Stewart, 2009). A summary of the EA is available at Paragraph B.17, page B-17, Appendix B. A summary of the anticipated environmental effects is available in Table B.2, page 3 of 3 on page B-7 (Appendix B). Details about the Automated Sniper Field Fire Range are available in Section 3.4.19.

The Sniper Field Fire Range and Heavy Sniper Range are very similar in their size and character. While the Heavy Sniper range has one lane and the Sniper Field Fire range has four, the overall land area is similar (Heavy – 26 acres; Sniper Field Fire 31 acres). Both ranges required terrain left in its natural state to provide realistic obstacles for the sniper to negotiate. Both ranges fire copper-jacketed lead bullets. Neither range is dud-producing.

The EA for constructing the Automated Sniper Field Fire Range determined there would be no effect on cultural resources, environmental justice, land use, infrastructure, noise, solid waste, threatened and endangered species, traffic, or visual resources. Minor effects were expected in the areas of air quality, facilities, natural resources, soils, water resources and wetlands and cumulative effects. Positive effects on socioeconomics were anticipated.

4.4.4 Non-Firing Ranges

Both the Bayonet Assault Course and the Hand Grenade Qualification Course are non-firing ranges. Details about the Bayonet Assault Course are provided in Section 3.4.5. Details about the Hand Grenade Qualification Course are at Section 3.4.10. Neither range uses live ammunition. Soldiers use fused practice hand grenades on the qualification course; the range is cleaned after each daily use.

The size of the Bayonet Assault Course is not strictly defined, however the maximum size is approximately 3.5 acres; the grenade course is approximately 1.5 acres. The Bayonet Course requires an Operations/Storage Building (See Appendix C). The hand grenade qualification course has the full complement of range operations and control facilities, less the Range operations center (small).

Each of these facilities requires less than 3.5 acres of land for the range itself, and neither uses live ammunition. The hand grenade qualification course uses fused practice grenades that are collected from the range daily.

These ranges have no automation or moving targets; therefore, the scope of construction is notably less than that on other larger, live-fire ranges. There is no effect on airspace. Effects on air quality and cultural resources, facilities and infrastructure, natural resources, solid waste, threatened and endangered species, water resources and wetlands would be similar to those of other ranges discussed earlier in this document. The level of noise generated on each of these ranges is substantially less than that from a live-fire range. Neither of these ranges would have an effect on land use. Constructing and operating any of these two ranges would have no effect on human health or the environment.

4.4.5 Hand Grenade Familiarization Range

Details about this range are provided in Section 3.4.9. The range has four throwing bays, each being approximately 25 meters wide by 50 meters deep (82 ft x 164 ft), with a total overall size of 100m x 50m (328 ft x 164 ft), and total area of 0.3 acres. Each lane is separated from adjoining lanes by a 1.8m (71 inch) concrete or wooden revetment or earthen berm. This range has the standard range control facilities, less the range operations center.

The effects on air quality from constructing and operating this range would be similar to other ranges discussed in this PEA, with short term, minor effects during construction. There could be minor effects for the life of the range resulting from dust and particulate generated with a grenade explodes. With most particulate settling after a few minutes, the impact on air quality would be minor and localized. There are no expected effects on facilities and infrastructure, hazardous materials and hazardous waste, land use, solid waste or traffic and transportation. There would be negligible effects on natural resources; the impact area would not have vegetation and the explosions would scare off wildlife. Similarly, there would not be any expected effect on endangered species, and care would be used to ensure the proposed site was not habitat for a threatened or endangered species. The site for the grenade range should not be within the regulatory setback distance from surface water or wetlands areas.

When constructing a grenade familiarization range on an existing range, any cultural or historic resources would have been affected by earlier activities.

Hand grenades will generate noise, but the range will be located within the installation's training and range complex, some distance from the installation's cantonment area and local communities. There would be some minor, short-term positive effects to socioeconomics resulting from the salaries and purchase of materials to construct the range.

Based on this analysis, the overall impacts for these ranges would not result in exceedance of the thresholds for level of significance for the VECs described above. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

4.5 CUMULATIVE EFFECTS

4.5.1 Introduction

Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR Part 1508.7).

Cumulative impacts and issues are increasingly important as they often create greater impacts than those direct and indirect effects of singular proposed actions. As articulated in the CEQ guidelines (CEQ, 1997) and Army guidance (U.S. Army, 2007), cumulative effects analysis (CEA) must focus on important regional resources, as opposed to the traditional "action impact" paradigm used to address direct and indirect impacts; focusing on the resources or valued environmental components (VECs) that are important in a specific region. The identification of these VECs is independent of a particular proposed project or action. Once identified, the evaluation of cumulative effects on these VECs can be readily accomplished.

4.5.2 Environmental Resource Areas Excluded From Further Consideration

As discussed in Section 4.2 several environmental resource areas were excluded from further consideration. A review of these resource areas showed that constructing or major renovation of a range on the site of a previous range would have no direct or indirect impact on energy or socioeconomic resource areas. Having no direct or indirect impacts, there would be no cumulative effects on these resource areas.

4.5.3 Past, Present, and Reasonably Foreseeable Future Actions

4.5.3.1 Past Actions

When installations were established, the Army constructed the infrastructure necessary to house, support, and train soldiers on each installation. The types and numbers of ranges varied by installation based on the mission of the installation and the types of units and training that had to be supported. Live fire and non-live fire ranges, which is the focus of this PEA, were established within the installations training areas outside of the cantonment area. These ranges were established around impact areas. Impact areas were established for dud producing and non-dud producing munitions. Small arms ammunition used on the ranges in this PEA use non-dud producing ammunition. Although the 40mm round for the grenade launcher is a dud- producing

munition, the rounds fired on the grenade launcher range are training practice rounds which produce only a puff of smoke when it hits the target or ground.

Installations established prior to World War II (WW II) and those established at the outbreak of WW II, have seen many changes in terms of ranges on the installations. These changes were due to new weapons systems being fielded into the Army requiring new types of ranges to be constructed to meet the training needs. The increased lethality and increased range of the weapons systems also drove the Army to construct new ranges on installations. The introduction of new weapons systems with greater lethality and range has constantly changed since the end of WW II.

Technology has advanced rapidly since the end of WW II and this rapidly changing technology has also impacted how the Army trains. It has exponentially expanded the battle space the ground maneuver brigade will operate on in Full Spectrum Operations (FSO) (conventional warfare). During WW II, when the Army established many of its current installations, a maneuver brigade could be expected to operate in an area 8 kilometers in width and 12 kilometers in depth. The Army's training doctrine dictates that units train as they would fight, consequently, for training on the installation the maneuver brigade would need an area the same size to train on at home station. During the 1st Gulf War (Desert Storm and Desert Shield), the brigade maneuver area had expanded to 20 kilometers in width and 50 kilometers in depth. This made the availability of training space on the installation at a premium.

With training space limited on installations and the range and lethality of weapons systems increasing, the Army made a conscious decision to construct new ranges on top of outdated, inactive ranges. By doing this the Army was able to meet its live fire training requirements as well as not encroach into the existing training lands on the installation. The creation of new ranges in a range complex would require the creation of duded or non-duded impact areas which would require the Army to take valuable maneuver training lands away from its intended purpose. This construction of new ranges on outdated ranges that can no longer meet the training requirements of advanced weapons systems has become common practice on installations.

4.5.3.2 Present Actions

The Army has undergone and continues to undergo a series of changes that have impacted virtually every Army installation. The actions in the ensuing paragraphs have had a major impact on Army installations and have resulted on more forces being stationed on installations in the United States.

Transformation

The Army is in a period of critical transition. On 12 October, 1999, the Secretary of the Army and the Army's Chief of Staff presented a vision for the Transformation of the Army to ensure it remained an effective and relevant operational force in the 21st Century. The leadership of the Army recognized the emerging need to shift away from a Cold War focus to meet new unconventional threats to national security. A decision was made to begin the 30 year process of transforming the Army; this was described in the 2002 Record of Decision for the PEIS for Army Transformation. Since this decision, the Army has continuing to implement those actions that are needed to field a force that is best configured to meet the evolving national security and defense requirements of the 21st century.

BRAC 2005

The BRAC 2005 realignments and closures were designed to provide the necessary infrastructure to support Army Transformation, including GDPR, the ACP, and conversion to a modular force structure. Through the current 2005 BRAC actions, the Army is transitioning from a force capable of countering Cold War-era threats to one that is responsive to a broad range of contingency threats that represent a range of security threats facing the nation today.

BRAC directed the closure of 13 active facilities and the realignment of 53 active facilities. Objectives of BRAC include optimizing military value, advancing the Army Modular Force (AMF) conversion, accommodating the re-stationing of overseas units, enabling the Transformation of both the active and reserve components, adjusting the force structure, and furthering the Army's ability to conduct joint operations. The BRAC Commission recommended the closure of specific Army installations and also directed the realignment of Army units from one home installation to another. The Army staff and Secretariat have a mandatory duty to implement these actions and they are thus considered part of the existing baseline.

Global Defense Posture Realignment

In the past, the Army has depended on its forward based presence in the Pacific and Europe to project power and undertake military actions overseas. The Quadrennial Review (QDR) provided guidance for service Transformation. The Army responded by moving to a joint (multi-service) and expeditionary force to meet the projected future needs for the Department of Defense. Under GDPR, the Army relocated 44,500 Soldiers back to the U.S. between 2004 and 2011.

Although the U.S. will retain transformed, forward-positioned forces in Europe and Korea, most Soldiers and their units have been realigned onto Army installations in the U.S. This realignment has created a greater demand on training ranges and facilities at these installations. This strategy will enable the Army to restructure in a manner that enhances the efficiency and effectiveness of response to emerging threats.

Grow the Army

In his 2007 assessment of the disposition of the Army, the Chief of Staff of the Army's (CSA) states the following:

"The need for Army growth is driven by the fact that the current operational demand is greater than the Army's sustainable supply of forces. Because of shortages in people, equipment and time to train, the non-deployed force does not meet readiness goals. As a result, the Army lacks strategic depth to respond to new contingencies, and generating forces to meet demands, which results in short term stress and long term institutional risk. These are symptoms of a larger strategic problem: the Army's strategic requirements and resources are not in balance." (General Casey, Chief of Staff of the Army [Army Initiative Charter, April 2007])

As a result of the imbalance between current mission requirements and available forces, the Army defined the growth and restructuring to meet the greater demands of the current security environment as its top priority (CSA, 2007). The National Security Strategy (NSS) and National Defense Strategy (NDS) provide a framework which directs Army mission requirements and contingency planning. The Army must be able to meet the nation's security and defense policy objectives as defined in these documents while continuing to implement recommendations for Army Transformation as defined in the QDR in 2001 and 2006.

In 2007 the Army made a decision as part of the Grow the Army Record of Decision to align its ground forces into an optimally configured force of appropriate sustainable size that is capable of meeting the current and future projected demands and requirements of national security and defense. In its end state this force will enable the Army to achieve balance between mission requirements, operational tempo, home station training and Soldier and Family quality of life while supporting the Army's intent to maintain a high quality all-volunteer force.

This initiative, coupled with GDPR and modularity, changed the structure of the force and increase the numbers of units on installations in the United States.

Range Modernization

The above actions required the Army to increase the number of firing ranges on installations and to modernize outdated, no longer usable for training ranges. The Army Range Modernization Program, established in the late 1990s, is a programmatic attempt to upgrade all outdated ranges to the modern suite of ranges needed to train Soldiers and units to meet their modern Warfighting training requirements. As with past actions, the focus for the construction of modernized ranges has been on constructing modernized ranges on the outdated ranges. This range modernization has impacted virtually every Army installation in the recent past and continues to impact installations as ranges in the Army Master Range Plan (AMRP) are being constructed. The range modernization to satisfy the training requirements of the above Army actions will continue through 2017.

4.5.3.3 Reasonably Foreseeable Future Actions

The current suite of modernized ranges once constructed will continue to be utilized until new weapons systems requiring new ranges are fielded. The current range modernization program will continue on installations well into the future.

Technology will advance rapidly. New weapons systems will be developed to replace current weapons systems. Weapons systems, both ground systems and aerial systems will consist of both manned and unmanned platforms. Technological advances have the potential to change the total inventory of weapons systems used on installations. As technology advances, for example, the use of lasers, the potential for laser individual and crew served weapons being fielded to units is great. As new weapons systems are fielded, range modernization will remain a constant effort on installations.

The heavy training load on the installations, to include the use of active component ranges by the Reserve Component on weekends and during their annual summer training cycle, will continue well into the future and the ranges on installations will be in continuous use, 7 days a week.

New modern ranges will continue to be constructed on outdated ranges. With cantonment areas space being built out to accommodate the facilities required to support the new units stationed on installations, there will be a push to expand the cantonment areas into the current training areas and potentially in the vicinity of live firing ranges.

Many Army installations are already experiencing encroachment from civilian communities building right up to the installation boundary. Light encroachment from these communities will cause night light encroachment and impact how the Army trains with night vision devices to include firing on live fire training ranges. With housing developments growing across the installation boundary, in many cases adjacent to live firing ranges, noise complaints due to live fire range training from the civilian community could be expected to increase.

