PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

for

USE OF THE M1117 ARMORED SECURITY VEHICLE AT ARMY INSTALLATIONS IN THE UNITED STATES

Headquarters, Department of the Army
Deputy Chief of Staff, G-3
Directorate of Training

Prepared by Environmental Planning Support Branch
U.S. Army Environmental Command
Aberdeen Proving Grounds, MD 21010

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APPROVAL PAGE

I have reviewed and approved this document

Tony R Francis
Colonel U.S. Army
HQ, Department of the Army
Office of the Deputy Chief of Staff
For Programs

Michael Bolluyt
Colonel, U.S. Army
Chief, Requirements Determination Div.
Capabilities, Development and
Integration Directorate

Reviewed By:

Jeffrey Hatch
Environmental Attorney
U.S. Army Environmental Command

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EXECUTIVE SUMMARY

This Programmatic Environmental Assessment (PEA) evaluates potential direct, indirect, and cumulative effects of Military Police (MP) companies and platoons using the M1117 Armored Security Vehicle (ASV) at Army installations in the United States. A Military Police (MP) Combat Support Company is authorized 47 High Mobility Multi-purpose Wheeled Vehicles (HMMWV); the Military Police Platoon organic to a Brigade Combat Team is authorized 14 HMMWVs. The Army plans to equip each MP company with 12 ASV's and each MP Platoon organic to Brigade Combat Teams with six (6) ASVs. For each ASV it receives, a unit will exchange one HMMWV. There will be no net increase of vehicles or of personnel assigned to an MP unit receiving an ASV. The current fielding plan is primarily based upon the Dynamic Army Resource Priority List (DARPL) which prioritizes units receiving the ASV based upon rotation sequences. A total of 3,118 ASVs are scheduled to be distributed to MP units Army-wide.

Because the proposed action will be to use the ASV at Army installations nationwide, the Army is analyzing the action in a programmatic approach. Subsequent site-specific NEPA analysis may be conducted at installations where MP units are assigned, and/or where MP units conduct training. To facilitate proper use of this PEA, as well as compliance with the President's Council for Environmental Quality (CEQ) guidance and the Army's regulation governing the National Environmental Policy Act (NEPA) (32 CFR Part 651), the Army has provided a Record of Environmental Consideration (REC) checklist that provides a framework for identifying NEPA requirements beyond the scope of this PEA. If the conditions of this checklist (located in Appendix A) are met, and if procedures and mitigations are adopted at the installation level, a REC may be prepared that references this PEA and the proposed action may proceed.

The HMMWV has been the workhorse of the MP since it was fielded in 1986. Experiences during combat operations in the past two decades forced the Army to explore options that will increase Soldier survivability while effectively supporting the Military Police mission.

The U.S. Army identified the M1117 Armored Security Vehicle (ASV) as a vehicle with the characteristics of mobility, firepower and crew protection that could effectively support the Army's MP mission. The ASV is a four-wheeled armored vehicle that provides ballistic and nuclear, biological and chemical protection to the crew, while providing the on- and off-road mobility to support the mission. The Army intends to assign four (4) ASVs to each of three (3) platoons in MP Combat Support companies, and six (6) ASVs to MP Platoons that are organic to Brigade Combat Teams. In each case units would exchange one HMMWV for each ASV assigned. There will be no additional personnel and no changes in military occupation specialty of any personnel associated with using the ASV.

For the purpose of this PEA, it was assumed that the operations associated with using the ASV would closely resemble the HMMWV it replaces, in terms of number of hours,

miles and operation, as well as the distribution of those hours and miles during on-road or off-road operations. The baseline for this analysis was an MP unit equipped with the M1025A2/M1026A2 variant of the HMMWV. The operating profile for the ASV is 50% on improved (paved) roads, 30% unimproved (unpaved) roads, and 20% off-road.

As a result of examination for applicability to using the M1117 ASV, certain resource areas have been eliminated from further analysis in this PEA, including:

- infrastructure (potable water supply, electricity, wastewater treatment, steam and process heat, telecommunications);
- land use;
- groundwater;
- socioeconomics;
- environmental justice;
- solid waste;
- traffic and transportation, and
- airspace management.

Resource areas analyzed in this PEA include:

- Air Quality
- Cultural Resources
- Noise
- Natural Resources and Soils
- Threatened and Endangered Species
- Water Resources
- Facilities
- Hazardous Materials and Hazardous Waste
- Energy

Given the wide spatial distribution of mobile emission sources, using the ASV should have a minor to moderate effect on air quality. The emissions from the ASV are higher than the HMMWV for nitrogen oxides (NO_x), hydrocarbons (HC), and particulates. The emissions from the ASV for carbon monoxide (CO) are less than the HMMWV (Table ES.1).

Table ES.1 Exhaust Emissions of the HMMWV and ASV

Emission	HMMWV (gm/hr)	ASV (gm/hr)
NO_x	480.	1,210.
HC	37.5	153.4
CO	270.0	143.0
particulates	34.5	50.2

The emissions for the ASV-equipped MP company are higher than that of a comparable MP company equipped only with HMMWVs for NO_x, hydrocarbons, and particulates, and lower for carbon monoxide (CO) (See Table ES.2). Combustion emissions

resulting from training would be from mobile sources and be widely distributed both spatially and temporally. Fugitive dust emissions remain a localized issue and should be addressed as an opacity issue if activities are close enough to installation boundaries that visible emissions leave the installation. Given the wide spatial and temporal distribution of emissions, it is not anticipated that regional air quality would be significantly affected, however further analysis at the installation level may be required. Implementation of best management practices for dust suppression will likely address any potential increase of fugitive dust generated from operating the ASV either off-road or on unpaved roads.

Table ES.2. Emissions of ASV- and HMMWV-equipped MP companies[1,2]

Emission	ASV-equipped	HMMWV-equipped	Difference (ASV-HMMWV)	Percent difference
NO_x	31,320.	22,560.	8,760.	+ 38.8 %
HC	3,154.	1,763.	1,391.	+ 78.9 %
CO	11,166.	12,690.	- 1,524.	- 12.0 %
Particulates	1,810.4	1,622.	188.4	+ 11.6 %

1. all units in grams per hour
2. Calculations provided in Appendix B

While operating on paved or unpaved roadways the vehicle will have no effect on either known or unknown historic or cultural resources. Off-road operations will be conducted within the context of the MP mission, and operate within established boundaries of existing training ranges and maneuver areas on Army installations. The ASV will operate in areas that are currently being used by other, and heavier, tactical vehicles. Training activities will adhere to guidelines provided in the installation's Natural and Cultural Resource Management Plans and Endangered Species Management Plans.

Normal operations of the ASV will have minor effect on noise. Equipped with both the .50 caliber machine gun and the 40mm grenade machine gun (GMG), an ASV-equipped MP company will have 25 percent more weapons. Firing the same weapons from an ASV on the same ranges will not generate more noise than when the weapons are fired from the HMMWV. However, it can reasonably be expected to take longer to process every weapon through a range. This will have minimal, if any, affect on the noise contours on either the 40mm GMG or .50 caliber machine gun ranges. The ASV has a larger engine than the HMMWV and during normal operations, the ASV generates more noise than the HMMWV it replaces, but the increase is localized and temporary. At 15 meters the ASV's drive-by noise was measured at 85 dB, slightly more than the HMMWV's 74.7 dB.

During off-road operations the ASV can be expected to cause minimal soil compaction, compared to that caused by the HMMWV. Bearing pressure on the soil equals the vehicle's tire pressure, which for off-road operations for the ASV is 23 psi. Normal tire inflation on the HMMWV is 31 psi. The ASV has a centralized tire inflation system that allows the vehicle operator to change tire inflation on all four tires from a control panel inside the vehicle. The HMMWV does not have a centralized tire inflation system. The

maneuver impact mile (MIM)[1] of the ASV is approximately 0.0032, which is double the MIM of the HMMWV. This, in turn, may contribute to minor increases of damage to the landscape and surface water quality by erosion. The increased weight of the ASV may cause increased levels of disturbance to stream banks and bottoms during fording operations.

Using the ASV should have minor effect on threatened and endangered species. Using existing roads and operating within established limits on existing training ranges and maneuver areas minimizes any potential adverse affects of the action on listed species and their habitat.

MP units using the ASV would have a minor to moderate effect on surface water quality. Because of its additional size and weight than the HMMWV, the ASV has a greater potential of degrading stream channels and banks during fording operations. It is not expected that using the ASV would have any effect on groundwater resources. The potential of leaking vehicle fluids from the ASV is less than the HMMWV because the engine and drive train components are inside the vehicle's hull.

MP units using the ASV are likely to have a minor effect on facilities. The ASV has a footprint approximately 60.2 square feet larger than the HMMWV. The ASV has a turning radius of 55 feet; 30 feet greater than that of the HMMWV. The ASV has a gross vehicle weight of 29,560 pounds; 19,260 pounds greater than the HMMWV. The Military Load Classification[2] (MLC) of the ASV and HMMWV are 15 and 4, respectively. The ASV has an 8.3 liter engine rated at 260 horsepower (hp); compared to a 6.5 liter engine in the HMMWV rated at 160 hp. See Table ES.3. Figure ES.1 provides photographs of the ASV.

Table ES.3 Physical characteristics of the M1025 HMMWV and the M1117 ASV

	M1025/M1026 HMMWV	M1117 ASV
Height	76 in.	102 in
Width	85 in	101 in
Length	190.5 in	246 in
Footprint (l x w)	112.4 sf	172.6 sf
Turning radius	25 ft	55 ft
Gross Vehicle Weight	10,300 lb.	29,560 lb.
Engine size	8-cylinder, 6.5 liter	6-cylinder, 8.3 liter
Engine horsepower	160 hp	260 hp
Military Load Classification	4	15

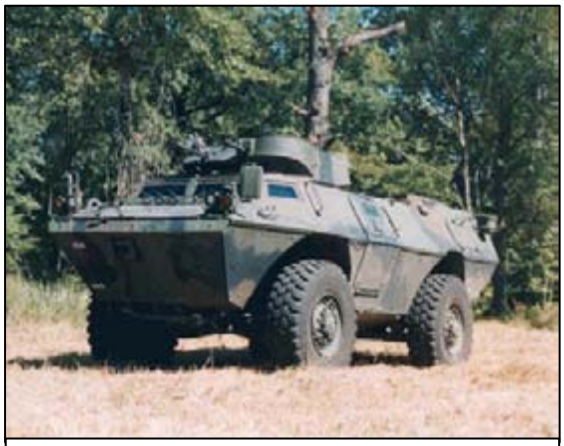
References: Global Security, 2007; U.S. Army, 2006; U.S. Army, 1996; AM General, 2007

[1] A Maneuver Impact Mile (MIM) is a dimensionless value assigned to vehicles based on their impact to training and maneuver lands. The standard against which all vehicles are compared is one M1A2 tank, traveling one mile while participating in a battalion task force field tactical exercise has a MIM of 1.0.

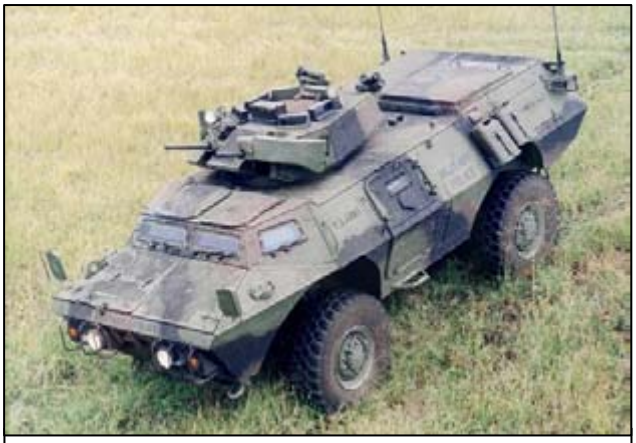
[2] Military Load Classification system is a standard method in which a route, bridge, or raft is assigned class number(s) representing the load it can carry. Vehicles are also assigned number(s) indicating the minimum class of route, bridge, or raft they are authorized to use.

While the HMMWV and ASV use several of the same petroleum products, the ASV uses a higher number of products, and in several cases a higher quantity (Table ES.4). All of the petroleum and lubricants used in the ASV are standard products used in other military vehicles. Normal maintenance operations for the ASV will generate increased volume of used oil. This will have a minor effect as installations already have in place material management processes and education programs for effectively managing these materials.

Figure ES.1 The Armored Security Vehicle



Source: http://www.geocities.com/cavscout031/vehicles/m1117_asv_150.html. Accessed Jan 24. 2008.



Source: http://defense-update.com/products/m/m-1117-ASV.htm, Accessed Oct 26, 2007.

Table ES.4. Petroleum, oil, and lubricants required for the M1025 HMMWV and M1117 ASV

Component	M1025 HMMWV	M1117 ASV
Fuel	25 gal	50 gal
Engine coolant system	26 qt	50 qt
Engine oil	8 qt	20 qt
Transmission oil	6 qt	22 qt
Transfer case	3.5 qt	22 qt
Differentials (each)	2 qt	2 qt
Wheel ends (each)	n/a	0.8 qt
Winch	n/a	1.25 qt
Hydraulic Reservoir	n/a	20 qt
Brake accumulator	1.2 pt	3 qt
Air Conditioning Refrigerant (R134A)	n/a	6 oz

References: U.S. Army, 1996; U.S. Army, 2003

Each ASV will consume 63% more diesel fuel than the HMMWV it replaces (Table ES.5). On a unit basis, an MP company equipped with ASVs will consume approximately 19% more fuel than an MP company equipped only with HMMWVs. The ASV's additional fuel consumption could potentially require an installation to have more frequent fuel deliveries, deliver more bulk fuel with the current number of deliveries, or

potentially build additional fuel storage based largely on the specific installation's fuel storage capacity. Any of these options would have a minor effect on the environment. Despite its higher fuel consumption rate, the ASV's larger fuel tank will require refueling at a lower frequency than the HMMWV, which reduces the risk of fuel spills during refueling operations.

Table ES.5 Characteristics of the HMMWV and ASV

Characteristic	M1025 HMMWV	M1117 ASV
Fuel Consumption (gal/hour)	8.8	14.44
Annual Waste Oil Generated (qt/year)	16	80

Using the ASV should have minor effect on facilities. The footprint of the ASV is 60.2 square feet larger than the HMMWV. In an MP company, the 12 ASVs will occupy approximately 722 square feet more than the same number of HMMWVs. The turning radius of the ASV is also 30 feet larger than the HMMWV. These factors may require modification, or addition to a unit's tactical vehicle parking area. If the parking area is expanded, this may cause an increase of impervious surface and increase stormwater runoff. The ASV has a Military Load Classification (MLC) of 15; larger than the HMMWV's MLC of 4. The ASV's MLC is comparable with that of other tactical wheeled vehicles commonly found on most installations in the U.S.

Using the ASV will have minor to moderate cumulative effects on the environment, primarily as a result of off-road operations. These effects include increased soil compaction, resulting in increased damage/mortality to vegetation. These conditions, in turn create the potential for increased soil erosion. An increase of ASVs conducting fording operations at non-hardened fording sites will likely have a moderate cumulative effect on surface water quality. Operations of multiple ASV-equipped MP companies within established limits on existing training and maneuver areas will have minor cumulative effects on facilities, hazardous materials and waste oil, noise and threatened and endangered species. The ASV is not expected to have any effect on cultural resources.

The ASV fills the operational gap of crew survivability, firepower and mobility to support the Military Police mission on the modern battlefield. The operational spectrum of the ASV is to operate 50% on improved (paved) roads, 30% on unimproved (unpaved) roads, and 20% cross-country (off road). Operating on all three of these conditions is an essential element of meeting the requirements of the Military Police mission. To operate across the full spectrum of the combat environment, requires similar training. Training under any conditions less than the full spectrum of the operational environment normally experienced by Military Police Soldiers and units would have a significant and detrimental effect on Soldier and unit readiness.

Using the ASV under the conditions of Alternative 1 (The ASV operates on all roads, and established ranges and maneuver areas) would have a significant and positive effect on the Military Police mission and the survivability of MP soldiers. Soldier and

unit training under Alternative 1 would be enhanced and would permit soldiers to train as they fight, which is current Army training doctrine. Using the ASV only on established paved roads (Alternative 2) or on paved and unpaved roads (Alternative 3) would not allow MP Soldiers or units to conduct the full spectrum of training that is inherent with their mission.

This PEA demonstrates that using the Armored Security Vehicle with MP units stationed in the unit states will not have significant affects on humans or the natural environment. Therefore a Finding of No Significant Impact will be issued for this action's programmatic implementation.

Potential environmental affects resulting from the proposed action and alternatives, including the No Action Alternative, are identified in this PEA. Under the Proposed Action, it has been determined that no significant environmental impacts would result, providing that site-specific conditions and criteria are met and that specified mitigation measures are implemented. If these specified mitigations cannot be implemented to reduce potentially significant impacts, or, if site-specific conditions are not consistent with this PEA, supplemental NEPA analysis and documentation will be required.

Table ES.4 Matrix of Potential Environmental Effects of Using the M1117 Armored Security Vehicle

	Soldier & unit Training	Natural Resources & Soils	Air Quality	Noise	Hazardous Materials	Facilities	Energy	Water Resources	Cultural Resources	Threatened & Endangered Species
1. ASV operates on all roads, ranges and maneuver areas.	+	⊘	⊙	⊙	⊙	⊙	⊙	⊘	○	⊙
2. ASV operates only on paved roadways	⊗	○	⊙	⊙	⊙	⊙	○	○	○	○
3. ASV operates only on paved or unpaved roadways	⊗	⊘	⊘	⊙	⊙	⊙	⊙	○	○	○
4. No Action Alternative	⊗	○	○	○	○	○	○	○	○	○

Key: ○ No effect anticipated
⊙ Minor effect anticipated
⊘ Moderate effect anticipated
⊗ Significant effect anticipated
\+ Beneficial impact

SECTION 1.0:
PURPOSE AND NEED FOR THE PROPOSED ACTION

1.1 INTRODUCTION

The M1025/1026 HMMWV has been the workhorse of the Military Police (MP) since it was fielded in 1986. Undesirable experiences during combat operations in the past two decades (including Operation Desert Storm in 1991 and in Mogadishu, Somalia in 1993) forced the Army to explore options that increased Soldier and crew survivability while effectively supporting the mission.

The U.S. Army Military Police determined it had an operational capability gap between the HMMWV and the M113 Armored Personnel Carrier/M2 Bradley Fighting Vehicle. While the M113 and the M2 have much greater survivability and firepower then the HMMWV, they are heavy, maintenance intensive, and cost prohibitive. The increased lethality of the third-world combat environment, to include armor-piercing munitions, improved anti-armor systems and mines forced the Military Police to look at light armored vehicles.

Based on a required operational capability document submitted in 1991, the Army developed the M1117 Armored Security Vehicle (ASV) to provide increased survivability for the crew while sustaining its mobility and speed on the battlefield to execute the Military Police Corps' primary battlefield missions. Production on the vehicle began in March of 2000. Initially the vehicle was deployed to Forts Lewis, Carson and Hood, as well as some MP units located outside the continental United States. Since the beginning of Operation Iraqi Freedom, a limited number of the ASVs have been assigned to selected installations in the United States for training (Fort Dix, NJ; Fort Leonard Wood, MO; Fort Campbell, KY; Camp Shelby, MS) and testing (Aberdeen Proving Grounds, MD), with new vehicles being deployed to combat theaters in Iraq or Afghanistan (Bradford, 2001).

An MP Company is authorized 47 HMMWVs; the MP Platoon organic to a Brigade Combat Team is authorized 14 HMMWVs. The Army plans to equip each MP company with 12 ASV's and each MP Platoon organic to Brigade Combat Teams six (6) ASVs. For each ASV it receives, a unit will exchange one HMMWV. There will be no net increase of vehicles or of personnel assigned to an MP unit receiving an ASV. The current fielding plan is primarily based upon the Dynamic Army Resource Priority List (DARPL) which prioritizes units receiving the ASV based upon rotation sequences (Kelly, 2007).

1.2 SCOPE AND METHODOLOGY

This Programmatic Environmental Assessment (PEA) evaluates potential direct, indirect, and cumulative effects of using the M1117 ASV at Army installations in the United States. If the considerations and analyses in this PEA are applicable

to local conditions and if no additional issues are identified, requirements of NEPA can be met through the use of this PEA and the completion of the specified REC checklist (Appendix A), and subsequent REC. Because the proposed action will be to "use the ASV at installations nationwide," the Army is analyzing the action in a programmatic approach. Table 1.1 provides a list of Army installations that will be among the first to receive the ASV. A total of 3,118 ASVs are expected to be fielded to MP units in the Active Army, U.S. Army Reserve and Army National Guard. Subsequent site-specific NEPA analysis may be conducted at installations where the ASV-equipped MP units are assigned or will conduct training. To insure proper utilization of this PEA, as well as compliance with the President's Council for Environmental Quality (CEQ) guidance (40 CFR Parts 1500-1508) and the Army's NEPA regulations (32 CFR Part 651), a specific Record of Environmental Consideration (REC) checklist is included that provides a framework for identifying NEPA requirements beyond the scope of this PEA for using the ASV. If the conditions of this checklist are met, and if procedures and mitigations are adopted at the installation level, a REC may be prepared that references this PEA and the proposed action may proceed. Otherwise a site specific supplemental EA will be prepared where needed.

The purpose of this PEA is to facilitate compliance with the Army's NEPA regulations (32 CFR Part 651) at installations receiving the ASV, or where the ASV may conduct training, by providing (1) a framework to address the impacts of this type of action, (2) a procedure to certify a complete understanding and mitigation plan (when required) for all impacts addressed in this PEA through the use of a specific REC, and (3) a procedure to ensure the preparation of a focused supplemental NEPA document when site specific (tiered) analyses identify the need. This PEA provides the public and decision-makers with the information required to understand and evaluate the potential environmental consequences of using the M1117 ASV at installations receiving the ASV, comprehend the need for required mitigations and certify their viability, and identify where further site-specific review and analysis may be necessary.

Potential environmental effects resulting from the proposed action and alternatives, including the No Action Alternative, are identified in this PEA. Under the Proposed Action, it has been determined that no significant environmental impacts would result, providing that site-specific conditions and criteria are met and that specified mitigation measures are implemented. If these specified mitigations cannot be implemented to reduce potentially significant impacts, or, if site-specific conditions are not consistent with this PEA, supplemental NEPA analysis and documentation will be required.