The Army is expected to greatly reduce the total number of active duty Soldiers in the near future. This decrease may reduce the need for duplicative ranges at certain installations, but would not reduce the need to modernize existing, outdated ranges.

4.5.4 Air Quality

The potential impact on air quality is the particulate (dust) and emissions from vehicle exhaust generated during earth-moving operations of range construction. These are minor, temporary and localized direct effects of range construction. Increases in population on the installation, or within the local community would likely cause increased vehicle use and accordingly, vehicle emissions. As a short-term, localized effect modernizing an Army training range, along with the other reasonably foreseeable future actions would not have a significant cumulative impact on regional air quality.

4.5.5 Cultural Resources

Under this PEA, ranges would be constructed on previously disturbed ground, as defined herein as ground previously used as a range. However, disturbed ground does not preclude the installation's responsibilities under Section 106 of the NHPA. As discussed in Section 4.3.2.3, installations are responsible for completing the Section 106 process for the development of those ranges under the PEA. BMPs and the use of an ICRMP do not replace the regulatory requirement under this regulation. Each site must be evaluated and considered for its potential for cultural resources prior to implementation of range construction. If NHPA consultation is completed for these actions, and appropriate mitigation identified when the installation determines that the construction of the range will constitute an adverse effect in accordance with 36CFR800.5(1), the construction and operation of ranges on previously disturbed ground will not have a significant cumulative effect on cultural resources.

4.5.6 Facilities and Infrastructure

Modernizing and operating a range would have little or no direct effect on an installation's facilities and infrastructure. Army ranges require a minimal level of utilities and infrastructure resources. Modernizing and operating an Army range would have no significant cumulative effect on an installation's utilities, facilities and infrastructure.

4.5.7 Hazardous Materials/Waste

Hazardous materials, when not properly transported, stored, or disposed, could adversely affect human health and the environment. This risk can be mitigated by the installation and regular maintenance of best management practices (BMPs) to prevent soil erosion on a range. Such BMPs are identified in detail in the "Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual" (Fabian and Watts, 2005), and in the document, "Lead Migration and Erosion from Small Arms Ranges" (U.S. Army Environmental Center, 1998). Other on-site measures have been successfully demonstrated to reduce lead concentration in stormwater runoff (Fabian, et al, 2009). Installation, operation, and regular maintenance of such measures will reduce the risk of erosion from the proposed range construction, as well as from other ranges constructed at the same installation. Proper design, installation and sustained maintenance of best management practices to reduce lead and metals migration will preclude lead and metals migration from having a significant effect on the environment and human health.

4.5.8 Land Use

Operating a weapons-firing range may affect land use of adjoining ranges resulting from expansion of the safety danger zone into another range, limiting the availability of nearby or adjoining ranges or maneuver areas. Care must be taken to ensure the potential safety danger zone of any potential new range does not affect the safety of individual Soldiers and units using a range constructed and operated under the proposed action. Modernizing and operating a range within an installation's training area would not affect land use.

4.5.9 Natural Resources

Constructing an Army training range can have some effects on natural resources, both flora and fauna. This would be the result of large-scale earth moving that may cause a loss of vegetation and loss of habitat, or cause some wildlife species to relocate to an area outside the range's safety danger zone. Construction or major renovation of other ranges on the installation could cause similar impacts within the installation's training range complex. Cumulatively, similar impacts from constructing ranges on the installation would have a less than significant impact on natural resources.

4.5.10 Noise

Noise generated during range construction is localized to the range area, limited to daylight hours on weekdays for the duration of the construction period. Noise from construction vehicles at the range would not create a significant cumulative effect.

Noise generated during range operation could occur during either daylight or evening hours on both weekdays and weekends. Historically, weapons firing ranges have been located in remote portions of the installation's training areas, at some distance from sensitive land uses. Noise from the range could have a minor to moderate cumulative effect on the installation or surrounding community. Simultaneous weapons firing on other ranges would have moderate, but less than significant effect on noise.

4.5.11 Soils and Topography

Modernizing an Army training range can have some impacts on soils and topography resulting from large-scale earth moving. Earth moving and construction projects routinely require preparing and implementing soil erosion control plans, and in some cases, compliance with National Pollution Discharge Elimination Program (NPDES) permits. Compliance with these requirements and use of BMPs can reduce or eliminate the risk of soil erosion from constructing and operating an Army training range. Other earth-moving or construction projects on the installation, and adjoining privately-owned land would have similar regulatory requirements to reduce/prevent erosion. Broad enforcement of soil erosion control regulations and NPDES permits, and implementation of soil erosion control BMPs reduce/eliminate the effect of soil erosion on the environment. Modernizing and operating an Army range, with soil erosion control measures discussed above, would not have a significant cumulative impact on human health or the environment.

4.5.12 Solid Waste

Constructing and operating an Army training range would have minimal impact on solid waste on most installations. There could be additional solid waste generated from either construction

and/or renovation of installation facilities, or a significant increase to the installation's population. While those, or similar events may add to the installation's total volume of solid waste generated, the solid waste from range construction would be a minimal contribution to the installation's total volume of solid waste. Range construction and operation would not have a significant cumulative impact on solid waste, and the other reasonably foreseeable actions would not affect, or be affected by, the proposed action.

4.5.13 Threatened and Endangered Species

Modernizing and operating an Army training range can affect threatened and endangered species by an action that causes direct harm, or otherwise affects the species' eating, breeding or nesting habits. While constructing ranges sometimes involves land clearing activities, in most cases the land has already been disturbed.

Modernizing and operating an Army training range could affect a threatened or endangered species if the range were cited such that construction or operation harmed the species or its habitat. The Army's policies and programs on planning and designing ranges recognizes the Army's legal and moral obligation to protect these species, and aggressively plans and designs ranges to avoid impacts on T&E species. This includes avoiding direct and indirect harm. Evidence from other range construction NEPA documents reaffirm that constructing and operating Army ranges has minimal impact on T&E species. The Army's planning, design and maintenance policies and programs contribute to the overall protection and safety of T&E species. Modernizing and operating an Army range would have minimal cumulative effect on T&E species.

4.5.14 Water Resources

One of the largest potential impacts on water resources is the sedimentation caused by soil erosion. This increases turbidity, which has a negative impact on aquatic life. Constructing a range can have minimal effect on water resources if soil erosion BMPs are implemented and maintained for the duration of the construction period and until sufficient vegetative cover has been established. There could be cumulative effects on surface waters contributed by soil erosion from other land-disturbing activities within the regional watershed. The risk to surface water and groundwater resources is minimized by implementing and maintaining BMPs to control soil erosion. Range modernization and operation would not have a significant cumulative effect on water resources.

Range construction would not routinely generate a large quantity of impervious surface that would create a significant contribution to stormwater runoff (see Section 3.3.10.3). Training ranges on Army installations have relatively small quantities of impervious surface area. Range modernization and operation would not have a significant cumulative effect on stormwater runoff.

4.5.15 Wetlands

Constructing and operating an Army training range can impact a wetlands area if site selection requires filling a range and mitigating that effect with enhancing or developing new wetlands (Fort Drum, 1996). Any effect on wetlands from a federal action would require coordination with, and a Section 404 permit (under the Clean Water Act) issued by the U.S. Army Corps of Engineers, which regulates effects on wetlands in the United States. The highly regulated nature of wetlands management would preclude significant negative effect on that ecosystem. Implementation of soil erosion control plans, compliance with NPDES permits and implementation and sustained

maintenance of soil erosion best management practices can avoid cumulative significant effects on wetlands.

4.5.16 Conclusion

Based on this analysis, the preferred alternative would not result in significant impacts. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant cumulative impacts.

SECTION 5 SUMMARY AND CONCLUSIONS

This PEA reviewed and analyzed 17 Environmental Assessments (EAs) that were prepared before constructing and operating training ranges at Army installations in the U.S. These EAs evaluated the potential effects of constructing a training range on previously disturbed ground that was currently, or had previously had been, used for a military training range. The EAs had been uploaded on the U.S. Army Environmental Command's NEPA repository, and identified through a database search using the keyword, "range." The EAs analyzed the potential environmental effects of constructing and operating 20 different types of Army training ranges at installations in the U.S. Table B.1 (Appendix B) provides a matrix of the types of ranges constructed at the various installations in the U.S. that were included for analysis in this PEA.

This PEA considered six alternatives, four of which were dismissed as not practical and not achieving the purpose and need. The alternatives carried forward for consideration in this PEA were to:

(1) **Construct modern ranges involving construction on 40 acres or less on Army installations on previously disturbed ground, based on this PEA.** The 20 ranges are identified in Table 1. This alternative includes using a programmatic NEPA approach, allowing each range construction project to tier from this Programmatic Environmental Assessment (PEA). This is the preferred alternative.

(2) **The No Action Alternative.** Under this proposal, the Army would continue conducting required environmental analysis on an individual basis.

Alternative (1) is the preferred alternative. The No Action Alternative is to continue conducting environmental analyses under NEPA for every range construction project is redundant and adds substantial time and cost to the range construction process. The potential environmental effects of alternatives (1) and (2) will be the same.

This PEA can serve as the environmental analysis under NEPA for the ranges listed in Table 1 when the proposed construction involves approximately 40 acres or less on previously disturbed ground. Previously disturbed ground, for the purposes of this document is a site that was or currently is being used as an Army training range. This PEA may not be used to meet the requirements of NEPA for ranges other than those listed in Table 1 or for any range proposed for a site that is not previously disturbed.

The anticipated effects of constructing and operating a variety of Army training ranges identified from the 17 EAs analyzed in this document are tabulated in Table B.2, Appendix B. From the analysis of those site-specific and range-specific EAs, this PEA draws the following conclusions about modernizing and operating an Army training range on previously disturbed ground in a training area:

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Several installations anticipated some minor impact from hazardous waste and/or hazardous material, largely due to the potential risk of petroleum fluids leaked or spilled from heavy construction equipment. This issue was addressed by ensuring the installation implemented and followed its Spill Prevention, Control, and Countermeasures Plan, and met the requirements of National Pollution Discharge Elimination System permits. Other research indicates the presence of metals from spent ammunition can accumulate in the soil on a range, and under certain soil conditions can migrate off a range area into surface waters and/or wetlands areas. The Army has identified a number of engineering solutions and best management practices that can be incorporated into range design and operating procedures to minimize or control erosion from training ranges. These engineering solutions and BMPs can mitigate this issue and reduce the risk of lead and other metals from migrating into surface waters or wetlands areas: they are discussed in detail in Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian and Watts, 2005), and Prevention of Lead Migration and Erosion from Small Arms Ranges (U.S. Army Environmental Center, 1998). Therefore, impacts from hazardous wastes and/or hazardous materials from the preferred alternative are expected to be less than significant.

Implementing the preferred alternative would have no effect on energy, environmental justice, facilities and infrastructure and protection of children. Minor, beneficial, short-term effects to socioeconomics were expected from salaries and purchase of supplies to construct the range.

There were no effects or minimal adverse effects on airspace at installations where installations have established Special Use Airspace that encompasses the installation's range and training areas.

Minor, short-term localized adverse effect on air quality was largely due to air emissions generated by heavy construction equipment, and from dust generated during earth-moving operations associated with constructing a range. These effects would be limited to daylight hours on weekdays for the duration of range construction.

Modernizing and operating a range on previously disturbed ground would have minimal impact on historic or cultural resources since the land had been disturbed from constructing and operating the existing range.

Modernizing and operating an Army training range was anticipated to have minimal effect on land use. New ranges were being constructed on disturbed ground from older ranges within the land area designated for live-fire training on an Army installation. There was no change in land use and the new range would not affect the use of adjoining land.

Modernizing and operating an Army range was anticipated to have minimal effect on noise. There would be some noise generated from construction equipment, particularly large earth-moving machinery, but would be localized and occur only during daylight hours for the duration of construction. Other potential noise issues would be the result of weapon-firing, which would occur during both daylight and evening hours

Modernizing an Army range was anticipated to have minimal effect on solid waste. Construction of the small range support facilities (e.g., ammunition breakout building, general storage building, and aerated vault latrine) would generate minimal construction debris. Operating an Army range was anticipated to have minimal effect on solid waste. Brass cartridges and ammunition links are commonly recycled and the minimal solid waste generated on the range is routinely collected and disposed of by the using unit.

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The potential effects on threatened or endangered species were anticipated to be minimal, and reflect the fact that the proposed ranges would be constructed on previously disturbed ground. Range construction at some installations caused the loss of some habitat, but the loss was minor compared to the overall size of the habitat in the rest of the training area.

Some potential impact on water resources, to include wetlands could be the result of sediment caused by soil erosion. As addressed earlier, the potential impact of soil erosion would be mitigated by employing BMPs. For example, Fort Drum expected a moderate impact due to the loss of 37 acres of wetlands to construct a range, but that loss was minor in the context of the installation's wetlands inventory; the loss of 37 acres of wetlands was 0.1 percent of the installation's wetlands inventory.

The issue of visual resources was largely omitted from evaluation in Army range Environmental Assessments. Overall, Army ranges are constructed within an area dedicated to weapons firing and cross-country movement of tactical vehicles, and there is little or minor impacts on visual resources.

When considering other past, present, and reasonably foreseeable future actions, the EAs reviewed and analyzed for this Programmatic EA determined that cumulative adverse effects of constructing a range on the land previously used for an Army range, would be minor.

Review and analysis of the 17 EAs prepared for constructing ranges on U.S. Army training areas, and other research determined that overall modernizing and operating a weapons training range on land previously used for the same purpose would not have significant effects on human health and the environment. However, research determined that metals, such as lead, from spent ammunition can migrate from the range and could affect surface water and wetlands ecosystems. Research, and field tests determined that application of sound design principles, use and maintenance of best management practices and operational procedures can contain and limit the migration of metals from Army training ranges.

The preferred alternative would not result in exceedance of the threshold levels of significance for the Valued Environmental Components analyzed within this PEA. In other words, the preferred alternative would result in less than significant environmental impacts. Use of the REC Checklist will ensure that no unusual circumstances exist that would result in significant impacts.

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SECTION 7 ACRONYMS AND ABBREVIATIONS

A	amp or ampere
ac	alternating current
AAR	after action review
AC	acres
ADNL	A-weighted day-night average sound level.
AEI	Architectural Engineering Institute
AFF	Automated Field Fire
AHPA	Archeological and Historic Preservation Act
AIRFAA	American Indian Religious Freedom Act
AMP	ampere
AR	Army Regulation
ASEL	A-weighted sound exposure level
BMP	best management practice
CAA	Clean Air Act
CAAA-90	Clean Air Act Amendments 1990
CACTF	Combined Arms Collective Training Facility
CDNL	C-weighted day-night average sound level
CEA	cumulative effects analysis
CEQ	Council on Environmental Quality
CFA	controlled firing areas
CFR	Code of Federal Regulations
CMU	concrete masonry unit (concrete block or cement block)
CNPS	California Native Plant Society
CPQC	Combat Pistol Qualification Course
DA PAM	Department of the Army Pamphlet
dB	decibel. Common measure of sound levels.
DNL	day-night average sound level
DOD	Department of Defense
DPW	Directorate of Public Works
DTR	Data Termination Rack
EA	Environmental Assessment
EISA	Energy Independence and Security Act
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESMC	Endangered Species Management Component (of the Integrated Natural Resource Management Plan)
FAA	Federal Aviation Administration
FCC	Facility Category Code
FFS	frosted flatwoods salamander
FM	Field Manual
FP	firing point

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GFCI	ground fault circuit interrupter
GIS	Geographic Information Systems
HAP	Hazardous Air Pollutants
HMU	habitat management unit
HPP	Historic Preservation Plan
HQDA	Headquarters, Department of the Army
HVAC	heating ventilation and air conditioning
ICRMP	Integrated Cultural Resource Management Plan
IFR	instrument flight rules
INRMP	Integrated Natural Resource Management Plan
IPBC	Infantry Platoon Battle Course
ISBC	Infantry Squad Battle Course
ITAM	Integrated Training Area Management
LN	lane
LOS	A quantitative measure describing operational conditions within a traffic stream, based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions and convenience. LOS is graded on a letter scale from A to F, A being the highest level of service and F being the lowest. At LOS A traffic flows freely, selecting desired speeds with ample passing opportunities. At LOS F traffic flow is forced and the traffic volume has exceeded the capacity of the roadway.
LRAM	Land Rehabilitation and Maintenance
LUPZ	land use planning zone
MBTA	Migratory Bird Treaty Act
MCL	maximum contamination level
MDP	Master Data Panel
MFR	Memorandum for Record
mm	millimeter
MOA	Military Operations Areas (a category of Special Use Airspace)
MOUT	Military Operations on Urbanized Terrain
MP	Military Police
MRF	Modified Record Fire
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NEPA	National Environmental Policy Act
NESHAP	national Emission Standards for Hazardous Air Pollutants
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NIC	Night Infiltration Course
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NSA	National Security Area (a category of Special Use Airspace)
NWI	National Wetlands Inventory
PEA	Programmatic Environmental Assessment
PM ₁₀	Particulate matter of 10 micrometers or less

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PM _{2.5}	Particulate matter of 2.5 micrometers or less
PP	power panel
QTR	Qualification Training Range
RCI	Residential Communities Initiative
RCS	Range Control Station
RCW	red cockaded woodpecker
REC	Record of Environmental Consideration
ROCA	range operations control area
RTLA	Range and Training Land Assessment
SARA	Superfund Amendments and Reauthorization Act of 1986
SARSA	small arms range safety area
SDZ	surface danger zone
sf	square feet
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SRA	Sustainable Range Awareness
SRP	Sustainable Range Program
SUA	Special Use Airspace
T&E	threatened and endangered
TC	Training Circular
TNT	Tri-nitro toluene (chemical name for an explosive)
TRADOC	Training and Doctrine Command
TRI	Training Requirements Integration
TSCA	Toxic Substances Control Act
UAC	Urban Assault Course
UFC	Uniform Facility Code
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
µg/L	micrograms per liter
V	volt
VEC	valued environmental component
VFR	visual flight rules
VOC	volatile organic compounds

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**APPENDIX A
RECORD OF ENVIRONMENTAL CONSIDERATION (REC)
CHECKLIST AND
PRELIMINARY EVALUATION**

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

This checklist is intended to provide a framework for identifying any NEPA requirements beyond this PEA for the constructing, or major renovation, and operating a training range at an Army installation in the United States. This checklist also will certify that both the installation staff and proponent understand and support the requirements and discussions in this PEA, particularly the site conditions, the proposed action, and any required mitigations. If the conditions of the checklist in this Appendix are met, and if the procedures and mitigations are adopted by the installation proponent, a Record of Environmental Consideration (REC) may be prepared, referencing this PEA, and construction can proceed.

If some checklist conditions are not met, the installation does not adopt the provisions of this PEA, or the installation environmental office finds this PEA inadequate, a separate EA will be required. That EA will culminate in either a separate Finding of No Significant Impact (FNSI), or if significant effects are identified a Notice of Intent (NOI) to prepare an Environmental Impact Statement.

The considerations in this PEA, and the REC checklist are comprehensive, but may not be sufficiently exhaustive to address site-specific conditions at every installation. For this reason, the installation's environmental staff must review this PEA, evaluate the checklist conditions and requirements, and determine the appropriate course of action. If an EA is required it can supplement this PEA, addressing only those topics or issues that require further evaluation.

To use the attached checklist to evaluate the proposed action, answer each question with a "yes," "no," or "N/A" as appropriate. Address each question. Use the "Response Documentation" column for any comments pertaining to the Proposed Action, or identify existing programs or BMPs, regulations or policies that mitigate an issue identified in the questionnaire. Any questions regarding completion of this checklist should be directed to the installation environmental staff. Document any outside coordination and describe all BMPs or other mitigating actions.

Installations may vary signatories for the Memorandum for Record (MFR) at their discretion, but it is recommended that at a minimum, signatories should include the Director of Plans, Training Mobilization and Security (DPTMS) and the Director of Public Works (DPW).

Edit the MFR to meet installation- or project- specific requirements. For the project description, recommend using established range project descriptions, such as those available in the *Army Range New Construction National Environmental Policy Act (NEPA) Document Templates*, (U.S. Army Environmental Command, 2008) (Available on the Internet at <http://aec.army.mil/usaec/nepa/nepadoctemplates.pdf>), and in TC 25-8, *Training Ranges* (U.S. Army, 2004b).

After completing this Record of Environmental Consideration, upload the MFR, the completed checklist, and other supporting documents onto the Army Environmental Command's NEPA Repository (<http://aec.army.mil/usaec/nepa/library/00.html>).

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

Use this draft MFR and checklist for each proposed range construction project.

OFFICE SYMBOL

DATE

MEMORANDUM FOR RECORD

SUBJECT: Evaluation, under the National Environmental Policy Act (NEPA), of constructing a [*specific range*] at [*installation name*].

1. Project Description: [*Identify the range being proposed, the support facilities, and the proposed location for the range. Recommend using text from TC 25-8 and/or Army Range NEPA Document Templates(USAEC, 2008) to provide a thorough description of the range and its purpose. Include a map(s) showing the proposed site and location of the range footprint at the proposed site*].
2. It has been determined that constructing [*specify proposed range and location*] as described above qualifies for a Record of Environmental Consideration, based on the evaluation of the criteria in the checklist attached because the issues requiring consideration under the National Environmental Policy Act are addressed in the Programmatic Environmental Assessment entitled, "Programmatic Environmental Assessment (PEA) for Constructing and Operating Training Ranges on Previous or Existing Range sites on Army Training Areas," Dated ____ 2010.
3. The following signatories certify their understanding of the PEA, the analyses therein, and certify compliance with the provisions and mitigations that are presented. This includes compliance of the procedures (BMPs and Standing Operating Procedures) that are specified, and the funding necessary to insure that the required mitigations will be implemented.
4. In accordance with 32 CFR 651.14(c)(2), this Record of Environmental Consideration (REC) appropriately documents consideration of all site-specific conditions for constructing the proposed range at the proposed site.

Name, signature, date: Director of Plans, Training, Mobilization and Security

Name, signature, date: Director of Public Works

Programmatic Environmental Assessment for Modernizing and Operating Training Ranges on Previous or Existing Range Sites on Army Training Areas

CATEGORY		Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
Compliance with this PEA			
1	The range proposed for construction under the purview of this PEA is one listed in Table 1 (page 3).		If no, the environmental analysis required under NEPA may not be tiered from this PEA. Initiate a separate NEPA action. If yes, continue to question #2.
2	The range proposed for construction under the purview of this PEA is being proposed for a previously disturbed site; defined as ground which is currently, or has been, used as a military training range.		If no, the environmental analysis required under NEPA may not be tiered from this PEA. Initiate a separate NEPA action. If yes, continue to question #3
3	The range proposed for construction under the purview of this PEA has a total estimated disturbed area of approximately 40 acres or less.		If no, the environmental analysis required under NEPA may not be tiered from this PEA. Initiate a separate NEPA action. If yes, continue to question #4.
Air Space			
4	The airspace above the proposed site for the range is classified as Special Use Airspace.		If No, identify potential mitigation actions. If the action cannot be mitigated, further analysis may be required. If yes, continue to question #5.
Air Quality			
5	Constructing the range would cause violation(s) of National Ambient Air Quality Standards (NAAQS).		If yes, further analysis, and coordination with air quality permitting authority may be required. If no, continue to question #6.

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6	Constructing the range would cause violation(s) of the installation's Title V Operating Permit		<p>If yes, further analysis, and coordination with air quality permitting authority may be required.</p> <p>If no, continue to question #7.</p>
7	Constructing the range would cause violation(s) of emission standards for Hazardous Air Pollutants at the installation or in the immediate surrounding area.		<p>If yes, further analysis, and coordination with air quality permitting authority may be required.</p> <p>If no, continue to question #8.</p>
Cultural Resources			
8	<p>Constructing or operating the range would alter the characteristics of a property that may qualify for inclusion on the National Register.</p> <ul style="list-style-type: none"> • Has the installation Cultural Resources Manager been notified of the action? • Has the SHPO, Federally-recognized Tribes (if applicable) been notified of the action and the installation's determination of effect as part of the NHPA Section 106 process? • Did the SHPO concur with the installation's determination of effect (no historic properties effected, no adverse effect, or adverse effect) as part of the above? 		<p>If yes, you may need to initiate formal consultation with the State Historic Preservation Officer (SHPO). Consultation with the SHPO may be necessary if a historic or cultural resource is within the range complex.</p> <p>If no continue to question #9</p>
9	<p>Constructing or operating the range would:</p> <ul style="list-style-type: none"> • Cause physical destruction, damage or alteration to all or part of the property • Introduce visual, audible or atmospheric elements that are out of character with the property or alter its setting • Violate the provision of ARPA or NAGPRA 		<p>If yes, you may need to initiate formal consultation with the State Historic Preservation Officer (SHPO). Consultation with the SHPO may be necessary if a historic or cultural resource is within the range complex.</p> <p>If no, continue to question #10.</p>

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Facilities and Infrastructure			
10	Constructing or operating the range would create a need for major expansion, substantial alteration or relocation of an existing utility system or require constructing or major expansion of installation facilities to support the proposed action.		<p>If yes, a more detailed analysis of facilities and infrastructure may be required.</p> <p>If no, continue to question 11.</p>
Hazardous Waste & Hazardous Material			
11	Constructing or operating the range would cause the storage, use, transport or disposal of hazardous materials to increase risk to human health the environment.		<p>If yes, initiate preliminary survey. Further analysis may be required.</p> <p>If no, continue to question #12.</p>
12	Constructing or operating the range would cause the installation to violate laws or regulations governing hazardous material/waste management and/or violate the installation's hazardous waste permit.		<p>If yes, coordinate with installation hazardous waste management specialists and state regulator as necessary</p> <p>If no, continue to question # 13.</p>
Hazardous Waste and Hazardous Material			
13	The installation has installed and has a maintenance program to ensure BMPs to reduce, to the maximum extent possible, migration of lead and other metals from the range.		<p>If no, implement BMP analysis protocol outlined in Army Small Arms Training Range Environmental Best Management Practices (BMPs) Manual (Fabian & Watts, 2005). <u>Strongly recommend</u> documenting the engineering measures and BMPs being implemented.</p> <p>If yes, specify implemented BMPs; continue to question #14.</p>
Land Use			
14	Constructing & operating the range would alter existing land use as to cause severe incompatibility with adjacent land uses.		<p>If yes, evaluate adjacent land uses or consider an alternate site.</p> <p>If no, continue to question #15.</p>

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15	Constructing & operating the range would cause significant changes to existing or regional land use.		If yes, evaluate adjacent land uses or consider an alternate site. If no, continue to question #16.
Natural Resources			
16	Constructing the range(s) would cause fragmentation, loss or degradation of high quality natural areas or sensitive sites.		If yes, initiate preliminary survey. Further analysis may be required. If no, continue to question #17.
17	Constructing the range would cause local destruction of rare or sensitive plant species		If yes, initiate preliminary survey. Further analysis may be required. If no, continue to question #18.
18	Constructing the range would cause local population impacts on local flora or fauna.		If yes, make necessary revisions. If no, continue to question #19.
19	Constructing the range would cause long term loss or impairment of local habitat.		If yes, make necessary revisions. If no, continue to question #20.
Noise			
20	Noise from constructing or operating the range would exceed the standard for noise levels in Land Use Planning Zones (See Table 7 of the PEA).		If yes, initiate further analysis to determine noise contours and identify potential mitigations. If no, continue to question #21.
21	Noise caused from construction would result in an hourly sound level of 75 dBA at a sensitive receptor.		If yes, recommend contacting the installation natural resource specialist and state natural resource agency as appropriate. If no, continue to question #22.