Table 1.1 provides a list of Army installations that will be among the first to receive the ASV. A total of 3,118 ASVs are expected to be fielded to MP units in the Active Army, U.S. Army Reserve and Army National Guard. Subsequent

site-specific NEPA analysis may be conducted at installations where the ASV-equipped MP units are assigned or conduct training.

Table 1.1 Army Installations that will be among the first Army installations to receive the ASV.

Installation Name, State	Installation Name, State
Camp Shelby, MS	Fort Lee, VA
Fort Bliss, TX	Fort Leonard Wood, MO
Fort Bragg, NC	Fort Lewis & Yakima Training Center, WA
Fort Campbell, KY	Fort Polk, LA
Fort Carson & Piñon Canyon, CO	Fort Richardson, AK
Fort Dix, NJ	Fort Riley, KS
Fort Drum, NY	Fort Stewart, GA
Fort Hood, TX	Fort Wainwright, AK
Fort Irwin, CA	Schofield Barracks & Pōhakuloa Training Area, HI
Fort Knox, KY	

The document provides a comprehensive, programmatic evaluation that is broad enough in scope to assist in the evaluation of potential affects of the using the ASV at specific installations. This Programmatic Environmental Analysis uses the physical and performance characteristics of the M1025A2/M1026A2 variation of the High HMMWV as the baseline.

1.3 REGULATORY AUTHORITY

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

1.4 PURPOSE OF THE PROPOSED ACTION

The purpose of the proposed action is to equip and train MP units at Army installations in the United States with the ASV, which provides increased survivability for the Military Police Corps' Soldiers while sustaining mobility and speed on the battlefield to execute primary battlefield missions. The ASV will replace the HMMWV in MP units at a rate of four (4) ASVs per platoon in each of the three (3) platoons in a Military Police company, and six (6) ASVs per platoon organic to a Brigade Combat Team, and to train MP units with the ASV. An MP unit would exchange one HMMWV for each ASV it receives.

1.5 NEED FOR THE PROPOSED ACTION

The Army identified a need to provide a vehicle with improved armored protection, payload capacity, and collective nuclear, biological and chemical protection for MP crews deployed to implement their mission in support of the

tactical commander. The HMMWV does not provide adequate ballistic or NBC protection. The HMMWV lacks sufficient growth potential to allow for upgrades to provide the necessary protection to permit MP teams to survive while performing their doctrinal missions. To correct these deficiencies, the Army developed the Armored Security Vehicle (ASV) that:

- Provides ballistic protection against 7.62 ball for the entire vehicle; 12.7mm ball for the crew compartment, weapons station and ammunition storage areas; overhead protection from 60mm mortar fragments at 10 meters radius of burst, and protection against anti-personnel mines and anti-tank blast mines up to equivalent 4 pounds TNT;
- Has provisions for add-on armor that increase ballistic protection to the crew compartment, weapons station, and ammunition storage areas to 12.7 armored piercing, overhead protection from 155 mm air-burst at 15 meters from burst radius, and anti-tank blast mine protection up to 12 pounds.
- Is equipped with a collective NBC protection system, have mobility comparable to the M1025 HMMWV with run-flat capable tires and central tire inflation system.
- Is transportable (roll-on/roll-off) by C-130 and larger U.S. Air Force aircraft, rail and marine transport.
- Has a payload of 4,360, pounds, recognizing that add-on ballistic protection will reduce the payload capacity by 1,000 pounds.

SECTION 2.0: DESCRIPTION OF THE PROPOSED ACTION

2.1 INTRODUCTION

This section describes in detail the operational characteristics of ASV and its operational mission, as well as that of the M1025/M1026 HMMWV it is expected to replace.

2.2 PROPOSED ACTION AND IMPLEMENTATION

The proposed action is to equip MP units with the M1117 ASV to use the vehicle on all roads (paved and unpaved) and established training ranges and maneuver areas on Army installations. Distribution of ASVs to MP units will follow the basis of issue as discussed in Section 2.5.4.

2.3 OPERATIONAL MISSION OF THE MILITARY POLICE

The Military Police have five broad missions to support the combatant commander on the modern battlefield (U.S. Army, 2002):

- maneuver and mobility support;
- area security;
- internment and resettlement;
- law and order, and
- police intelligence operations.

Maneuver and mobility support are the actions necessary to support the commander's freedom of movement. The MP supports forward and lateral movement of combat resources and ensures commanders get the forces, supplies and equipment when and where they are needed. The MP support river-crossing operations, breaching operations, and passage of lines. Military Police units establish security around river crossings and establish staging and holding areas around the crossing site to ensure the commander continues momentum toward the objective. Military Police support breaching operations by providing area security, establishing holding areas and conducting straggler control operations. MP units maintain security of strategic and tactical lines of communication (LOC) and security of main supply routes (MSRs), and conduct route reconnaissance and route security.

MP area security actions protect the force and enhance the freedom of movement of units to conduct their missions. The MP is a response force that delays and defeats enemy attempts to disrupt or demoralize military operations in the area of operations. The MP conducts area and zone reconnaissance in order to detect and deter enemy or hostile activity in and around the area of operation and in support of base defense and designated critical sights and activities. The

MP's mobility makes it possible for them to detect the threat while conducting patrols in the area of operations (AO), MSRs, key terrain, and critical assets. The MP use checkpoints and roadblocks to control the movement of vehicles, personnel, and materiel and to prevent illegal actions that may aid the enemy. The MP monitor critical areas and provide security for key MSRs, bridges and tunnels, depots, terminals, logistics-support bases, ammunition supply points (ASPs), communications centers/nodes, and command and control headquarters. The MP are the base and base-cluster commanders' links for detection and early warning, and are the commander's response force against enemy attacks in rear-area or sustainment operations.

Military Police are tasked with coordinating shelter, protection, accountability, and sustainment for enemy prisoners of war (EPW) and civilian interees (EPW/CIs). The MP are tasked with collecting EPWs/CIs from combat units as far forward as possible. The MP operate collection points and holding areas to temporarily secure EPWs/CIs until they can be evacuated to the next higher echelon's holding area.

The law and order function consists of those measures necessary to enforce laws, directives, and punitive regulations. Military Police, in coordination with Criminal Investigation Command, work to suppress the chance for criminal behavior throughout the AO.

The police intelligence operations supports, enhances, and contributes to the commander's protection program, situational awareness, and battlefield visualization by portraying relevant threat information that may affect the operational and tactical environments. Information gathered through the other MP functions support the overall intelligence preparation of the battlefield.

2.3.1 Off-Road MP Operations

Off-road travel for MP units is performed largely while conducting the maneuver and mobility support and area security missions. See Section 2.3 for details.

2.4 UNIT AND SOLDIER TRAINING

Every soldier, noncommissioned officer (NCO), warrant officer, and officer has one primary mission—to be trained and ready to fight and win our Nation's wars (U.S. Army, 2002b, pg 1-1). Success in battle does not happen by accident; it is a direct result of tough, realistic, and challenging training. 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. The Army has an obligation to the American people to ensure its soldiers go into battle with the assurance of success and survival. This is an obligation that only rigorous and realistic training, conducted to standard, can fulfill. The Army has adopted a

"train the way we fight" philosophy because its historical experiences show the direct correlation between realistic training and success on the battlefield (U.S. Army 2002b).

To "train the way we fight," commanders and leaders at all levels must conduct training with respect to a wide variety of operational missions across the full spectrum of operations. These operations may include combined arms, joint, multinational, and interagency considerations, and span the entire breadth of terrain and environmental possibilities. Commanders must strive to set the daily training conditions as closely as possible to those expected for actual operations (U.S. Army, 2002b, pg 1-2).

2.5 OPERATIONAL CHARACTERISTICS OF THE ASV

2.5.1 Description of the Armored Security Vehicle (ASV).

The Military Police used the M8 Armored Car during World War II, the M20 Armored Car during the Korean War and the V-100 "Commando" Armored Car in Vietnam. These vehicles provided critical mission support to include convoy escort missions and patrols, and were highly relied upon by the Military Police. The M1025/M1026 HMMWV has been the workhorse of the Military Police (MP) Corps since it replaced the ¼-ton M151 Jeep in 1986. Events in Operation Desert Storm and in Mogadishu, Somalia resulting in vehicle damage and casualties from small arms fire demonstrated the need for a more survivable, wheeled vehicle platform to support the mission of the Army's Military Police. An armored wheeled vehicle fits the Army's operational gap between the capabilities of the HMMWV and the M2 Bradley Fighting Vehicle (BFV). The BFV has greater survivability and firepower than the HMMWV, but it is very heavy, maintenance intensive and cost prohibitive (Bradford, 2001).

The ASV provides the Military Police the mobility and speed of the Up-Armored HMMWV, but provides significantly enhanced firepower and crew protection in the modern battlefield (Bradford, 2001).

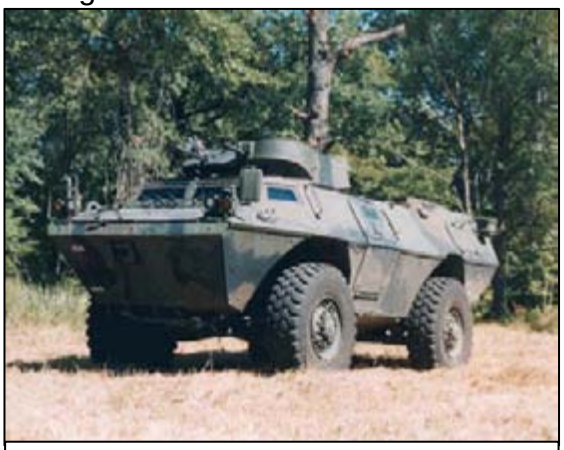
The ASV is 26 inches higher, 16 inches wider, 55.5 inches longer, has a footprint 60.2 square feet (sf) larger, and weighs 19,260 pounds more than the HMMWV. The turning radius of the ASV is 30 feet larger than that of the HMMWV (Table 2.1). Photographs of the ASV are provided in Figure 2.1. The ASV has a Military Load Classification (MLC) of 15.

Table 2.1 Physical characteristics of the M1025 HMMWV and the M1117 ASV

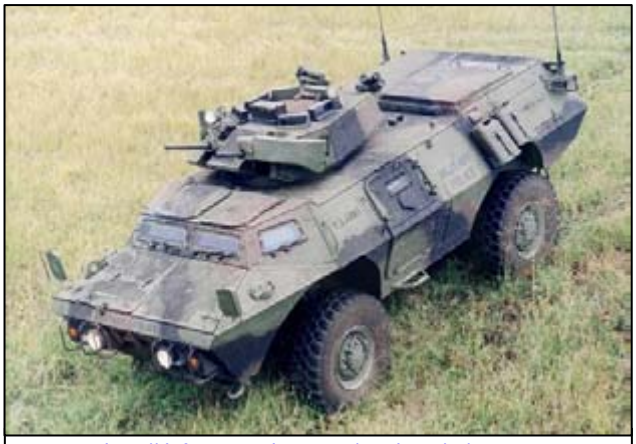
	M1025/M1026 HMMWV	M1117 ASV
Height	76 in.	102 in
Width	85 in	101 in
Length	190.5 in	246 in
Footprint (l x w)	112.4 sf	172.6 sf
Turning radius	25 ft	55 ft
Gross Vehicle Weight	10,300 lb.	29,560 lb.
Engine size	8-cylinder, 6.5 liter	6-cylinder, 8.3 liter
Engine horsepower	160 hp	260 hp
Military Load Classification (MLC)	4	15

References: Global Security, 2007; U.S. Army, 2006; U.S. Army, 1996; AM General, 2007

Figure 2.1. The M1117 Armored Security Vehicle (ASV)



Source: http://www.geocities.com/cavscout031/vehicles/m1117_asv_150.html. Accessed Jan 24. 2008.