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22	Is there a sensitive noise receptor (hospital, school, church, day care facility, etc.) located within 500 meters of the small arms range site or within 1,000 meters of a grenade familiarization range?		<p>If yes, recommend that noise contours be developed for the range.</p> <p>If no, continue to question # 23</p>
Soils, Geology and Topography			
23	Constructing or operating the range would cause a substantial increase in soil compaction resulting in decreased re-vegetation potential.		<p>If yes, contact the installation environmental office and consult with the Natural Resources Conservation Service as needed.</p> <p>If no, continue to question #24.</p>
24	Constructing or operating the range would cause a substantial increase in soil erosion and/or loss of productivity due to soil mineral leaching.		<p>If yes, contact the installation environmental office and consult with the Natural Resources Conservation Service as needed. Incorporate and document soil erosion control BMPs as needed.</p> <p>If no, continue to question #25.</p>
25	Constructing or operating the range would cause a decrease of a unique soil type		<p>If yes, contact the installation environmental office and consult with the Natural Resources Conservation Service as needed.</p> <p>If no, continue to question #26.</p>
26	Does the proposed action require either, or both a soil erosion control plan and an NPDES permit for the construction process?		<p>If yes, coordinate with the appropriate regulating authority to obtain the NPDES permit and submit the soil erosion control plan for review and approval.</p> <p>If No, continue to question #27</p>

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CATEGORY		Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
Solid Waste			
27	Constructing and operating the range would have a substantial, long-term changes to solid waste management practices		If yes, initiate preliminary survey. Further analysis may be required. If no, continue to question #28.
28	Constructing and operating the range would create an increased risk for the installation to violate local or state solid waste management regulations.		If yes, initiate preliminary survey. Further analysis may be required. If no, continue to question #29.
Threatened and Endangered Species			
29	Constructing or operating the range would cause permanent loss of habitat to a level below that required to achieve long-term species recovery.		If yes, Section 7 Consultation with the U.S. Fish and Wildlife Service may be required. If no, continue to question #30.
30	Constructing or operating the range would violate conditions in a biological opinion.		If yes, Section 7 Consultation with the U.S. Fish and Wildlife Service may be required. If no, continue to question #31.
31	Constructing or operating the range would have direct impacts or disturbance to candidate species for federal or state listing.		If yes, Section 7 Consultation with the U.S. Fish and Wildlife Service may be required. If no, continue to question #32.
32	Constructing or operating the range would cause an unpermitted "take" of a federally-listed species or loss of designated critical habitat.		If yes, Section 7 Consultation with the U.S. Fish and Wildlife Service may be required. If no, continue to question #33.
CATEGORY		Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
Traffic and Transportation			
33	The proposed action would cause an increase in traffic volume that would reduce the level of service (LOS) to LOS E or F.		If yes, initiate further analysis, coordinate with the proponents of the other action(s); conduct further analysis as needed. If no, continue to question #34.

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Water Resources			
34	Constructing or operating the range causes an unpermitted deposition of sediment into wetlands or other "Waters of the U.S."		If yes, initiate further analysis, coordinate with the proponents of the other action(s); conduct further analysis as needed. If no, continue to question #35
35	Constructing or operating the range causes a violation of a state water quality regulation or a state or federal discharge permit		If yes, initiate further analysis, coordinate with the proponents of the other action(s); conduct further analysis as needed. If no, continue to question #36.
36	The proposed range would result in spent rounds landing in a surface water body (e.g., stream, creek, pond, lake).		If yes, either (1) revise range siting or (2) develop a mitigation by design to eliminate risk of rounds landing in a water resource. If no, continue to question #37.
37	Do site characteristics of the range and proximity to surface waters potentially allow for migration of lead or other MC into surface waters?		If yes, either revise the range siting or initiate further analysis as needed. If no, continue to questions 38.
Wetlands			
38	The proposed range would result in spent rounds landing in known wetlands areas.		If yes, either (1) revise range siting or (2) develop mitigation by design to eliminate risk of rounds landing in wetlands. If no, continue to question #39.
	CATEGORY	Yes, No, N/A	RESPONSE DOCUMENTATION (as needed)
Socioeconomics			
40	Does noise or other range impacts disproportionately affect low income or minority populations?		If yes, initiate further analysis to determine whether or not and EA might be required. In no, continue to questions 41.
Cumulative Assessment			
41	Is a considerable amount of range construction, modernization, or upgrades of past, present, or reasonably foreseeable actions such that it would		If yes, consider additional analysis to take into these actions into account.

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	be unreasonable and that further disclosure/analysis would be warranted?		If no, and all previous answers (except #10) have been no, complete the requirements for a Record of Environmental Consideration in Accordance with Title 32 CFR Part 651.28, Subpart D. Enter the names, signatures and date of those providing input to this questionnaire on the following page.
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APPENDIX B
SUMMARY OF ARMY RANGE CONSTRUCTION
NEPA DOCUMENTS

This appendix provides a summary of NEPA documents prepared before construction, or major renovation, of a number of training ranges at Army installations in the U.S. Table B.1 (page B-3) is a matrix of the Army installations that have conducted environmental assessments associated with construction or major renovation of ranges. This table also serves as a table of contents for the summaries of Environmental Assessments prepared for range constructions that are included in this PEA.

Table B.2 (pages B-4 through B-6) is a matrix of the potential environmental effects of constructing Army training ranges, based on their published Environmental Assessment, for each range listed in Table B.1. The information in this table was derived from the Environmental Assessments prepared for each of the ranges listed.

The information following Table B.2 (pages B-8 through B-19) is a summary of each of Environmental Assessments that was prepared before construction of that training range(s) on an Army installation. Each of the EAs discussed is cited (e.g., Fort Carson, 2004), and each EA is fully cited in Section 7, References.

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Table B.1 Matrix of Range Environmental Assessments at Army Installations

Paragraph Number	Page	Installation	Range Type																				
			10m Machine Gun	25-m rifle zero	Anti-Armor Tracking	Breach Facility	CACTF	Combat Pistol	Grenade Launcher	Infantry Squad Battle Course	Infantry Platoon Battle Course	Known Distance Range	Military Operations in Urban Terrain (MOUT)	Modified Record Fire (MRF)	Multi-purpose Machine Gun	Night Infiltration Course (NIC)	Offense/Defense Station	Qualification Training Range (QTR)	Shoohouse	Small Arms, Shotgun	Standard Sniper Range	Trench, Live-Fire Course	Urban Assault Course (UAC)
B.1	B-7	Fort Carson, 2004				X	X																X
B.2	B-7	Fort Carson, 2005															X						
B.3	B-8	Fort Dix, 2002									X												
B.4	B-8	Fort Drum, 1996			X					X													
B.5	B-9	Fort Eustis, 1993																	X				
B.6	B-10	Fort Hood, 2004																X					X
B.7	B-10	Fort Hunter-Liggett, 2005									X							X					X
B.8	B-11	Fort Hunter-Liggett, 2006	X	X				X				X	X										
B.9	B-12	Fort Jackson, 2009										X		X									
B.10	B-12	Fort Polk, 2005					X																
B.11	B-12	Fort Riley, 2003				X	X									X		X					X
B.12	B-13	Fort Riley, 2005					X		X														
B.13	B-15	Fort Riley, 2007									X											X	
B.14	B-15	Fort Riley, 2008															X	X					
B.15	B-15	Fort Riley, 2009								X													
B.16	B-16	Fort Stewart, 2005																					X
B.17	B-17	Fort Stewart, 2009																			X		

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Table B.2 Matrix of Environmental Effects from Army Range Construction (p. 1 of 3).

Installation and year of Environmental Assessment	Range	Valued Environmental Component																				
		Air/poll	Air Quality	Cultural Resources	Energy	Environmental Justice	Facilities and Infrastructure	Hazardous Mat/Waste	Land Use	Infrastructure	Natural Resources	Noise	Safety of Children	Socioeconomics	Soils, Geology & Topography	Solid Waste	T&E Species	Traffic & Transportation	Water Resources	Wetlands	Visual Resources	Cumulative Effects
Carson, 2004	Breach Facility	○	⊗	○	N	○	N	○	○	N	○	⊗	○	○	⊗	N	⊗	N	○	○	N	○
Carson, 2004	CACTF	⊗	⊗	○	N	○	○	○	○	○	⊗	○	○	+	⊗	N	○	N	⊗	⊗	N	⊗
Carson, 2004	Urban Assault Course	○	⊗	○	N	○	N	○	○	N	○	⊗	○	○	⊗	N	⊗	N	○	○	N	⊗
Carson, 2005	Qualification Training Range	○	⊗	○	N	○	N	○	○	○	⊗	○	+	○	N	⊗	N	○	○	○	N	⊗
Dix, 2002	MOUT	⊗	⊗	○	N	○	○	+	⊗	⊗	⊗	⊗	○	+	⊗	○	⊗	N	⊗	N	N	⊗
Drum, 1996	Infantry Platoon Battle Course	N	○	○	○	N	○	N	○	○	⊗	⊗	N	○	⊗	○	⊗	○	⊗	⊗	N	⊗
Drum, 1996	Anti-Armor Tracking	N	○	○	○	N	○	N	○	○	⊗	⊗	N	○	⊗	○	○	⊗	⊗	⊗	N	⊗
Eustis, 1993	Small Arms	N	⊗	○	○	N	N	○	○	N	⊗	○	N	+	⊗	○	○	○	⊗	○	N	○
Hood, 2004	Shoohouse	N	⊗	○	N	○	○	⊗	○	○	⊗	⊗	N	+	⊗	○	○	○	⊗	○	⊗	⊗
Hood, 2004	Urban Assault Course	N	⊗	○	N	○	○	⊗	○	○	⊗	⊗	N	+	⊗	○	○	○	⊗	○	⊗	⊗
Hunter Liggett, 2005	MOUT	N	○	○	N	○	○	⊗	○	⊗	⊗	○	N	○	⊗	○	⊗	⊗	○	○	⊗	⊗
Hunter Liggett, 2005	Shoohouse	N	○	○	N	○	○	⊗	○	⊗	⊗	○	N	○	⊗	○	⊗	⊗	○	○	⊗	⊗
Hunter Liggett, 2005	Urban Assault Course	N	○	○	N	○	○	⊗	○	⊗	⊗	○	N	○	⊗	○	⊗	⊗	○	○	⊗	⊗

KEY			
○	No effect	⊗	Significant effect
⊗	Minimal effect	+	Positive effect
⊗	Moderate effect	N	Not evaluated

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Table B.2. Matrix of Environmental Effects from Army Range Construction (p. 2 of 3)

Installation	Range	Valued Environmental Component																				
		Air Quality	Air Quality	Cultural Resources	Energy	Environmental Justice	Facilities & Infrastructure	Hazardous Mat/Waste	Land Use	Infrastructure	Natural Resources	Noise	Safety of Children	Socioeconomics	Soils, Geology & Topography	Solid Waste	T&E Species	Traffic & Transportation	Water Resources	Wetlands	Visual Resources	Cumulative Effects
Hunter Liggett '06	Modified Record Fire	N	⊗	○	N	○	N	⊗	⊗	⊗	⊗	○	○	○	⊗	⊗	⊗	⊗	○	○	⊗	○
Hunter Liggett '06	10m Machine Gun Zero	N	⊗	○	N	○	N	⊗	⊗	⊗	⊗	○	○	○	⊗	⊗	⊗	⊗	○	○	⊗	○
Hunter Liggett '06	25 m Rifle Zero Range	N	⊗	○	N	○	N	⊗	⊗	⊗	⊗	○	○	○	⊗	⊗	⊗	⊗	○	○	⊗	○
Hunter Liggett '06	Combat Pistol	N	⊗	○	N	○	N	⊗	⊗	⊗	⊗	○	○	○	⊗	⊗	⊗	⊗	○	○	⊗	○
Hunter Liggett '06	Multi-Purpose Machine Gun	N	⊗	○	N	○	N	⊗	⊗	⊗	⊗	○	○	○	⊗	⊗	⊗	⊗	○	○	⊗	○
Jackson '09	Modified Record Fire	⊗	⊗	⊗	⊗	○	○	⊗	⊗	N	⊗	⊗	○	○	⊗	○	⊗	⊗	⊗	N	N	⊗
Jackson '09	Night Infiltration Course	⊗	⊗	⊗	⊗	○	○	⊗	⊗	N	⊗	⊗	○	○	⊗	○	⊗	⊗	⊗	N	N	⊗
Folk '05	CACTF	⊗	⊗	⊗	N	○	○	○	○	N	⊗	○	○	○	○	○	○	N	○	N	○	○
Riley '03	CACTF	N	⊗	○	N	○	○	○	○	○	⊗	○	N	+	⊗	○	○	○	⊗	○	N	⊗
Riley '03	Breach Facility	N	⊗	○	N	○	○	○	○	○	⊗	○	N	+	⊗	○	○	○	⊗	○	N	⊗
Riley '03	Offense/Defense Facility	N	⊗	○	N	○	○	○	○	○	⊗	○	N	+	⊗	○	○	○	⊗	○	N	⊗
Riley '03	Shoothouse	N	⊗	○	N	○	○	○	○	○	⊗	○	N	+	⊗	○	○	○	⊗	○	N	⊗
Riley '03	Urban Assault Course	N	⊗	○	N	○	○	○	○	○	⊗	○	N	+	⊗	○	○	○	⊗	○	N	⊗

KEY			
○	No effect	⊗	Significant effect
⊗	Minimal effect	+	Positive effect
⊗	Moderate effect	N	Not evaluated

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Table B.2. Matrix of Environmental Effects from Army Range Construction (p. 3 of 3)

Installation	Range	Valued Environmental Component																				
		Airpace	Air Quality	Cultural Resources	Energy	Environmental Justice	Facilities	Hazardous Mat (Waste)	Land Use	Infrastructure	Natural Resources	Noise	Safety of Children	Socioeconomics	Soils, Geology &	Solid Waste	T&E Species	Traffic & Transportation	Water Resources	Wetlands	Visual Resources	Cumulative Effects
Riley '05	Infantry Squad Battle Course	N	⊙	○	N	○	N	⊙	+	○	⊙	⊙	N	+	⊙	N	○	N	○	○	N	⊙
Riley '07	Trench Live-Fire Course	N	⊙	○	N	N	N	N	○	N	⊙	⊙	N	+	⊙	N	○	N	○	N	N	○
Riley '08	Qualification Training Course	N	⊙	○	N	N	N	⊙	N	○	⊙	⊙	N	+	⊙	N	○	N	○	N	N	○
Riley '08	Shoothouse	N	⊙	○	N	N	N	⊙	N	○	⊙	○	N	+	⊙	N	⊙	N	○	N	N	○
Riley '09	Known Distance Range	N	⊙	○	N	N	N	N	○	○	⊙	○	N	+	⊙	N	○	N	⊙	N	N	○
Stewart '05	Urban Assault Course	N	○	○	N	○	○	○	○	N	⊙	⊙	○	○	○	○	○	⊙	⊙	⊙	○	⊙
Stewart '09	Sniper Range	N	⊙	○	N	○	⊙	○	○	○	⊙	⊙	N	+	⊙	○	○	○	⊙	⊙	○	⊙

KEY			
○	No effect	⊙	Significant effect
⊙	Minimal effect	+	Positive effect
⊙	Moderate effect	N	Not evaluated

B.1 Fort Carson, Urban Assault Course, CACTF, Breach Facility

Fort Carson prepared an Environmental Assessment to construct two range facilities (Urban Assault Course (UAC) and a Breach Facility) in a single complex. The UAC encompassed Approximately 5 acres; the breach course approximately 2 acres. The Environmental Analysis determined there were virtually no impacts on the following areas: Safety to Children (Executive Order 13045), Environmental Justice (Executive Order 12898), geology and topography, land use, airspace, noise, hazardous waste/materials, and cultural resources. Constructing these ranges would not have adverse effects on soils beyond the construction sites. Impact on soils at the construction sites, specifically erosion, could be mitigated by use of accepted BMPs during construction and through the period when natural vegetation was restored. Spills of petroleum, oil, lubricants or any other hazardous substances could affect water resources. Military units are required to have appropriate spill response materials for types and quantities of hazardous materials they may transport, and any promptly clean up any spills. Spills greater than 5 gallons would be reported to Range Control who would notify the Fire Department for spill response. Effects on vegetation would be minimal, if even detectable. Constructing this range complex would have minimal, if even detectable impacts on wildlife. There would be no impact on either federally- or state-listed threatened or endangered species. Range construction or operations would have minimal impact on air quality. Fugitive dust would be a minor, short-term issue that could be mitigated by using standard BMPs. There would be short-term minor positive socio-economic impact related to constructing the range complex (Fort Carson, 2004).

B.2 Fort Carson, Colorado. Qualification Training Range

Fort Carson prepared an Environmental Assessment to upgrade Range #49 to construct a Qualification Training Range (QTR). This range upgrade would provide a single, modern range complex for small-arms training, which has been conducted at three separate ranges. The proposed action would disturb approximately 16 acres; much of this disturbance would be on soils already disturbed from former activities. Effects to native vegetation would be minimal and primarily confined to the 16-acre construction disturbance area; a small wetland in the impact area would be affected in a manner as it is similarly affected by small arms firing. Very small amounts of native habitat would be removed; this would not significantly affect wildlife species. There was potential for inadvertent mortality of wildlife from live-fire operations. Implementing the proposed action would result in either no significant adverse environmental consequences or temporary and relatively minor negative effects on each environmental area. Temporary, short-term beneficial effects were anticipated on socioeconomics from constructing the range. The affected environment would not be significantly or adversely effected by constructing the QTR on Range #49. No significant cumulative effects were expected (Fort Carson, 2005).

B.3 Fort Dix, New Jersey. MOUT training site

Fort Dix prepared an EA for constructing a MOUT training site. This involved clearing 20 acres of woods, constructing 25 buildings representing an urbanized area, improve 9,700 feet of existing roads with asphalt paving, constructing 2,400 feet of new asphalt paved roads, and supporting infrastructure and facilities. Supporting facilities included a latrine with septic system, a 7,800 square-foot after action review facility and control building and upgrade electrical and communication systems. The EA determined there would be no or minimal impact on geology, topography, groundwater, hazardous waste/material, solid waste, socioeconomics, recreation and community facilities, regional economic development, public health and safety, environmental justice, or protection of children. There would be temporary, short-term impacts on solid waste resulting from construction activities. The anticipated impact of noise would be minimized due to the site's distance from housing or noise-sensitive land use areas. Clearing of approximately 20 acres of

forested area would be mitigated by the installation's active reforestation program that has resulted in a net increase of forested area by approximately 1,000 acres. Wildlife in the area would be displaced, but there are large tracts of uninhabited areas on the installation. This action would occur outside the 300-foot transition zone of wetlands or surface water. There was an endangered species (Northern Pine Snake) at Fort Dix, but risk to the snake or its habitat was minimal due to the large quantity of habitat on the installation. Construction would cause temporary, short-term impacts to air quality. Increased use of military vehicles would cause long-term impacts due to the installation being in a non-attainment area for ozone (Fort Dix, 2002).

B.4 Fort Drum, New York. Infantry Platoon Battle Course, Anti-Armor Tracking Range

Fort Drum prepared an Environmental Assessment to construct an Infantry Platoon Battle Course on the site used as a Fire and Movement Range. Proposed range construction included constructing a control tower, latrine, general instruction/operations/storage building, ammunition breakdown building, enclosed bleacher, covered mess, parking area, helicopter pad, secondary power and electrical distribution system, information systems and general site improvements. Other facilities, outside the range complex include an extension of the site access road and extension of primary power and communication lines by approximately two miles.

Another proposed action in this EA was to construct an Anti-Armor Tracking and Live-Fire Range with 20 firing points. This range would be constructed on the site of an existing multipurpose machine gun range. There were no facilities on the site, requiring construction of additional facilities, such as: ammunition breakout facility, training equipment storage building, control tower, sanitary sewer, electric service, information systems, access road and parking area. The review of environmental media determined there would be no significant impacts on geology and soils, groundwater, aquatic life, air quality, vegetation, wildlife, threatened or endangered species, cultural resources, recreational facilities, transportation and communication facilities, infrastructure and utilities, medical care and emergency facilities, noise, or solid waste. Some minor impacts to wetlands and vegetation were expected due to construction activities. BMPs would be employed to minimize erosion and migration of soil sediment to surface waters and wetlands. Vegetation would be cleared for construction of firing lines, equipment storage buildings, target trenches, armor targets, roads and parking areas. Disturbed areas, less parking lots and roads, would be seeded. Wetland impact areas in Range 24 would not be significant and would require mitigation. Wetland areas on Range 37 will be mitigated under an Individual permit under Section 404 of the Clean Water Act (Fort Drum, 1996).

B.5 Fort Eustis, Virginia. Small Arms and shotgun range

Fort Eustis, Virginia prepared an EA for improving a small arms and shotgun firing range. The project involved demolition of existing wooden buildings on the range, collection of spent lead and copper, extend and re-shape the earthen berm around the range, and construction of three new ranges and a control tower. The range complex would have: (1) shotgun/stress range consisting of five lanes with positions at 3, 5, 7, 25, and 50 yards, and four stress course lanes with positions at the same distances; (2) Police firing range, consisting of 21 police lanes with positions at 3, 5, 7, 15, 25 and 50 yards. It would be asphalt-covered with concrete distance markers; (3) Military Police range to be used by DOD personnel with 12 lanes with positions at 7, 15, 25, and 50 meters. The area would be grass covered with concrete distance markers; (4) a 1,400 sf single-story classroom building, and (5) a two-story control tower. Concrete walls would be added to the current site. The facility's gravel parking lot would remain unpaved. Drinking water would be brought to the site by users. The latrine would have a septic tank and drain field. Stormwater would be drained to a catchment system which would filter stormwater and retain solids. Weapons used on the range would be handguns (.357, .38 caliber, .45 caliber and 9mm), submachine guns (.45 caliber) and

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shotguns (10- 12- and 20-gauge). The range would be used by both DOD personnel and local law enforcement agencies.

This project would have minimal negative impacts on soils, surface water quality, floodplains, groundwater, air quality and noise. No impacts to geology, aquatic biota, threatened or endangered species, or wetlands were anticipated. Positive impacts were expected for hazardous and toxic waste removal, socio-economic impacts and public safety (Fort Eustis, 1993).

B.6 Fort Hood, Texas. Urban Assault Course and Shoot House

Fort Hood, Texas prepared an EA to construct an Urban Assault Course and Shoot House and associated support facilities. The proposed action included a two-story Urban Offense/Defense Building, Individual Team Trainer, Grenadier Gunnery, Squad Trainer/Land, an Underground Trainer and Shoot House. Proposed support facilities included an After-Action Review building, ammunition breakdown area, and maintenance building. Related infrastructure would include electric service, access roads, storm drainage, parking services, information systems and general site improvements. This EA determined the proposed action would have little measureable effect on the existing environment and could not easily detect effects on the following environmental media areas: land use, geological resources, water resources, vegetation, floodplains, aesthetic resources, solid and hazardous waste, and wildlife. The EA determined there were no impacts on long-term air resources, wetlands and waters of the U.S., aquatic species, cultural resources, environmental justice and transportation. The EA determined there were insignificant, but beneficial effects on socioeconomics due to the short-term increase in employment and economic impact to the local economy (Fort Hood, 2004).

B.7 Fort Hunter Liggett, California. Urban Assault Course, Shoot House and a mobile MOUT training facility.

Fort Hunter Liggett prepared an Environmental Assessment to document the potential effects of constructing an Urban Assault Course (UAC), Shoot House and mobile MOUT training facility. The UAC would consist of a simulated urban site of several buildings and dirt roads. Training facilities would include individual team trainer, platoon trainer, grenadier gunnery trainer, urban offense/defense training and an underground trainer. The Shoot House would consist of one specialized building in which live-fire would occur. The MOUT, a blank-fire facility, comprised of temporary training devices configured as simulated buildings that could be reconfigured and relocated as needed.