Source: http://defense-update.com/products/m/m-1117-ASV.htm, Accessed Oct 26, 2007.

2.5.2 Capabilities and Mission of the Armored Security Vehicle

The ASV supports the MP in conducting the five MP functions across the full spectrum of military operations (See Section 2.3). The ASV can also support counter-mortar and counter-IED patrols, cordon and searches, and raids as part of a quick response force. In addition, the ASV assists the maneuver commander with enhanced force protection and sustainment capabilities (U.S. Army, 2002; U.S. Army, 2006).

The ASV provides greater ballistic protection than any other wheeled vehicle of its size in the world. The modular armor system provides ballistic protection for the crew, ammunition, fuel tanks, and storage areas against 12.7-millimeter armor-piercing ammunition. The ASV provides overhead protection against 155-millimeter ammunition at 15 meters. It provides under body protection against antipersonnel and antitank mines up to 12 pounds TNT or equivalent explosive.

This superior ballistic protection also includes a spall liner on the interior surfaces of the vehicle (U.S. Army, 2003).

The armored, four-wheel drive ASV is equipped with a 260-horsepower (hp), 8.3 liter, turbocharged Cummins diesel engine and an Allison 6-speed automatic transmission. It provides power sufficient to climb 60-percent slopes and maintain highway speeds up to 63 miles per hour. The ASV can ford hard bottom water crossings up to 60 inches and can travel through ditches and climb vertical obstacles up to 22 inches in height. Output from the transfer unit drives the rear differential when in two-wheel drive mode and the front and rear differentials when in four-wheel drive mode. Operators can engage four-wheel drive "on the fly" by actuating a shift lever at the driver's station. The ASV is equipped with an electric bilge pump rated at 46 gallons per minute that removes water that may enter the vehicle during extended fording operations. This modern design provides the mobility, agility, and durability required for the wide range of missions encountered by MP Soldiers (U.S. Army, 2006).

The ASV also includes a central tire inflation system that enhances mobility by allowing tire pressure adjustment to accommodate four different terrain types—highways, secondary roads, off-road, and emergency conditions. In addition to the central tire inflation system, the ASV's run-flat capability prevents vehicle immobilization due to tire failure. The central tire inflation system may also provide additional operational capabilities when tires are punctured by small arms fire or shrapnel and tire pressure is not reduced enough to allow run-flat capability. The ASV also includes a winch capable of conducting retrieval operations up to 15,000 pounds, and a snatch block and cable for self-recovery operations (U.S. Army, 2006).

The ASV crew stations are designed for functionality, operability and Soldier comfort. The climatic controls include an auxiliary personnel heater and an air conditioner to sustain continuous operations under all environmental extremes. The air conditioning system is capable of 30,000 btu/hour and uses R134A refrigerant (U.S. Army, 2003). The ASV can accommodate a crew of three plus one passenger, however the ability to accommodate the passenger is omitted when the vehicle is configured for combat operations with a full complement of ammunition, water, sustenance and combat equipment (U.S. Army 2006).

The ASV is transportable (roll-on/roll-off) by C-130 and larger aircraft, rail, highway and marine transport modes. The ASV is employed by three-man MP teams designed to perform missions across the entire operational continuum. The MP units programmed to receive the ASV perform their five battlefield missions regardless of the level of combat intensity on the operational continuum. The vehicle operates with specified loads under an on-road/off-road mission profile of 50% primary (paved) roads, 30% secondary (unpaved) roads and 20% cross-country (off-road) operations (U.S. Army TACOM, 1997).

2.5.3 Weapon Systems on the ASV

The following weapons and associated systems are found in the ASV gunner's station (U.S. Army, 2006):

- MK19 40mm grenade machine gun (GMG). It allows the gunner to engage direct and indirect targets to a maximum effective range of 4,920 feet or 1,500 meters.
- M48 .50 caliber machine gun. It is used for direct targeting operations at a maximum effective range of 6,002 feet (1,830 meters).
- M249, Squad Automatic Weapon. The ASV has a pintle mount that allows for exterior mounting of a squad automatic weapon with a maximum effective range of 3,281 feet (800 meters).
- M257 Light Vehicle Obscuration Smoke System. This consists of eight grenade launch tubes that can fire a 180-degree smoke pattern 35 meters from the vehicle. The LVOSS is a self-defense smoke/obscurant and non-lethal device externally mounted on the host vehicle. The LVOSS is made of lightweight materials consisting primarily of the M7 Discharger and an installation kit. The LVOSS has a push button arming/firing unit which allows the operator to select the quadrant he needs to obscure. The LVOSS uses M90 smoke grenades which are low in toxicity and which minimize safety hazards to personnel and the environment (Joint Program Executive Office, 2007; Federation of American Scientists, 2007b).

2.5.4 Basis of issue of the Armored Security Vehicle

The basis of issue is the method by which the Department of the Army issues equipment, vehicles and weapons systems to individuals and units to meet their mission requirements.

A Military Police combat support company has 47 HMMWVs and would be allotted twelve (12) Armored Security Vehicles (ASVs). The Military Police platoon organic to a Brigade Combat Team has 14 HMMWVs and would be allotted six ASVs. For every ASV assigned, a unit must exchange a HMMWV. The Army Acquisition Objective has every authorization across the Active and Reserve Components (U.S. Army Reserve and Army National Guard) of the Army being fielded for a total of 3,118 ASVs at end state. The current fielding plan is primarily based upon the Dynamic Army Resource Priority List (DARPL) which prioritizes units based upon rotation sequences (Kelly, 2007). Table 1.1 provides a list of Army installations that will likely be among the first Army installations to receive the ASV.

2.5.5 Personnel Support Requirements for the ASV

The ASV is being distributed to MP units under a basis of issue discussed in Section 2.5.4. Analysis performed by the Combat Systems Division, U.S. Army Military Police Center and School determined no changes in personnel strength,

or in distribution of military occupation specialties are necessary for units receiving the ASV (Funk, 2007).

2.6 OPERATIONAL CHARACTERISTICS OF THE HIGH MOBILITY MULTI-PURPOSE WHEELED VEHICLE (HMMWV)

The HMMWV is the replacement vehicle for the M151-series ¼-ton jeeps. The M998 is the baseline vehicle for the series of 1-1/4-ton trucks, which are known as the HMMWV. The HMMWV includes a number of variants, with various equipment to meet a number of Army missions. All HMMWVs are designed for use over all types of roads, in all weather conditions and are extremely effective in the most difficult terrain. The HMMWV's high power-to-weight ratio, four wheeled drive and high ground clearance combine to give it outstanding cross-country mobility.

The mission of the HMMWV is to provide a light tactical vehicle for command and control, special purpose shelter carriers, and special purpose weapons platforms throughout all areas of the modern battlefield. It is supported using the current logistics and maintenance structure established for Army wheeled vehicles. The HMMWV is equipped with a 6.5 liter, 8-cylinder 150 horsepower (hp) diesel engine, automatic transmission and four-wheel drive. The HMMWV is air transportable and droppable from a variety of aircraft. The HMMWV can be equipped with a self-recovery winch capable of up to 6,000 pound 1:1 ratio line pull capacity and can support payloads from 2,500 - 4,400 pounds depending on the model. The HMMWV is produced in several configurations to support weapons systems, command and control systems, field ambulances, and ammunition, troop and general cargo transport.

The HMMWV can climb 60% slopes and traverse a side slope of up to 40% fully loaded. The vehicles can ford hard bottom water crossing up to 30 inches without a deep water fording kit and up to 60 inches with the kit (Federation of American Scientists, 2007a). The M1025, M1025A1/A2, M1026 and M1026A1/A2 HMMWVs are armament carrier configurations of the HMMWV family.

The M1025/M1026 armament carriers are the variation of the HMMWV fielded to MP units. It has a ring-mounted turret with 360° arc of fire, with armor protection for crew, weapon components, and ammunition. The M1025 and M1026 are identical, save the winch system included on the M1026.

In 1995 the Army fielded the M1025A2/M1026A2 version of the HMMWV. The A2 series modification package included a new 6.5-liter naturally aspirated diesel engine with improved 160 horsepower rating. The new engine was coupled with an electronically controlled four-speed automatic transmission and a new exhaust emission system with catalytic converter that had been redesigned to meet new 1995 environmental standards. In addition, the A2 vehicles were produced in "Central Tire Inflation - ready" configuration, with axles / wheels

capable of accepting a Central Tire Inflation System (CTIS) as a field-installed item. (AM General, 2007). The HMMWV has a Military Load Classification of 4.

2.6.1 Weapon Systems on the M1025/M1026 HMMWV

The M1025, M1025A1, M1025A2, M1026, M1026A1, and M1026A2 versions of the HMMWV can be equipped with any of the following weapon systems. (Global Security, 2007):

- M2, .50 caliber machine gun;
- MK19, 40mm grenade machine gun;
- M60, 7.62 mm machine gun;

The M249 squad automatic weapon can be mounted on the M1025/M1026 with the use of an adaptor kit. The HMMWV can be equipped with the M257 Light Vehicle Obscuration Smoke System (LVOSS) (Federation of American Scientists, 2007b) . Information about the LVOSS is provided in Section 2.5.3.

2.7 ARMY SUSTAINABLE RANGE PROGRAM AND POLICIES

The affects of off-road travel by military vehicles are managed through the Army's Sustainable Range Program, which is mandated by Army Regulation (AR) 350-19, "The Army Sustainable Range Program" (U.S. Army, 2005). This regulation establishes the objectives, responsibilities, and policies for the Army's Sustainable Range Program (SRP) to achieve optimum and sustainable use of Army training lands. These comprehensive programs require Army installations to implement a uniform land management regimen, including the periodic inventory and monitoring of land conditions, integration of training requirements with land carrying capacity, education of land users to minimize adverse impacts, and the provision of required training land rehabilitation and maintenance. The Army's Sustainable Range Program outlines how each component program contributes to the overall sustainability of the natural and cultural resources on Army training lands. The training constraints overlay is a tool to manage training lands and control training area land use. This overlay, provided to each military unit using military training lands identifies areas off-limits to training, and off-limits to vehicle maneuver (U.S. Army, 2005; paragraph 5-5). This Geographic Information Systems (GIS) overlay is updated regularly by the installation and issued to training units before every field training engagement. The off-limits areas prohibit soldier training or vehicle operations based on the presence of cultural resources, threatened or endangered species, critical habitat, or training lands in various stages of restoration or re-growth.