Impacts of the proposed action on the environment were not significant, and the proposed action did not involve unique or unknown risks; nor was the project expected to establish a precedent for future actions with significant effects. The proposed action would not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or cause loss or destruction of significant scientific, cultural, or historical resources. The proposed action would not jeopardize any Federally-listed threatened or endangered species, or species proposed for listing as threatened and endangered under authority of the Endangered Species Act. The proposed action would not threaten or violate Federal, State, or local law or requirements imposed for the protection of the environment (Installation Management Agency, 2005)

B.8 Fort Hunter Liggett, California. Modified Record Fire Range (MRF), 25-meter Zero Range, 10-meter Machine Gun Zero Range. Modify a Multi-Purpose Machine Gun Range

Fort Hunter-Liggett, California prepared an EA for constructing an automated combat pistol qualification range, a Modified Record Firing Range, a 25-meter Zero Range, a 10-Meter Machine

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Gun Zero Range and upgrade an existing Multi-Purpose Machine Gun Range. The areas of topography, geology, water resources, parks and recreation and public services were reviewed and eliminated from further study because implementing the proposed action was expected to have not effect on those areas. Construction and modification of the range would include replacing pop-up targets, establishing firing points, trenching power lines to targets within ranges and power lines along roads leading to the range area, construction of range towers, bleachers, flag poles and parking areas. Support facilities, such as latrine, maintenance and storage buildings were not planned. The two zero ranges would occur on previously undeveloped grasslands.

Short and long-term impacts on land use were anticipated to be minor. Construction activities would disturb soils and vegetation in the area, but use of established BMPs would result in minor impacts. Recovery of natural grasslands may result in an increase in wildfire frequency and would affect approximately 15 acres. The installation would develop and implement a re-vegetation and restoration plan to stabilize soils, and conduct a controlled burn program. Impacts to air quality will be minor. The installation conducts, within established permits, controlled burns of grasslands to minimize risk of wildfires. Due to the distance from the ranges to noise sensitive receptors and existing intermittent noise levels, the impact from noise would be minor. While there would be no expected impacts to historic or cultural resources. The installation initiated Section 106 consultation with the State Historic Preservation Officer. There would be short-term minor impacts to traffic and transportation. There would be minor, long-term impacts on utility infrastructure and energy use. There would be minor short and long-term impacts on solid waste resulting from both the construction debris and additional solid waste generated from ammunition damage and miscellaneous trash generated at the ranges.

The proposed action would have negligible impact on the local economy and no impact on environmental justice. The EA concluded there would be no cumulative impact on soil resources and minor cumulative impacts on land use, air quality, noise, natural resources, visual resources and traffic. (Installation Management Command, 2006).

B.9 Fort Jackson, South Carolina. Night Infiltration Course, Modified Record Fire Range (MRF)

Fort Jackson prepared an EA for constructing a Night Infiltration Course over the existing footprint of previously existing range. The environmental analysis determined there would be no effect on facilities, wetlands or socioeconomics. There were minor impacts in the areas of airspace, cultural resources, noise, threatened and endangered species, migratory birds, water resources, energy, land use, hazardous materials/waste, traffic and transportation safety fire management and air quality. Moderate impacts on soils were anticipated, largely due to the risk of erosion, that would be mitigated by standard BMPs such as silt fences until vegetation was fully restored (U.S. Army Environmental Command, 2009)

Fort Jackson prepared and EA for constructing a Modified Record Fire (MRF) range on an old mortar range that had been inactive for several years. Environmental analysis determined there would be no impacts on wetlands, and minor impacts in the area of airspace, cultural resources, noise, threatened and endangered species, migratory birds, water resources, facilities, socioeconomics, energy, land use, hazardous materials/waste, traffic and transportation, safety, fire management, and air quality. Moderate impacts were expected on soils due to the risk of erosion that would be mitigated by using standard BMPs such as silt fences until vegetation was fully restored (Fort Jackson, 2009).

B.10 Fort Polk, Louisiana. Combined Arms Collective Training Facility (CACTF)

The Proposed Action Alternative would have negligible impacts to the soil and water resources. These impacts, associated with military training, would be further reduced by the installation of two sediment basins and the continued implementation of environmental programs and measures as mentioned above. The Biological Opinion for the endangered species concluded the proposed action would not likely have an adverse affect the Red-cockaded Woodpecker, thus population management will continue. A minor impact would result from the removal of 20 acres of Habitat Management Unit (HMU), the only measurable impact. The cumulative effects would be negligible to water resources and the endangered species (Fort Polk, 2005).

B.11 Fort Riley, Kansas. Combined Arms Collective Training Facility (CACTF), Urban Assault Course (UAC), Life-Fire Shoot House, Breach Facility, and Offense/Defense Station (ODS)

Fort Riley prepared an EA to evaluate the potential effects of constructing a number of live-fire ranges. The infrastructure for the proposed action would be permanent. Fort Riley expected to enhance these training sites in the future with semi-permanent and temporary structures to simulate combat environments at different locations throughout the world. The proposed facilities would cover approximately 50 acres. No changes to land use types would occur. The proposed action would not adversely impact air quality. Construction projects would generate total suspended particulates and particulate matter less than 10 microns (PM₁₀). Effects from emissions caused by fugitive dust from ground disturbing activities (e.g., grading, demolition, soil piles, etc.) and combustion of fuels in construction equipment would be localized and temporary. Implementing the proposed action would have minor, temporary effects on the noise environment near the project sites resulting from the use of heavy equipment during construction activities. Noise associated with construction activities would be comparatively minor and would occur in relatively remote areas of the installation. Potential minor and short-term effects on soils may result from the proposed action. The potential for soil erosion and transport of sediment into nearby waterways existed during movement of soil and construction activities. This potential would be minimized by using sediment and erosion control best management practices such as silt fencing, sediment traps, application of water sprays, and re-vegetation at disturbed areas. The primary effects on water resources under the proposed action would occur from sediment from soil erosion into streams associated with the proposed construction. BMPs including soil watering and stockpiling would minimize fugitive dust by reducing the total amount of soil exposed.

Fifty acres of grassland prairie would be cleared and grubbed and additional road and parking areas constructed as a result of the proposed action. Additional areas would be disturbed in the process of laying utility lines to new structures. Runoff and localized sedimentation from new facility construction activities could cause indirect and short-term adverse water quality effects, thus impacting aquatic resources along Three Mile Creek. Appropriate erosion control measures would be employed to mitigate potential impacts on water quality. There are three previously recorded sites found within the proposed CACTF village construction area that are being evaluated for inclusion into the National Register of Historic Places (NRHP). Inventory level surveys of both the CACTF Village and the UODS construction areas also are being conducted to determine whether or not any prehistoric archeological resources are present. Short-term beneficial socioeconomic effects would be expected. No adverse impacts related to environmental justice were anticipated if the proposed action was selected. Hazardous materials management at Fort Riley would not be impacted by the proposed construction activities. There would be no impact on Fort Riley's infrastructure as a result of the Proposed Action (Fort Riley, 2003).

B.12 Fort Riley, Kansas. Infantry Squad Battle Course

Fort Riley prepared an EA to construct an Infantry Squad Battle Course. This training range was proposed to be constructed within the boundary of two out-of-date ranges and part of a third. The entire Squad Battle Course complex will be 1200 meters long by 850 meters wide. Components of this effort included site clearing and grading, range roadways, storage facilities, after action review building, latrines, supporting utilities infrastructure, low water crossings, moving and stationary armor and infantry targets, and parking. Construction of the range would include surface disturbance within the development area (e.g., roads, buildings, trench, bunkers, etc.). Much of this disturbance would be minimal and similar to land-grooming activities performed during development of a modest community park. Grooming activities would ensure proper line of sight between firing positions and targets. The EA identified short-and long-term minor beneficial impacts to land use and socioeconomic environment from the proposed construction of the range. The new range would increase throughput of Soldiers, and the installation's land use for military training would be more efficient over both short and long-term. The EA also determined there would be no direct effects on water resources, and no effects on threatened or endangered species, cultural resources, or infrastructure. Noise from construction vehicles would be during normal business hours and would be minor and short-term. Noise from weapons firing and helicopter operations were not expected to impact livestock, tourism or recreational activities. Topography of the range and surrounding area would dampen noise generated from range activities. A minor, direct adverse impact to safety could result due to the higher numbers of individual Soldiers and tactical vehicles that would operate on this range, but the net effect on installation safety would be marginal due to risk assessment and management efforts by the installation safety office. Minor, direct long-term adverse effects from hazardous and toxic substances could result from risks of accidental spills and releases from increased vehicle operations, but mitigated by the installation's active spill prevention and spill response programs. Increased operation of tactical vehicles was expected to have a minor, temporary effect on air quality. Minor, direct adverse effects to soil would result from training at this range. Minor, short-term soil erosion would occur at the construction site, but mitigated by implementing BMPs. Minor, direct short- and long-term adverse effects could occur to floral communities on the range but using existing roads, minimal site modifications and integration of BMPs would reduce anticipated impacts. Minor direct short- and long-term adverse effects to wildlife could occur from construction activities, and from training activities. Prohibiting heavy vehicles and equipment near sensitive areas along surface waters would reduce risks to aquatic life. Training restrictions in sensitive areas would protect habitats and minimize disturbance to populations of designated T&E species. Increases in ground maneuvers were not anticipated to effect cultural resources. The proposed action is not anticipated to have any adverse effects n Environmental Justice. Constructing the range is expected to have moderate positive direct and indirect short and long-term benefits to the local economy. Constructing this range would have no effect on visual or aesthetic values or recreational activities (Fort Riley, 2005).

B.13 Fort Riley, Kansas. Live Fire Trench Training Complex

Fort Riley prepared an EA to construct a live-fire Trench Training Complex. This complex would mimic some aspects of the urban battlefield. Fort Riley anticipated beneficial impacts to the socioeconomic environment and minor adverse impacts to environmental noise, soils, air quality, and flora and fauna. There would be no direct or indirect adverse impacts to cultural resources, safety of children, environmental justice, land use, contaminated sites, threatened and endangered species. There would be minor direct, long-term adverse effects to the soils because of the grubbing, grading and earthmoving required to construct the range. The installation would mitigate potential soil loss and migration to surface waters by implementing established BMPs for erosion

control. There would be minor direct short and long-term adverse impacts to floral and faunal communities from clearing the land to construct the range (Fort Riley, 2007).

B.14 Fort Riley, Kansas. Qualification Training Range and Shoot House

Fort Riley, Kansas prepared an EA for constructing a Qualification Training Range (QTR) and a live-fire Shoot House. Each project area contained previously disturbed training range grounds. The proposed QTR would support live-fire training for the M2 heavy machine gun, 40-mm grenade launcher, M60 machine gun, M240 and M249 machine guns M249 Automatic Rifle, M24 Sniper Rifle, M16 rifle, M4 Carbine and M9 pistol. The ranges would include support facilities, such as general instruction buildings, range operations centers, ammunition breakdown buildings, after-action review facilities, storage buildings, vault latrines, covered mess areas, bleacher enclosures, utilities, access roads, parking areas and security barricades. The installation anticipated minor adverse effects to operational noise, air quality, soils and flora and fauna resulting from constructing and operating these ranges. Fort Riley anticipated no adverse effects to surface water, soils, land use, and cultural resources. The installation would implement standard best management practices, such as mulching, silt fences and sediment traps to control erosion and prevent sedimentation of surface waters. The installation anticipated no effect on threatened or endangered species or their habitats, and no direct or indirect adverse effects on cultural resources. Fort Riley would implement a number of BMPs to reduce or eliminate any risk to historic or cultural resources (Fort Riley, 2008).