Recognizing that the management of single training events had historically proven inadequate to sustain these ranges over time, this more comprehensive approach focuses on "'carrying capacity" of the land (total stresses on these ranges) and the relationship between use (maneuver impact miles), condition of the land, and required maintenance to meet desired goals. The Army approach

focuses on the cumulative erosion conditions on the training lands. This approach has been articulated in Army policy (U.S. Army, 2005) which (1) estimates training land carrying capacity to support maintenance and optimal use for realistic training, and (2) establishes mechanisms to predict and secure required land rehabilitation and maintenance requirements based on training usage. This approach insures the active and ongoing characterization of the land conditions and allows for analysis of stresses, thresholds, and cause-effect mechanisms. It also evaluates the establishment of baseline conditions, analysis of the magnitude and significance of effects, mitigation design and implementation. This approach allows for monitoring of predicted effects of training activities. The Army approach has expanded to include establishing stress thresholds based upon the ability of the landscape, under various conditions, to support levels or intensities of military activity (Anderson and Sullivan, 2000).

The long-term Army range maintenance policies and guidelines constitute a proactive approach. Supported by considerable Army research on the fundamental mechanisms for analyzing such significance (Vaughn, 1983; Riggins, 1979), the concept of "carrying capacity" can now be used to eliminate major (significant) effects to training lands by managing training stresses on the landscape (Anderson and Sullivan, 2000).

SECTION 3.0:
DESCRIPTION OF ALTERNATIVES CONSIDERED

3.1 ALTERNATIVES TO THE PROPOSED ACTION

The following discussion describes the alternatives considered for using the Armored Security Vehicle. Three alternatives address different operational limitations when MP units equipped with ASV operate the vehicle at Army installations in the United States.

3.1.1 **Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas.**

The ASV would operate on the installation on all roads (paved and unpaved), all weapons ranges and all established tactical maneuver and training areas. This is the preferred course of action.

3.1.2 **Alternative 2. The ASV operates only on the installation's paved roadways.**

The ASV would operate on the installation only on paved roadways. Operations on both unpaved roads and off-road would be prohibited.

3.1.3 **Alternative 3. The ASV operates only on the installations roadways.**

The ASV would operate only on the installation's established paved and unpaved roadways. Off-road operations would be prohibited.

3.1.4 **No Action Alternative. Continued use of the HMMWV.**

The No Action Alternative is to not use the ASV at an installation in the United States. This would lead to a degradation of the training and readiness of MP units in the U.S. Army. The vehicle has been developed in order to fulfill an identified gap in the operational capabilities of MP battlefield missions, and not having the vehicle available for training would create a gap in training requirements for MP units. This alternative provides a baseline for comparison to the Proposed Action and other alternatives listed in this section.

3.2 EVALUATION CRITERIA

This section lists the criteria that will be used to evaluate the alternative courses of action. Listed below are the criteria by which the alternatives will be evaluated and compared.

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

SECTION 4.0:
ENVIRONMENTAL CONDITIONS AND CONSEQUENCES

4.1 INTRODUCTION

This PEA evaluates the potential environmental effects of using the M1117 ASV at an Army installation and determine if any site-specific requirements require more detailed analyses.

The PEA has considered several environmentally-related resource areas which, for purposes of evaluation, have been identified as program resource areas, and those eliminated from further consideration.

4.2 RESOURCE AREAS ELIMINATED FROM FURTHER CONSIDERATION

Analysis of potential environmental effects associated with a programmatic Environmental Assessment typically address numerous resource areas that may be affected by implementation of proposed actions. In the case of using the M1117 Armored Security Vehicle certain environmental resource areas that typically receive attention have been initially examined and determined not to warrant further analysis. These areas include infrastructure, hazardous waste site contamination and cleanup, groundwater, socioeconomics, environmental justice, traffic and transportation, and airspace management.

Infrastructure. The proposed action is a one-for-one exchange of an ASV for a HMMWV and will not likely post ad additional demand on an installation's infrastructure, such as potable water supply, electricity, wastewater treatment, steam and process heat, telecommunications, solid waste disposal. The MLC is a measure of the vehicle's impact on bridges, ferries and roads. While the ASVs MLC is greater than that of the HMMWV, it is comparable to other wheeled tactical vehicles commonly used on bridges and paved roads both on post and off. The ASV's weight should have no effect on roadways, and no effect on bridges with an MLC greater than 15.

Hazardous Waste Site Contamination and Cleanup. Past practices related to the handling and disposition of hazardous waste generated by an Army installation have occasionally resulted in the creation of waste sites that require remediation under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). Since passage of the Superfund Amendments and Reauthorization Act in 1986, federal facilities have been subject to CERCLA to the same extent as private sector sites. In the main, waste sites at Army installations have been identified and are now being addressed by remedial program efforts. Using the ASV at military installations in the United States would not affect, or be affected by, such remediation actions.

Environmental Justice. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations requires the Army to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The Proposed Action is a one-for-one exchange of a combat vehicle that is operated almost exclusively within the confines of the military installation. Using the ASV at an Army installation in the U.S. would not affect minority or low-income populations.

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 with a region of influence. Fielding the ASV involves the one-for-one exchange with the HMMWV. Fielding the ASV on this basis would not alter the personnel authorizations for the units receiving the vehicle. Using the ASV would not alter aspects of the human environment typically classified as part of the socioeconomic environment.

Land Use. Land use addresses the effects of an action on how land is used, and the potential effect an action has on adjoining land uses. The ASV incorporates both the MK19 GMG and the M48 .50 caliber machine gun. HMMWV's currently in MP companies are equipped with either the M2 .50 caliber machine gun, or the MK19 GMG. The ASV will be employed during training maneuvers in much the same manner as the HMMWV, and will fire the same weapon systems on the same ranges as the HMMWV. The employment of the ASV will not cause any changes in land use planning on weapons firing ranges, on maneuver training areas, or have any impact on adjacent land uses. The ASV will likely be parked in the same motor pools as the HMMWV, and will not affect the land use of either current unit parking, current maintenance facilities, or that of adjoining land.

Airspace. The ASV is a ground combat weapon system. The ASV weapon systems (Section 2.5.2) are direct fire, and will be used exclusively on ranges specifically designed for those weapon systems. Employment of the ASV at Army installations will have no effect on airspace management.

Traffic and transportation. This topic evaluates the potential effects of a proposed action on the traffic and transportation network, and what effect, if any, the proposed action has on the level of service (LOS). Assigning ASVs on a one-for-one exchange for HMMWVs will not increase the number of wheeled combat vehicles in a unit or on an installation. Assigning ASVs in exchange of HMMWVs will not change the number of personnel assigned to MP units, and thus not affect the number of privately-owned vehicles on the road network of either an Army installation or the local community. Using ASVs on an Army installation will have no affect on traffic and transportation.

Solid waste. 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. Assignment of the ASV on a one-for-one basis for a specified number of HMMWVs in MP units does not increase the number of personnel in an MP company. The ASV will be employed during training and weapons firing in manner similar to that of the HMMWV. Because is equipped with both the .50 caliber machine gun and the 40mm GMG, it will cause the generation of up to 25 percent more dunnage associated with ammunition storage. Army installations have well-established systems in place to properly manage dunnage and recycling of used shell casings. Because the ASV is larger than the HMMWV it is possible that routine vehicle maintenance will generate more solid waste, such as rags and similar consumables. The Army has mature, well-established programs to effectively manage this waste. The ASV will generate a higher volume of solid waste than the HMMWV it replaces, but the waste is similar in nature to that generated by the HMMWV. There will be minimal negative effects on solid waste management from using the ASV on an Army installation.

4.3 PROGRAM RESOURCE AREAS

A program resource area is an area that is applicable at all, or nearly all, locations at which the ASV would be used. Resource areas in this category include natural resources and soils, air quality, noise, hazardous material and waste oil, facilities, energy, surface water, threatened and endangered species, and cultural resources.

4.3.1 Air Quality

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 1990 amendments to the CAA (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, the primary federal statute regulating air emissions, 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 SIPs may be established for stationary and mobile sources. Implementation of the Act's requirements, for purposes of achieving NAAQS, is achieved primarily through SIPs and various federal programs. The CAA requires states to develop SIPs that establish requirements for the attainment of NAAQS within their geographic areas. SIPs 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 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 sanctions 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 will 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 provide the framework for the majority of air quality regulations and guidelines with which Army installations must comply. The CAAA-90 are implemented by detailed federal, state, and local regulations. The CAAA-90 requirements are incorporated within Army's AR 200-1 (U.S. Army, 2007a). The Air Pollution Abatement Program in AR 200-1 includes activities to control emissions and cooperation with appropriate regulatory agencies. The objectives are to:

- identify and monitor air pollution sources, determine types and amounts of pollutant emissions, control pollutant levels to those specified in applicable regulations or to protect health;

- procure commercial equipment and vehicles with engines that meet applicable standards and regulations and that do not present a health hazard (exceptions are those vehicles or engines specifically excluded or exempted by EPA regulations or agreements);

- ensure that each piece of military equipment is designed, operated, and maintained so that it meets applicable regulations;

- monitor ambient air quality in the vicinity of Army activities per applicable regulations;

- cooperate with EPA and state authorities to achieve the requirements of the CAA 1977 and applicable regulations issued according to this act, applicable state and local air pollution regulations, air pollution control provisions in other federal and state environmental laws and regulations, including RCRA of 1976, as amended, the Toxic Substances Control Act (TSCA) of 1976, CERCLA of 1980, Superfund Amendments and Reauthorization Act of 1986 (SARA of 1986), and applicable State and local environmental regulations

Conclusion of effect. Given the wide spatial distribution of mobile emission sources, using the ASV should have a minor to moderate effect on air quality. The level of effect largely depends on the current status of regional air quality near an installation receiving ASVs. There is no indication there would be any significant change in the numbers of "process" emissions from maintenance shops and other sources resulting from the proposed change. Best Management Practices (BMPs) for dust suppression should mitigate any potential problems caused by fugitive dust.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas. Operating the ASV on paved, unpaved roads, and off-road during training operations will likely have a moderate effect on air quality as described above. The ASV will generate more exhaust emissions than the HMMWV it replaces. The ASV may generate more fugitive dust while operating on unpaved roadways. Installations should continue implementing best management practices to minimize fugitive dust resulting from vehicle operations on up-paved roadways.

Alternative 2. The ASV operates only on the installation's paved roadways: This alternative course of action will have a minor effect on air quality. Operating the ASV only on paved roads may reduce the total vehicle exhaust emissions because the vehicle would be limited to operations only within the installation cantonment area and the limited paved roads on the installation's training and maneuver area. This is a reasonable assumption understanding the operational profile for the ASV is 50% on improved (paved) roads. Under these conditions, it is likely the ASV will actually operate fewer hours than the HMMWV it replaces. While operating only on paved roads, the ASV will not contribute fugitive dust that would be generated while operating on unpaved roadways or off-road.

Alternative 3. The ASV operates only on the installations roadways: Operating on both paved and unpaved roadways would generate virtually the same vehicle exhaust emissions as Alternative 1. The operating profile for the ASV is

projected to be 50% on paved roadways, 30% on unpaved roadways, and 20% in off-road operations. Prohibited from off-road operations it is very likely the ASV will spend a majority of its projected off-road operations on unpaved roads. This would likely increase the fugitive dust generated on the installation. This alternative course of action will likely have a moderate effect on air quality. Installations should continue implementing best management practices to minimize fugitive dust resulting from vehicle operations on up-paved roadways.

Alternative 4. The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. As stated earlier, the ASV will produce localized, short-term elevated air pollutant concentrations that should not result in any sustained impacts on regional air quality.

Installations with current air emissions inventories close to regulatory thresholds will have to pay very close attention to the potential affects of transitioning to ASVs might have on the local airshed. Analyses prepared for site- and project-specific proposals will have to include full compliance with the General Conformity Rule. As discussed earlier, installations classified as major sources of air pollutants in NAAQS attainment or maintenance areas require a Conformity Determination when the total direct and indirect emissions caused by an action would equal or exceed thresholds specified by the EPA. Even if the proposed action meets the definition of one of the exemptions or when emissions would not exceed de minimis thresholds, Army policy requires preparation of a “Record of Non-applicability” to reflect a proponent’s consideration of the Conformity Rule’s requirements.

Army installations maintain appropriate programs to insure and document compliance with local and state air quality requirements, and these on-going efforts should prove sufficient. In some cases, site-specific analyses, and further coordination with federal, state and local regulators, may be required. Such regulations include those addressing visible emissions, particulate emissions, and VOC emissions; and applicability will be a site-specific, local determination

Table 4.1 provides a summary of calculations that show the emissions of MP companies equipped with 12 ASVs and 35 HMMWVs and the same company equipped with a full contingent 47 HMMWVs. Calculations are provided in Appendix B. The calculations in the following tables assume that ASVs will operate the same number of hours and same conditions as the HMMWVs they replace. The emissions generated by any given MP unit is directly related to its operational tempo, which reflects the number of miles and hours a unit operates its vehicles. If the projected emissions, based on the information provided here, could pose an issue a site-specific issue, the installation may need to conduct air quality modeling to determine with more precision the air quality affects of using the ASV.

Table 4.1. Emissions of ASV- and HMMWV-equipped MP companies[1,2]

Emission	ASV-equipped	HMMWV-equipped	Difference (ASV-HMMWV)	Percent difference
NO_x	31,320.	22,560.	8,760.	+ 38.8 %
HC	3,153.8	1,763.	1,390.8	+ 78.9 %
CO	11,166.	12,690.	- 1,524.	- 12.0 %
particulates	1,810.4	1,622.	188.4	+ 11.6 %

1. All units in grams per hour
2. Calculations provided in Appendix B

Combustion emissions resulting from training would be primarily from mobile sources and be widely distributed both spatially and temporally. Given the wide distribution of emissions, it is anticipated that regional air quality would not be significantly affected.

The emissions for both the ASV-equipped MP company and MP platoon are higher than those of a comparable MP company equipped only with HMMWVs for NOx, hydrocarbons, and particulates, and slightly lower for carbon monoxide (CO) (Tables 4.1 and 4.2). The local regional effect of an ASV-equipped company will have to be determined at the local level, based on the proposed operational tempo of the ASV-equipped units and the local/regional air quality conditions.

Table 4.2 Emissions from ASV- and HMMWV-equipped MP platoons [1,2,3]

Emission	ASV-equipped	HMMWV-equipped	Difference (ASV-HMMWV)	Percent difference
NO_x	11,100.	6,720.	4,380.	+ 65.2 %
HC	1,220.4	525	695.4	+ 132 %
CO	3,018.	3,780.	- 762.	- 20.2 %
particulates	577.2	483.	94.2	+ 19.5 %

1. All units in grams per hour
2. Calculations provided in Tables B-5 through B-8, Appendix B
3. For MP platoon organic to a combat brigade team

The Proposed Action may result in incidental emissions from fugitive dust, and vehicle exhausts. These incidental emissions resulting from training would be primarily from mobile sources and be widely distributed both spatially and temporally. Fugitive dust may be more prevalent in drier climates, such as the desert southwest or other regions where soils are more susceptible to generating fugitive dust. Best Management Practices (BMPs) for dust suppression should mitigate potential problems caused by fugitive dust. Dust suppressants or gravel should be considered to mitigate fugitive dust emissions on heavily traveled unpaved roads. Dust resulting from convoys can be reduced by regulating convoy routes, distance between vehicles and enforcing speed limits. Scheduling routes away from the installation's perimeter would reduce the off-post affects from fugitive dust. Maneuver in "off-road" locations might be reduced

or terminated during periods of high winds that have the potential to transport the dust and emissions well beyond the installation.

4.3.2 Cultural Resources

Affected Environment. A wide variety of cultural resources are found on Army installations. Significant properties are classified as buildings, sites, districts, structures, or objects. Buildings were primarily constructed for human activity. Structures usually were constructed for purposes other than shelter. Objects are principally artistic in nature or relatively small in scale. Sites are often the location of a valued significant event, prehistoric or historic occupation or activity, or a standing location that possesses those values. Sites may also be natural landmarks strongly associated with significant prehistoric or historic events or patterns or events. Districts typically are a significant concentration or continuity of sites, buildings, structures and objects.

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, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, the Archeological Resources Protection Act, the Archeological and Historic Preservation Act and other federal and state regulations.

Conclusion of effect. Operation of the ASV on paved or unpaved roadways will have no effect on historical or cultural resources. The ASVs off-road operational profile is 20%, and it is expected to operate within established boundaries of existing training and maneuver areas. These areas have been used by other and heavier tactical vehicles. Normal operations of the ASV within the boundaries of established training and maneuver areas will have no effect on historic or cultural resources.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas: On-road operations of the ASV will have no effect on historical or cultural resources. Off road operations within established boundaries of existing training areas will have minimal effect on historical or cultural resources.

Alternatives 2 and 3 Operating the ASV only on installation roads: Normal operations of the ASV on both paved and unpaved roads on the installation will have no effect on historic or cultural resources on an Army installation.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. The operational parameter for the ASV will be 50% on paved roads, 30% on unpaved roads, and 20% off-road. While operating on paved or unpaved roadways the vehicle will have no effect on either known or unknown historic or cultural resources. Off-road operations will be conducted within the context of the MP mission (see Section 2.3.1), and operate on established training ranges and maneuver areas on Army installations. The ASV will operate on land previously used by other heavier tactical vehicles. Normal operations of the ASV on established training and maneuver areas will have no effect on cultural resources.

4.3.3 Noise

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.

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.

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 airfields 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 4.3) (U.S. Army, 2007a).

Table 4.3 Department of the Army Noise Limits for Noise 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)

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). 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.

Conclusion of effects. Normal operations of the ASV will have minor effect on noise. Using the M1117 ASV is not expected to significantly increase ambient noise levels. During normal operations, the ASV generates more noise than the HMMWV it replaces, but the increase is localized and temporary. At 15 meters the ASV's drive-by noise was measured at 85-dB, slightly more than the HMMWV's 74.7 dB. Operation near or adjoining zone I areas (such as housing, schools, and medical facilities) should be avoided.

With 12 ASVs replacing 12 HMMWVs in MP companies, the total number of 40mm GMG and .50 caliber machine guns increases from 47 to 59. Weapons from both the HMMWV and the ASV will fire from the same ranges. With 25 percent more weapons, it can be expected that it will take approximately 25 percent more time, depending on the number of firing lanes, to process each weapon through their respective ranges. The noise from firing additional weapons from the ASV will be no greater than when they are fired from the HMMWV, and will cause little, if any, changes to the noise contours on these ranges.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas: When operating on roadways, training ranges and maneuver areas the noise of the ASV will likely have a minimal effect. Noise generated from normal operations of the ASV is slightly higher than the HMMWV, but the noise is localized and temporary. The noise generated from weapons firing on the ASV will be no greater than that from weapons mounted on the HMMWV. With more weapons, it will require more time to process each weapon through its

respective range. This will generate the same level of noise for a longer period of time, and will cause little or no changes in the range's noise contours.

Alternative 2. The ASV operates only on the installation's paved roadways: Limited to the paved roadways, the effects of normal operations of the ASV on noise would be minimal. The minimal effects would be localized and temporary. The effect of noise generated from weapons firing would be the same as that described in Alternative 1, above.

Alternative 3. The ASV operates only on the installations roadways: Noise from normal operations of the ASV would be limited to paved roadways and unpaved roads, such as tank trails. The minimal effects of noise from normal operations of the ASV would be localized and temporary. The effect of noise generated from weapons firing would be the same as that described in Alternative 1, above.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. Potential sources of high impulse noise include the weapons systems of the ASV. Each weapon system on the ASV is also capable of being used on the HMMWV (Sections 2.4.3 and 2.5.1). The number of rounds of ammunition fired from each weapon on the ASV will be comparable to the number of rounds fired from the HMMWV and done on the same ranges. There will be no additional noise generated from firing weapons on the ASV, which fires the same weapons as on the HMMWV.

Potential sources of steady-state noise from operating the ASV include the vehicle's engine, tires, and auxiliary equipment. The ASV has a larger engine (6-cylinder, 8.3 liter) than the HMMWV (8 cylinder, 6.5 liter). When operating at low engine idle (850 rpm) The 85 dBA contour is 1 meter (3.2 feet) in the area near the vehicle's engine compartment, and 15 meters (48.1 feet) in a 60-degree arc from the vehicle's engine compartment at high idle (½ throttle).

Drive-by noise was measured at 82 dB at a distance of 15 meters (49.2 feet) from the centerline of the vehicle traveling 35 mph on a paved surface (Emery, 2000). Drive-by noise caused by a HMMWV was measured at 74.7 dB at a distance of 50 feet while traveling 35 mph (U.S. Army Hawaii, 2004).

The ASV will generate more noise than the HMMWV, but the noise increase from operating the vehicle will be localized and temporary. The operating parameter of the ASV is also primarily (approximately 80%) on established roads, with approximately 20% of anticipated usage in cross-country operations. The normal operating parameter of the vehicle on an Army installation is in the unit motor pool, unit maintenance facility, enroute to and returning from installation training areas, and on the installation training areas. Operation near or adjoining zone I areas (such as housing, schools, and medical facilities) should be avoided.

Within the installation's training and maneuver areas, the impact of the increased noise area is not significant because the relatively minor difference in drive-by noise measurements between the ASV and HMMWV.

The ASV is equipped with both the MK19 40mm GMG and the M48 .50 caliber machine gun. The HMMWV's currently in MP companies are equipped with either the MK19 or the .50 caliber machine gun. With 12 ASVs replacing 12 HMMWVs in MP companies, the total number of 40mm GMG and .50 caliber machine guns increases from 47 to 59. Weapons from both the HMMWV and the ASV will fire on the same ranges. With 25 percent more weapons, it can be expected that it will take approximately 25 percent more time, depending on the number of firing lanes, to process each weapon system through their respective ranges. The noise from firing additional weapons from the ASV will generate the same level of noise for a longer period of time. This will cause little, if any, changes to the noise contours on these ranges

4.3.4 Natural Resources and Soils

Affected Environment. This discussion and analysis of the proposed action focuses on natural resources and soils conditions in the maneuver and training areas of an Army installation. This would include specifically the potential affects the proposed action may have on soils and vegetation. Consideration of the potential affects 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 identifies a number of Army installations in selected ecological provinces.

Soil disturbance resulting from military vehicles causes environmental damage by decreasing plant development. Many researchers have investigated the effects of vehicle traffic on soil and environmental damage. Soil puddling, displaced surface horizons, rut formation, increased soil density, decreased macrospore space, reduced soil strength and structure, restricted water movement and physical damage to root systems are potential consequences of vehicle traffic. These soil changes can result in restricted root growth and restricted movement of gasses, water and nutrients. The physical disturbances affect not only vigor and increased mortality of vegetation but also may affect site recovery (Sullivan and Anderson, 2000).