B.15 Fort Riley, Kansas, Known Distance Range

Fort Riley, Kansas prepared an EA for constructing a Known Distance Range (KD) on an upland site adjacent to Range 19, which the proposed KD would replace. This range would have 32 firing lanes, 10 meters apart, a bank of targets at the north end and firing lines every 100 meters extending for a distance of 1,000 meters. This range would have a range control tower, range operations and storage building, classroom building, covered mess, vault latrine, ammunition breakdown building, bleacher enclosure, parking area and exterior lighting. The range would include a berm to create the target bank and firing positions. Fort Riley anticipated minor indirect short-term and long-term adverse effects to operational noise. Noise emissions from firing small arms at the proposed site would sometimes be audible at low levels, the noise emissions would have little potential to cause annoyance in local communities. A study performed by the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) determined that all of the noise zone III contour lines, and nearly all of the noise zone II contour lines would be contained within the installation boundary. To ensure personnel safety, the installation envisioned the need to close an adjoining range while the KD is operational; similarly, the KD would close while the adjoining range was operational. Some minor, direct and indirect adverse effects to air quality were anticipated. During dry conditions, construction activities would generate particulate (dust) into the atmosphere and construction equipment would generate exhaust emissions. The impacts would be temporary and localized to the site. There could be some minor negative effects to soils resulting from increased potential for erosion. The construction contractor would be required to implement BMPs, consistent with State of Kansas regulations, to mitigate and reduce the effects of soil erosion. Some minor effects were anticipated on floral and faunal communities resulting from earth-moving activities necessary to construct the range. No adverse effects on land use, water resources, threatened and endangered species, or cultural resources were anticipated. There would be a short-term, minor beneficial effect to the economies of the region. Direct payments to construction personnel would have a positive effect on the local economies, as well as the payments to personnel to repair and maintain the range. Fort Riley anticipates no significant cumulative effects associated with constructing and operating a Known Distance Range (Fort Riley, 2009)

B.16 Fort Stewart, Georgia. Urban Assault Course (UAC)

Fort Stewart, Georgia prepared an EA to clear-cut approximately 2.88 acres to complete a 6.2-acre facility, sufficient to construct the five stations of an Urban Assault Course. There were no anticipated effects on installation or regional land use. No long-term impact to soils was anticipated. The installation would prepare an erosion and sedimentation control plan for approval by the State of Georgia's Environmental Division. Construction would not result in significant emissions. BMPs would be implemented to control erosion and runoff. No impacts to surface water or groundwater, or aquatic resources, such as reptiles, amphibians, or fish were anticipated. There were no wetlands within the footprint of the proposed site. There were isolated wetlands adjacent to the site, but no adverse impacts were expected. Construction would not destroy or damage unique vegetation or habitat, or disturb wildlife. The proposed site was not native to any threatened or endangered species. The proposed site would not impact prime farmlands or wild and scenic rivers. The proposed site was surveyed for historic and cultural resources, and the installation consulted with the State Historic Preservation Officer. Work would cease if historic/cultural resources were discovered on the site. No hazardous waste or materials would be generated or stored on the site. There would be no impact to the installation's infrastructure or utilities. The proposed action would not impact the volume of solid waste generated on the installation, and not impact the solid waste disposal system. There would be a minor, short-term increase in traffic associated with range construction that would have minimal impact on the installation's transportation network. There would be a minor, short term boost to the local economy resulting from the purchase of labor, machinery and materials. There would be no change in population demographics and no impact on environmental justice. There would be no impact on public schools, recreation or public health and safety, aesthetics and visual zones. Review of other, past, present, or reasonably foreseeable future actions determined there were no significant cumulative impacts from constructing this range complex (Fort Stewart, 2005).

B.17 Fort Stewart, Georgia. Standard Sniper Field Fire Range

Fort Stewart prepared an EA on the potential impacts from the construction, operation, and maintenance of a standard Sniper Field Fire Range. The preferred alternative was construct a standard Sniper Field Fire Range on the footprint of the existing range, essentially modernizing it for the purpose of meeting all training requirements and better serving the Soldiers' training needs. Modification would include demolishing two existing structures, constructing new facilities, extending the length of the range, reducing the number of lanes, and installing new targetry. This alternative consisted of constructing a standard Sniper Field Fire Range on the footprint of the existing range thereby optimizing existing real property features. A large portion of the required range floor (area) for the standard Sniper Field Fire Range is already disturbed under this alternative, reducing the amount of new ground-disturbing activities from timber harvest, clearing, and construction to approximately 55 acres.

No effects were anticipated to land use, recreation, visual resources, transportation, utilities, noise, public health, safety, solid waste and recycling, socioeconomics, Environmental Justice, provision for the handicapped, protection of children, sustainability, and green constructing. Potential minor adverse effects were noted to the red-cockaded woodpecker as a result of some tree removal and other vegetation comprising the Habitat Management Unit in which the preferred alternative site is located; however the RCW were expected to persist. The proposed action was not expected to affect cultural resources during construction, operations and maintenance.

Minor adverse potential effects to water resources were anticipated. However, these potential effects would be minimized, and/or mitigated via timber harvest BMPs and as outlined in the Erosion and Sediment Pollution Control Plan and Notice of Intent submission package for coverage under the

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National Pollution Discharge Elimination System General Permit to Discharge Stormwater Associated with Construction Activities. Wetland impacts would be mitigated by either the Installation bank or the purchase of in-kind wetland credits. No potential effects to hazardous and toxic materials and waste were anticipated. Minor adverse potential effects to soils at the preferred alternative site would occur during the construction period; potential effects from subsequent training, operations, and maintenance would be minimal. No potentially adverse effects to air quality were anticipated. Minor adverse cumulative impacts were expected on biological resources, water resources and soils. Implementation of the Preferred Alternative will comply with Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." (Fort Stewart, 2009).

APPENDIX C

RANGE SUPPORT FACILITIES

This appendix provides information on the size, construction characteristics of range support facilities commonly found at the Army ranges discussed in this Programmatic Environmental Assessment.

C.1 Aerated Vault Latrines



Function: This building provides lavatory facilities for the troops and trainers who are using the range.

Siting: Latrines should be located near the major range facilities; however, they must be a minimum of 30 meters (100 feet) from the mess area.

Aerated Vault Latrines: If a water supply is not available, an aerated vault latrine with compressor or dry vault with holding tank may be used; in remote areas, a composting toilet may be used. Some installations may wish to include comfort heating. This latrine will accommodate a training unit of up to 190 men and 35 women.

Typical Configuration:

Size:	18.6 square meters (200 square feet)
Occupancy:	190 men and 35 women
Foundation:	Concrete slab-on-grade with turned-down edges
Shell:	Structural steel frame with metal siding or reinforced split-faced CMU
Roof:	SSMR on wood trusses with batt insulation
Doors:	Insulated hollow metal
Interior Finishes:	Painted metal siding or CMU
HVAC:	No Heating or Air Conditioning – ventilation only
Wall exhaust fan:	50 cfm per water closet (Men's)
Wall exhaust fan:	50 cfm per water closet (Women's)
Roof exhaust fan:	100 cfm
Special Lighting:	Red lens or red lamps
Special Switching:	See Night Operations Lighting paragraph
Lightning Protection:	None
Electrical Service:	120/240V ac, single phase, 3-wire secondary entering and leaving the building underground in rigid steel conduits
Receptacles:	Receptacles shall be ground fault circuit interrupter (GFCI), 120V; 20 amp duplex outlets located a minimum of 305 mm (12") above the finished floor.
Communications:	None

Electrical Service: The Aerated Vault Latrine is supplied via a main breaker power distribution panel that has separate circuits for the lighting and convenience outlets.

Grounding: Grounding is required for safety. Constructing electrical system grounding will consist of one or more ground rods connected to the service panel in accordance with NFPA 70 and all applicable standards.

Night Operations Lighting. To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

C.2 Ammunition Breakdown Building



Function: Used to breakdown containerized small arms ammunition and load magazines for issue to troops.

Siting Criteria: In accordance with DA PAM 385-64 and UFC 3-570-01, siting will be based on the quantity and classification of the ammunition items that will be involved. This building must be sited No less than 50 feet/15 meters distance from the range firing line, range support facilities, and other exposed sites associated with the range. Because this building will be used to issue ammunition only, not ammunition storage, no explosives safety site plan is required. Design coordination is required between the designer and the specific base personnel.

Typical Configuration:

Size:	11.1 square meters (120 square feet) enclosed; 12 square meters (129 square feet) covered
Occupancy:	2
Foundation:	Concrete slab-on-grade with turned-down edges
Shell:	Structural steel frame with metal siding or reinforced split-faced CMU
Roof:	SSMR on wood trusses
Doors:	Hollow metal
Windows:	Hollow metal shutters in metal frames

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Interior Finishes:	Painted sheetrock or CMU
HVAC:	None
Lighting:	Incandescent lamps requiring both red and white lamps or globes.
Special Lighting:	Gasketed vapor-proof type enclosed with a guard
Special Switching:	See Night Operations Lighting paragraph
Lightning Protection:	Mast Style Lightning Protection conforming to NFPA code 780
Power:	120 volt (V)
Communications:	None

Night Operations Lighting. To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

C.3 Bleacher Enclosure



Function: Used as an instruction area for Soldiers before and after range use; it may also be used as a range observation area.

Typical Configuration:

Size:	55.6 square meters (598.5 square feet)
Occupancy:	200
Foundation:	Concrete slab-on-grade with individual spread footings
Shell:	Structural steel frame with metal siding

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Roof:	Un-Insulated SSMR system
Doors:	Sliding doors may be placed in the back or on the sides for ventilation.
Windows:	None
Interior Finishes:	Metal siding
HVAC:	None
Lighting:	Both red and white lighting are required
Special Switching:	See Night Operations Lighting paragraph
Receptacles:	General Purpose GFCI, 120V, 20A duplex receptacles mounted a minimum of 450 mm (18 inches) above the finished floor
Lightning Protection:	Mast-style safe cover for personnel
Misc:	2 10-row aluminum bleachers 4.57 meters long
Power:	120V
Communications:	None

Grounding: Grounding is required for safety. Constructing electrical system grounding will consist of one or more ground rods connected to the service panel in accordance with NFPA 70 and all other applicable standards.

Night Operations Lighting: To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

Lightning Protection: A risk analysis performed in accordance with NFPA 780 on the Bleacher Enclosure and Covered Mess may indicate lightning protection is not required for these facilities. A mast style protection shall be provided for these facilities regardless of the results of a risk analysis. Range safety procedures require a solidly grounded structure on site for Soldiers to safely assemble during lightning storm events. The Covered Mess and Bleacher Enclosure facilities provided with lightning protection systems serve this function.

Removal of the lightning protection system from either of these facilities will only be allowed under the concurrence of the safety personnel responsible for the range in consideration. In such cases, they should have a safety procedure in place to allow for the safety of Soldiers during lightning storm events.

C.4 Operations/Storage Building



Function: Used as a range office and storage area for range maintenance equipment, spare parts, tools, and supplies.

Design Details: The operations/storage building accommodates range personnel and stores supplies, spare parts, and tools. The configuration of the operations/storage building may be modified by the designer based on the functional requirements of the building's designated use.

Typical Configuration:

Size:	74.3 square m (800 square ft)
Occupancy:	4
Foundation:	Concrete slab on-grade with turned-down edges
Shell:	Structural steel frame with metal siding or reinforced split-faced Concrete Masonry Unit (CMU)
Roof:	SSMR on wood trusses with batt insulation
Doors:	Insulated hollow metal
Windows:	Aluminum frame with polycarbonate glazing
Interior Finishes:	Painted sheetrock or CMU, sheetrock ceiling
HVAC:	Through wall heat pump - site adapt-(Operations Area only, Storage Area has ventilation only)
Standard Lighting:	Fluorescent
Special Lighting:	Red lenses or red lamps, Emergency Lighting
Special Switching:	See Night Operations Lighting paragraph
Lightning Protection:	None
Electrical Service:	120/240Vac, Single Phase, 3-wire Secondary
Receptacles:	General purpose, 120V, 20A duplex outlets mounted 450 mm (18") above the finished floor.
Data Communications:	None
Telephone:	Standard voice cable (optional)

Primary Power Distribution: Primary distribution service may be overhead or underground. The ROC-Control Tower may also supply power to the building depending on the physical separation between the two structures.

Electrical Service: The Operations/Storage building is supplied via a main breaker power distribution panel that has separate circuits for the lighting, convenience outlets, control, and HVAC equipment.

Lighting: Emergency and Exit lighting will be provided in accordance with NFPA 101 and NFPA 70.

Night Operations Lighting: To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

Grounding: Grounding is required for safety. Constructing electrical system grounding will consist of one or more ground rods connected to the service panel in accordance with NFPA 70 and all other applicable codes.

Environmental: The indoor temperature for the operational equipment should be between + 21.1°C (70°F) to +25.6°C (+78°F). Non-operating temperature should be: -34.44°C (-30°F) to +65.56°C (+150°F). Humidity should be between 10% - 80% RH non-condensing.

C.5 After-Action Review Building (AAR) - Small

General: The AAR-Small provides space for personnel to review training exercises.

Space is also provided for the installation of required electronics and communications equipment to prepare the review presentation and control rooms to monitor the presentation. All AAR information is collected via fiber optic cabling from the Range Operations Center (ROC) which is described elsewhere in this manual. A 40 seat theater room is provided with a folding partition to allow for two smaller 20 seat theaters. Monitors, computers, printers, and associated equipment to aid in AAR editing and development are located in the development room. An outside covered area for boot and gear cleaning with gear hooks is included.

Facility Development: The information included in this section provides the overall concept for the After Action Review (AAR) operation for Non-Instrumented Ranges and Live Fire Shoot House Training Facilities. The entire suite of standard buildings is currently under revision. Contact the MCX for most current building layouts on specific projects. The building layout and sketches shown in this section may not explicitly match the new layouts, but the function of the equipment and the components described in this section should be incorporated to all new AAR facilities.

Typical Configuration:

Size:	99 square meters (1064 square feet)
Occupancy:	48
Foundation:	Concrete slab on grade with turned down edges
Shell:	Reinforced split-faced CMU
Roof:	Insulated Standing Seam Metal Roof (SSMR) system
Doors:	Insulated hollow metal
Windows:	Aluminum frame with polycarbonate glazing
Interior Finishes:	Painted CMU, acoustical tile ceiling, sheetrock/metal studs partition walls
HVAC:	Central heat and air - Site adapted
Standard Lighting:	Fluorescent
Special Lighting:	Red lens or red lamps. Dimming capable lighting in the theater
Lightning Protection:	Air terminals
Power:	120/240Vac, Single Phase, 3-wire Secondary
Telephone:	Standard Voice Cable (optional)
Data Communication:	Fiber Optic Cable from ROC

Electrical/Communications: This paragraph discusses electrical/communication considerations unique to this specific structure type. Downrange power, communication, load, transformers, trenching requirements, etc. are discussed elsewhere in this manual.