Conclusion of effect. Using of the ASV may have a minor localized negative effect on soil and vegetation resulting from off-road operations. Increased soil compaction, and associated damage to vegetation could contribute to increased levels of soil erosion. While the ASV weighs more than the HMMWV, the actual

bearing pressure on the soil is the vehicle's tire pressure (U.S. Army, 1994). When operating off-road, the recommended operating tire pressure for the ASV when operating off-road is 23 psi (U.S. Army, 2006). The ASV is equipped with a centralized tire inflation system – inflating or deflating all the vehicle's tires can be accomplished by a control switch in the driver's compartment. Normal operating pressure for tires on the HMMWV is 31 psi. The HMMWV does not have centralized tire inflation system.

Alternative 1: When operating at the recommended off-road tire inflation of 23 psi, it is probable that the ASV would impose a lower bearing pressure on soils and cause less damage to vegetation than the HMMWV.

Alternatives 2, 3: These alternatives limit operations of the ASV to roadways, and as a result would have no effect on vegetation and soils.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. The potential affects of the ASV on natural resources and soils will likely derive from its off-road operations. The mission profile for the ASV is to operate 50% on primary (paved) roads, 30% on secondary (up-paved) roads and 20% off-road operations (U.S. Army TACOM, 1997).

Table 4.4 Physical characteristics of the M1025 HMMWV and the M1117 ASV

	M1025/M1026 HMMWV	M1117 ASV
Height	76 in.	102 in
Width	85 in	101 in
Length	190.5 in	246 in
Footprint (l x w)	112.4 sf	172.6 sf
Turning radius	25 ft	55 ft
Gross Vehicle Weight	10,300 lb.	29,560 lb.
Engine size	8-cylinder, 6.5 liter	6-cylinder, 8.3 liter
Engine horsepower	160 hp	260 hp
Military Load Classification	4	15

References: U.S. Army, 2006; U.S. Army, 1996; AM General, 2007

While operating on paved or unpaved roadways the vehicle will have little or no effect on soils. The ASV has a MLC of 15, comparable to that of a fully-loaded M925 5-ton truck. While the ASV is larger and heavier than the HMMWV it replaces, while in off-road operations, the ASV should operate at a tire inflation of 23 psi. The wheel load exerted on the driving surface by a single wheel equals the tire inflation pressure (U.S. Army, 1994). This is less than the standard tire inflation of 31 psi used by the HMMWV (U.S. Army, 1996). Off-road operations will be conducted within the context of the MP mission (see Section 2.3.1), and operate on established training ranges and maneuver areas on Army installations. MP units would operate the ASV on ranges and training/maneuver areas currently, or previously, used by other, and possibly heavier, tactical

vehicles (e.g., M2 Bradley Fighting Vehicle, M1A1 Abrams Tank). As such, any disturbance to subsurface habitat or life forms would likely to have already occurred from previous training and maneuver operations. Operating the ASV will likely not have significant effect on subsurface habitat or life forms on existing training and maneuver areas.

The ASV has a Centralized Tire Inflation System (CTIS) designed for the vehicle operator to change the vehicle's tire inflation based on the mission and driving conditions. The ASV's CTIS has pre-set tire inflation for various conditions: paved roadways, 71 psi; unimproved (unpaved) roadways, 45 psi; off-road, 23 psi; and emergency conditions, 18 psi.

A maneuver impact mile (MIM) is the equivalent impact of an M1A2 tank traveling one mile while participating in an armor battalion field training exercise (FTX). The impacts of all mission activities are converted to MIMs using data from the Army Training and Testing Area Carrying Capacity (ATTACC) training model in combination with training impact factors. Training impact factors include the Event Severity Factor (ESF), Vehicle Severity Factor (VSF), Vehicle Off-Road Factor (VOF), Local Condition Factor (LCF), and Vehicle Conversion Factor (VCF). The ESF is a multiplier that represents the relative impact of an event, as compared to the standard event (armor battalion FTX). The VSF is a multiplier that represents the relative impact of a vehicle, as compared to the standard vehicle (M1A2 tank). The VOF is a multiplier that represents the percentage of vehicle mileage typically driven off improved roads. The VCF is a multiplier that represents the area impacted by a vehicle, as compared to the area impacted by the standard vehicle. The LCF is a multiplier that represents the relative impact of vehicle traffic due to different site conditions including soil moisture (Sullivan and Anderson, 2000).

Equation (1) below is a simplification of the equation for calculating MIM provided in Sullivan and Anderson (2000). The simplification uses unity for the number of daily miles by each type of vehicle, duration of the event, and local conditions factor.

$$MIM = VCF \times VOF \times VSF \times ESF \quad (1)$$

The value for the event severity factor (ESF = 0.07) was estimated based on the size of an MP company and type of vehicles compared to an armor battalion FTX (Weith, 2007).

The ESF for both vehicles are the same, as this analysis assumes that the ASV and HMMWV would operate on the same terrain for the same duration. The result is an equation that provides a relative comparison of the impact of a field training event with either an ASV or HMMWV, and provides a relative comparison of the MIM between the ASV and the HMMWV (Table 4.5), and

between MP companies equipped with ASVs and only with HMMWVs (Table 4.6).

Table 4.5 Maneuver Impact Mile (MIM) data for the HMMWV and ASV.

Vehicle	MIM	VCF	VOF	VSF	ESF
HMMWV	0.0016	0.429	0.20	0.27	0.07
ASV	0.0032	0.50	0.20	0.46	0.07

Table 4.6 Maneuver Impact Miles (MIMs) for ASV- and HMMWV-equipped MP Companies.

	Vehicles	Vehicle MIM	MP Company MIM
MP Company HMMWV-equipped	47 HMMWVs	0.0016	0.0752
MP Company ASV-equipped	35 HMMWVs	0.0016	0.056
	12 ASV	0.0032	0.0384
		total	0.0944
			0.0944 – 0.0752 = 0.0192

The MIM for an ASV is double that of the HMMWV (Table 4.6). Table 4.6 shows the calculations for maneuver impact miles (MIM) for the HMMWV-equipped and ASV-equipped MP companies. The MIM for an MP company equipped with ASV's is 26% higher than the same MP company equipped only with HMMWVs. The composite MIM for an ASV-equipped MP platoon organic to a Combat Brigade Team is approximately 0.206 (Table 4.7). This is higher than an MP platoon equipped only with HMMWVs, but is significantly less than the MIM for a single M1A2 tank.

Military Load Classification (MLC) is a standard system in which a route, bridge or raft is assigned class number representing the load it can carry. Vehicles are also assigned a class number indicating the minimum class of route, bridge or raft they are authorized to use (U.S. Army, 2003b). The MLC for the ASV is 15 (Kirklin, 2007); the MLC for the HMMWV is 4 (U.S. Army Engineer School, 2007).

By way of comparison the MLC of some other tactical vehicles include: M113 Armored Personnel Carrier, 13; M2 Bradley Fighting Vehicle, 24; M93 Fox NBC Reconnaissance Vehicle, 19; M925, 5-Ton Truck (loaded), 16; M1083 Standard Cargo Truck (loaded), 16; and M1A1 Abrams Tank, 70 (U.S. Army Engineer School, 2007).

Soil erosion effects are caused when surface area is removed, and soil particles are subsequently dislodged (by wind or water), and the transport of these soil particles creates numerous indirect (or secondary) effects. These indirect effects are generally more important than the direct effect (the actual soil erosion) as

they often constitute environmental issues important to regional stakeholders. Direct and indirect soil erosion impacts are best addressed early in the erosion cause-effect process, prior to the dislodging and transport of soil particles as sediment.

Table 4.7 Maneuver Impact Miles (MIM) for ASV and HMMWV-equipped MP platoons.

	Vehicles	Vehicle MIM	MP Platoon MIM
MP Platoon without ASVs	14 HMMWVs	0.0016	0.0224
MP Platoon with ASVs	8 HMMWVs	0.0016	0.0128
	6 ASVs	0.0032	0.1920
		total	0.2058
		difference	0.2058 – 0.0224 = 0.1824

When disruption of the vegetative cover and soil surface is inevitable (as with many construction activities), soil erosion can often be contained using Best Management Practices (BMPs). While these general effects may occur, their severity and potential significance will vary by installation. As discussed in Bailey (1995) and Ramos (2006), some of the natural resources are more resilient than others. For example, southeastern U.S. ecosystems are more diverse and resilient, and can quickly recovery from stresses and disruptions, while the southwestern U.S. ecosystems are much more fragile and require more time for recovery. Other potentially affected ecosystems recover at a slower or faster rate, depending on natural resilience, and the other stresses on the affected landscape. As noted earlier, the Army's Sustainable Range Program is focused on identifying, mitigating if possible, and ensuring land restoration due to off-road activities of military vehicles.

The calculations for trafficability and MIMs indicate that the ASV will have a larger effect on the soil during off-road operations than the HMMWV it replaces. Being heavier than the HMMWV, the ASV will likely compress soil more resulting in decreased plant development and increasing erosion.

When operating off-road, the ASVs tires should be inflated to 23 psi, which increases the surface area of the tire in contact with the soil and increases traction and maneuverability (U.S. Army, 2003). Increasing the surface area between the tire and roadway also has the effect of reducing the effective pressure of the vehicle's weight on the soil and vegetation encountered during off-road operations, and reduces the potential of negative effects on the soil and vegetation. Off-road operations with a tire inflation of 23 psi is a recommended practice (U.S. Army, 2003; U.S. Army, 2006), but should be mandated in installation-level range operations.

4.3.5 Threatened and Endangered Species.

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. Management and conservation of T&Es and their habitat is accomplished through implementation of the installation's Endangered Species Management Component (ESMC) of the Integrated Natural Resources Management Plan (INRMP) (Army Regulation 200-1; U.S. Army, 2007a). 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 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).

The areas to be impacted by the proposed action fall within existing mission footprints. The operational profile of the ASV is 50% on paved roads, 30% on unpaved roads, and 20% off-road.

Conclusion of effect. Implementation of the installation INRMP, SRP and ITAM program, and consultation, when necessary, with the USFWS or NMFS will ensure that the proposed action avoids or has minimal impact on listed species and their habitat within the action area. Using existing roads and operating within established limits on existing training ranges and maneuver areas will minimize any potential adverse affects of the action on listed species and their habitat.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas: Any potential effect on endangered species by operating the ASV will likely be during off-road operations. The operational profile for the vehicle is 20% off-road operations. Drive-by noise generated by the ASV is slightly higher than that of the HMMWV (82 dB vs 74.4 dB at 50 feet). This

increased noise level is not expected to have a noticeable effect on threatened or endangered species. Off-road operations will be within established boundaries of existing training areas and will have minimal effect on threatened and endangered plant species.

Alternatives 2 and 3: Normal operations of the ASV on either paved and unpaved roads on an Army installation will have minimal, if any, effect on threatened and endangered species.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. Installations will utilize their ESMC and INRMP for planning purposes so as to avoid or minimize potential impacts of actions on listed species and their habitat. For actions that may affect listed species, installations will seek assistance from the USFWS or NMFS on ways to avoid and/or minimize impacts. Installations will initiate consultation when impacts are unavoidable or to obtain concurrence on determinations that an action may affect, but is not likely to adversely affect listed species or critical habitat.