General: Electrical service to the AAR-Small will be 120/240Volt, single phase, 3-wire secondary; 277/480Volt, three phase, 4-wire; and 120/208 Volt, three phase, 4-wire secondary. The voltage supplied must be maintained within 5 percent at a frequency of 60 Hz, +/-0.5. Surge suppression devices will be provided at the service entrance for protection of the AAR-Small distribution system. Rigid steel conduit shall extend a minimum of 1524mm (5 feet) beyond the outside of the building foundation for power circuits entering or leaving the building. The AAR-Small power distribution panel will have separate circuits for lighting, convenience outlets, communications, and Heating, Ventilation, and Air Conditioning (HVAC) equipment. Additionally, each workstation should be fed by a 120V, 20-amp duplex receptacle on a dedicated 20-amp circuit. In the classroom, 120V, 20-amp duplex receptacles should be provided for each overhead projector and video camera. For power to the DTRs in Live Fire Shoothouse AARs an L5-30 outlet fed by a dedicated 30-amp circuit should be provided in the ceiling above each Data Termination Rack (DTR) location. There should be power for two DTRs, and both the DTRs will be provided by the instrumentation contractor. For all other types of small AARs, a quad outlet fed by two dedicated 20-amp circuits should be provided in the base of each Data Termination Rack (DTR) and the DTRs will be furnished and installed during construction.

Communication: A direct buried fiber optic cable will connect the AAR-Small and the ROC via the Data Termination Rack (DTR). The cable will enter the buildings via RGS conduit filled with inner-duct to facilitate future expansion [Military Construction (MILCON) funded]. The DTR is an enclosed equipment rack where all fiber optic cables are terminated in a cross-connect panel with industry standard type SC connectors (also MCD). A minimum 24-strand fiber optic connection is required between the AAR-S and the ROC for transporting video and data information. For Live Fire Shoothouse AARs, the AAR will also serve as the ROC. There is no data connectivity between the Live Fire Shoothouse AAR and any other facility except for the Live Fire Shoothouse training building. In the Shoothouse AAR a direct buried, 12 strand, single mode fiber optic cable will connect the AAR and the Shoothouse Training building. This fiber optic cable is terminated on a fire rated communications backboard inside the AAR. The fiber optic cables are terminated in a cross-connect patch panel with industry standard type SC connectors. This patch panel is mounted to the fire rated communications backboard. The DTRs will be provided by the instrumentation contractor only for the Live Fire Shoothouse AAR.

Coordination should be done with the instrumentation contractor to ensure the backboard is installed immediately adjacent to the location of the DTRs, and for coordination for the location of the wireway system and DTR power outlets. Note, for all other types of AAR facilities it is the responsibility of the construction contractor to purchase and install the DTRs. A ladder type wireway system is required to extend from the DTR to above the ceiling (MILCON supplied). Vertical cable tray elbows shall be installed above DTR locations and work stations to allow smooth transition of cables from vertical to horizontal cable tray. A 24 inch ladder type cable tray shall interconnect the workstations and the fiber racks in the AAR Development Room. The AAR workstations shall be connected to the wireway system via 12" x 4" cable tray. Vertical cable tray serving AAR workstations shall be recessed in wall and terminate 18" AFF with a removable section for cable access. All data communication conduits shall connect to the horizontal wire-way to allow for interconnecting of instrumentation components. Camera and video projectors in the AAR Classroom shall be connected to the wireway system via 1" conduits. A 4" x 4" junction box is required in front wall of classroom at 18" AFF.

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Recessed junction box shall have a 1" conduit that extends back to cable tray. Provide pull wires in all conduits where cables are to be installed by others.

Other Appropriations-Army (OPA) funded communications equipment will share DTR rack space to convert the fiber optic cables to industry standard. Ethernet copper network cable for connection with the network, video editing computers, as well as other instrumentation components. Coordination with OPA contractors should be conducted for location of communication conduits and boxes for networking and video presentation.

Lighting: Lighting will be fluorescent and red lamps or lenses for night operation will be provided with protected switching to prevent accidental illumination of white lights during night operations. Due to night firing requirements, all lighting within the AAR if located along the baseline will need to be in both white and red lighting to ensure proper range operations. Red light is required during training so as not to ruin the night vision of the Soldiers. Where necessary, low-level in-ground lights (similar to AIR Field markers), may be used for vehicle parking areas and walkways. There is not an Army standard for the lighting system, the designer will need to ensure that the customer's lighting requirements are met.

Night Operations Lighting: To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

C.6 Range Operations Center (ROC) - Tower



Examples of the ROC-Tower

Function: The control room houses the Range Control Station (RCS), Data Termination Rack (DTR), optional Master Data Panel (MDP), instrumentation equipment, communications equipment, Power Panel (PP), Heating Ventilation and Air Conditioning (HVAC), and also accommodates range personnel.

General: The ROC-Tower will be positioned near the baseline. The height to the floor of the control room will be one flight above ground per the standard design. (No observation decks are required). The ROC-Tower will be designed with deep roof overhangs and pull-down shades as well as other measures to reduce solar glare. All windows in the ROC-Tower are to be sliding windows in order to facilitate cleaning. The ROC-Tower may require a FAA aircraft warning light on the roof. A permanent ladder is also included to facilitate changing of the roof lights. Security fencing will surround the ROC tower

Siting Criteria: The ROC-Tower will be located approximately 15 to 50 meters behind the baseline in an area that provides an unobstructed view of the entire baseline. This location must have visibility of as much of the downrange area that is economically practical. The console operator must have an unobstructed view of the firing line and down range.

Typical Configuration:

Size:	23.04 square meters (248.06 square feet)
Occupancy:	3
Foundation:	Concrete spread footings with grade beam

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Shell:	Structural steel frame with insulated metal sandwich panels
Roof:	Insulated Standing Seam Metal Roof (SSMR) system
Doors:	Insulated hollow metal
Windows:	Aluminum frame with polycarbonate glazing
Interior Finishes:	Metal liner panel
HVAC:	Site adapt
Standard Lighting:	Fluorescent
Special Lighting:	Red lens or red lamps
Lightning Protection:	Mast equipment protection
Power:	120/240Vac, single phase, 3-wire secondary
Telephone:	Standard Voice Cable (optional)
Misc:	Built-in work table

General: Electrical power distribution will conform to the Architectural Engineering Institute (AEI) and the Technical Manual (TM) 5-811-1. Voltage regulation and/or metering may be required. The voltage supplied must be maintained within 5 percent at a frequency of 60 Hz, +/-0.5; the design agency will verify the power supply for each site.

Electrical Targetry Control: For ranges from 0 to 300m deep, each lane will be powered individually from the ROC-Tower Power Distribution Panel. Lanes and targets on ranges greater than 300m deep will be powered from downrange power centers (PC) located on the range.

Public Address (PA) System: Small arms ranges require a PA system to maintain safety on the firing line. This system will originate in the ROC, with speakers mounted on the ROC and poles along the firing line as required.

White Light - Red Light: Due to night firing requirements, all lighting within the ROC and along the baseline will need to be in both white and red lighting to ensure range operations. White light is required for range set-up, emergencies, and cleaning up "brass", red light is required during training, so as not to ruin the Soldiers' night vision. This system will originate in the ROC, with lights mounted on the ROC and poles along the firing line as required. Protected switching must be provided to prevent accidental illumination of white lights during night operations. Where necessary, low-level, in-ground lights (similar to Airfield markers), may be used for vehicle parking areas and walkways.

C.7 Covered Mess



Function: The structure provides an area for troop messing at the range site. This facility is also used as a weapons cleaning facility by the troops using the range.

Typical Configuration:

Size:	37.2 square meters (400 square feet) TRADOC ranges: 65.7 square meters (707 square feet)
Occupancy:	62 or 120 (TRADOC Ranges) down edges
Foundation:	Concrete slab-on-grade with turned
Shell:	None
Roof:	SSMR on wood or steel trusses
Doors:	None
Windows:	None
HVAC:	None
Special Lighting:	Red Lens or Red lamps
Special Switching:	See Night Operations Lighting paragraph
Lightning Protection:	Mast-style system
Misc:	Stainless steel tables
Power:	120/240Vac, Single Phase, 3-wire Secondary Receptacles: GFCI weatherproof, 120V, 20A duplex mounted 24 inches above finished floor
Communications:	None

Electrical Service: The Covered Mess is supplied via a main breaker power distribution panel that has separate circuits for the lighting and convenience outlets.

Grounding: Grounding is required for safety. Constructing electrical system grounding will consist of one or more ground rods connected to the service panel in accordance with NFPA 70 and all other applicable codes.

Night Operations Lighting: To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions

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- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

Lightning Protection: A risk analysis performed in accordance with NFPA 780 (National Fire Protection Association, 2008). In the Bleacher Enclosure and Covered Mess may indicate lightning protection is not required for these facilities. A mast style protection shall be provided for these facilities regardless of the results of a risk analysis. Range safety procedures require a solidly grounded structure on site for Soldiers to safely assemble during lightning storm events. The Covered Mess and Bleacher Enclosure facilities provided with lightning protection systems serve this function.

Removal of the lightning protection system from either of these facilities will only be allowed under the concurrence of the safety personnel responsible for the range in consideration. In such cases, they should have a safety procedure in place to allow for the safety of Soldiers during lightning storm events.

C.8 General Instruction Building



Function: This building is an instruction area for troops before, during, and after range use.

Design Details: The configuration of the general instruction building shown in the ROCA Details in the Appendix of this document may be modified by the designer, based on the functional requirements of the building's designated use.

Typical Configuration:

Size:	74.3 square m (800 square ft)
Occupancy:	40 personnel
Foundation:	Concrete slab on-grade with turned-down edges
Shell:	Structural steel frame with metal siding or reinforced split-faced CMU
Roof:	SSMR on wood trusses with batt insulation
Doors:	Insulated hollow metal
Windows:	Aluminum frame with polycarbonate glazing
Interior Finishes:	Painted sheetrock or CMU, sheetrock ceiling
HVAC:	Through wall heat pump - site adapt
Standard Lighting:	Fluorescent
Special Lighting:	Exit, Emergency, also see Night Operations Lighting paragraph
Lightning Protection:	None

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Electrical Service: 120/240V ac, single phase, 3-wire secondary
Data Communication: network cable from the Range Operations Center (ROC) (optional for future use)

Primary Power Distribution: The primary power distribution service may be overhead or underground. The ROC-Control Tower may also supply power to the building depending on the physical separation between the two structures.

Electrical Service: The General Instruction building will be supplied in the Appendix of this document with a main breaker power distribution panel that has separate circuits for the lighting, convenience outlets, control, and HVAC equipment.

Lighting: Exit and emergency lighting shall be provided in accordance with NFPA 101 (NFPA, 2009). and NFPA 70.

Night Operations Lighting. To prevent interference with specialized equipment used during night operations, red lenses or red lamps must be provided in addition to standard lighting if the following conditions exist.

- Night training will be performed
- ROCA buildings are near the firing positions
- ROCA building has windows that cannot be covered.

Separate switching for the standard and red lighting shall also be provided, located near points of egress.

Grounding: Grounding is required for safety. Constructing electrical system grounding will require one or more ground rods connected to the service panel in accordance with NFPA 70.

C.9 Range Access/Service/Maintenance Roads



Service/Maintenance: Service/Maintenance roads are normally provided for access to the target emplacement. These roads will facilitate the installation and maintenance of the target mechanisms and target emplacement. Service/maintenance roads are designed as a gravel section and are designed for site-specific soil conditions. When possible, these roads should be located on the left and right side edge of the range, with target access road traversing the range behind the target emplacements. If the range has tank trails, they can be used as maintenance/service roads. The purely maintenance/service roads will be designed for light trucks and similar lightly loaded vehicles.

Access Roads: The range access road can be a gravel or paved road, designed to support lightly loaded, rubber-tired vehicles, and must meet site-specific soil conditions. The access road extends from the existing range land's road network to the ROCA. The alignment of this road should take advantage of any existing roads. Alignment must be coordinated with range control and the installation master planner. A range project will not pay to upgrade an entire section of an Installation's road infrastructure in order to access a range project.

Gravel Road Maintenance: One of the primary causes of continual maintenance on the gravel roads is the environment. Rainfall and water running over the gravel tend to wash the fines from the surface course, reducing the stability of the gravel. Therefore, to minimize maintenance, adequate drainage should be provided via ditches and the natural topography, thereby moving water away from the gravel trails.

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Frequency of Maintenance: Maintenance should be performed every 6 months or more frequently if needed. Experience with gravel roads indicates that the frequency of maintenance will be high for the first few years of use but will decrease over time to a consistent level. The majority of the maintenance will consist of periodic grading and replacement of lost materials in order to remove the ruts and potholes that will inevitably be created by traffic and the environment.