Considering that vehicle maneuvering will occur primarily (80%) on existing roadways, or on existing training ranges and maneuver areas, it is not anticipated that implementation of this action will exceed the level of current impacts. Soil compaction and erosion, and damage to vegetation will be similar to existing use of the area. Therefore, the impacts of the proposed action on listed species, their habitat and any designated critical habitat is not anticipated to be any greater then base-line levels. Drive by sound levels for the ASV (85 dB) are slightly more than the HMMWV (74.4 dB) and this may cause some disturbance to any listed animal or bird species within the range of the vehicle noise (48 ft). It is possible that any such species would soon be habituated to the noise levels as they were for the existing mission use of the travel corridors. A possible mitigation action to the increased noise levels may require the installation to modify the operating parameter of the ASV and increase the size and/or location of areas off-limits to ASV operations.

4.3.6 Water Resources

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. Using the ASV on Army installations is not expected to have any affect on 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 governing protection of wetlands (EO 11990) and floodplains (EO 11988), and off-road vehicles on public lands (EO 11644). The primary issue regarding the using the ASV is the potential effect its operations may have on the landscape

during off-road operations that may contribute to erosion, and thus increased sedimentation in surface waters. The potential effects of erosion are addressed in Section 4.3.4.

Conclusion of effect. Using the ASV with MP units would have a minor to moderate effect on surface water quality. Using the ASV would not have any effect on groundwater quality. Because of its additional size and weight, the ASV has a greater potential for degrading stream channels and banks during fording operations, than the HMMWV. The ASV will likely have minimal impact on surface water quality since 80% of its operations will be on established roadways. While the Maneuver Impact Mile (MIM) of the ASV is approximately double that of the HMMWV (0.0032 vs. 0.0016), at this level, the MIM of the ASV is almost insignificant. The potential of leaking vehicle fluids from the ASV is less than the HMMWV because the engine and drive train components are inside the vehicle's hull. The vehicle The SRP program, mandated by Army regulations (U.S. Army, 2005) is designed to identify and restore natural resources and lands damaged by training operations. The ASV will likely have little, if any, effect on surface water quality if it uses hardened stream crossings.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas: Operating the ASV on paved, unpaved roads, and off-road during training operations will likely have a minor to moderate effect on surface water quality. The ASV is heavier, and its physical characteristics are likely to contribute to conditions that support soil erosion, such as soil compaction and loss of vegetation or retarding vegetative re-growth, more than that of the HMMWV. This overall effect will be relatively minor since 80% of its operations are is expected on existing roadways. The Maneuver Impact Mile (MIM) of the ASV is approximately double that of the HMMWV it replaces, but it is still 0.3% of the MIM of the M1 battle tank. Because of its size and weight, the ASV may contribute to stream sedimentation at non-hardened fording sites.

Alternative 2. The ASV operates only on the installation's paved roadways: By limiting operations to paved roadways, normal operations of the ASV will have no effect on surface water quality at an installation.

Alternative 3. The ASV operates only on the installations roadways: By limiting operations to established roadways, normal operations of the ASV will no effects on surface water quality at an installation.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. While operating on paved or unpaved roadways the vehicle will have no effect on surface water, wetlands or floodplains. The ASV is heavier than the HMMWV it replaces and will have a higher bearing pressure on the soil (Section 2.5.1). The ASV can ford hard-bottom water crossings up to a depth of

60 inches (U.S. Army, 2006). The HMMWV can ford hard-bottom water crossing up to 30 inches and up to 60 inches with a deep water fording kit (U.S. Army, 1996). ASV off-road operations will be conducted within the context of the MP mission (see Section 2.3.1), and operate on established training ranges and maneuver areas on Army installations. The operating instructions for the ASV (U.S. Army, 2003; U.S. Army 2006) recommend a tire pressure of 23 psi during off-road operations. While the pressure exerted by the vehicle equals the tire inflation pressure (U.S. Army, 1994), the ASV's tires are larger than that of the HMMWV, and accordingly, will affect a larger cross section of stream's bank and bed during fording operations.

The potential impacts could include loss of benthic habitat, disruption and erosion of the stream bottom, and destruction of streamside vegetation, which would increase the susceptibility of stream banks to erosion. Vehicles operating in streams during fording also have the potential to leak fluids into the water which can have direct impacts upon water quality (U.S. Army, 1998b). The risk of the ASV to leak vehicle fluids and affect water quality is less than that of the HMMWV because the engine and almost all components of the vehicle's drive train are within the hull.

To alleviate the potential environmental effects of fording military vehicles, many installations are building "hardened" crossings at fording sites. A hardened crossing is an engineering practice using either heavy course aggregate or concrete designed to provide a hard-surface for vehicles crossing a small water body, such as a creek or stream. The hardened crossing reduces the effect vehicles have on stream banks and beds during fording operations. When using hardened crossing sites, an ASV will cause little or no negative effect to stream banks or bottom and will not negatively affect the quality of surface waters. It is not anticipated that using the ASV will have any effect on groundwater quality.

Monitoring the conditions of streams and stream banks at fording locations is an established component of the Sustainable Range Program (SRP). This program, operated at the installation-level is mandated by an Army regulation (U.S. Army, 2005) to identify and restore natural resources and lands damaged by training operations.

4.3.7 Facilities

Affected Environment. "Facilities" encompasses all aspects of Army real property management. Army real property includes lands, facilities and infrastructure. This includes land (and interests in land), leaseholds, standing timber, buildings, improvements and appurtenances. 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 and bridges, which enable the use of this land and resident facilities.

Conclusion of effect. There are no anticipated effects on facilities relating to weapons firing ranges or on maneuver training areas from using the ASV at Army installations in the United States.

There may be some limited effects on facilities within the cantonment area regarding the size of existing motor polls and size of existing maintenance facilities. The footprint of an ASV is approximately 60 square feet greater than the HMMWV; for an MP company the footprint of 12 ASVs is approximately 722 feet more than the same unit with HMMWVs. This, along with a greater turning radius may require a unit to make a minor expansion of the motor pool. Addition of impervious surface may require an installation to modify its stormwater management plan.

The Military Load Classification (MLC) for the ASV is 15; the MLC for the HMMWV is 4. However, considering the MLC of other wheeled and tracked vehicles, it is unlikely the ASV will have an effect on the roadways or bridges on an installation. Standing Operating procedures and/or regulations governing bridges and vehicle operations on the installation should be updated if any bridge(s) on an installation has an MLC or 15 or less.

The ASV is wider and longer than the HMMWV it replaces. It is possible that the ASV may not fit within the existing vehicle bay doors of maintenance facilities. If this situation exists, an installation may be required to either modify an existing bay door, build a new facility, or conduct maintenance in another building.

Alternatives 1, 2 and 3: The operating range of the ASV as described in the three alternative courses of action will be the same on facilities. There will be no anticipated changes of range facilities to support weapons firing for any of the three alternative courses of action. Some units may need to expand their motor pool to accommodate the additional footprint and turning radius of the ASV, which may require amending the installation's storm water management plan. The MLC of the ASV is greater than that of the HMMWV it replaces, and steps should be taken to prevent the vehicle operating on facilities with MLC less than 15. It is unlikely the ASV will have a negative effect on the roadways on an installation, as the MLC of the ASV is comparable to that of several other tactical wheeled vehicles. The ASV consumes fuel at a higher rate than the HMMWV, which may require an installation to install additional fuel storage. The overall effect of the ASV on facilities is minor.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. The ASV has the same weapon systems as the HMMWV it replaces and training with those weapon systems will occur on ranges that are already functioning for that purpose on Army installations. The ASV, while providing more protection for its crew with its armored hull, has the same basic mission as

the HMMWV it replaces. It is unlikely that new ranges for weapons training will be required to support the ASV.

The ASV has a turning radius of 55 feet, which is 30 feet larger than that of the HMMWV (Table 2.1). The "footprint" of the ASV is 60.2 square feet (sf) greater than the HMMWV. The 12 ASVs in an MP company will occupy approximately 722 square feet (sf) more space in the motor pool than the same company was equipped only with HMMWVs. The 6 ASVs in an MP platoon organic to a Brigade Combat Team will occupy approximately 361 sf more space in the motor pool than the same unit equipped only with HMMWVs (Table 2.1).

The additional area required for parking the ASV, and the vehicle's larger turning radius, may require some units to expand the size of their motor pool to meet the additional parking space and maneuver requirements posed by the ASV. Expansion of a motor pool could have nominal short-term effects due to noise and fugitive dust generated during construction. If additional paving is required, this would cause a slight increase in surface water runoff of water that might otherwise percolate to groundwater. Modification of the installation's stormwater management plan may be necessary.

The ASV is larger and heavier than the HMMWV it replaces, and has a larger engine (Table 2.1). As discussed in Section 4.3.9, ASV-equipped units will consume approximately 19% more fuel than an MP company equipped only with HMMWVs (Table 4.12). This increase in fuel consumption may require either more frequent delivery of fuel or installing additional fuel storage assets. Any new fuel storage tanks would be built in compliance with Subtitle I, of the Resource Conservation Recovery Act (RCRA). More frequent delivery of fuel would be accomplished in same manner as current fuel deliveries.

The Military Load Classification (MLC) of the ASV (15) is larger than the HMMWV (4) it replaces. By way of comparison the MLC of some other tactical vehicles include: M113 Armored Personnel Carrier, 13; M2 Bradley Fighting Vehicle, 24; M93 Fox NBC Reconnaissance Vehicle, 19; M925, 5-Ton Truck - (loaded), 16; M1083 Standard Cargo Truck (loaded), 16; and M1A1 Abrams Tank, 70 (U.S. Army Engineer School, 2007). While the MLC of the ASV is greater than the HMMWV it replaces, its MLC is within the range of many other common tactical wheeled vehicles. The ASV should not cross bridges with a military load classification less than 15. The ASV will not have a significant negative effect on roads or bridges with an MLC greater than 15. Standing Operating procedures and/or regulations governing bridges and vehicle operations on the installation should be updated if an installation has bridge(s) with an MLC of 15 or less.

4.3.8 Hazardous Materials and Hazardous Waste.

Affected Environment. This category evaluates the proposed action's potential impact on all aspects of transporting or generating hazardous materials or hazardous waste. For military vehicles, this relates to the storage and management of hazardous material, such as petroleum, oil and lubrication (POL) products and waste oil (see Table 4.9) These materials, when not properly transported or stored could cause negative effects on human health and the environment. The U.S. Army, as a used oil generator, must comply with federal regulations (Title 40 CFR, Part 279) which prescribe all aspects of managing used oil and used oil filters.

Conclusion of effects. An ASV-equipped MP company will generate approximately 192 gallons more waste oil per year (48 gallons per quarter) than an MP company equipped only with HMMWVs. The presence of an ASV-equipped MP unit on an installation will require the unit to store and manage additional hazardous material, such as POL products and waste oil.

Petroleum, oils and lubricants (POL) required for the ASV are either the same type required by the HMMWV (e.g., engine oil, transmission fluid), or are standard materials used in other military vehicles (e.g., hydraulic fluid). However, the ASV requires increased volume of many of the same products used in the HMMWV (Table 4.8). The increased number or volume of POL products may require the unit to increase storage, or require more frequent delivery, of those products.

Using the ASV will require proper management and storage of POL products, or for more frequent collection of related waste and waste oil. Installations receiving the ASV currently manage such products and waste material and will not require developing new processes, procedures and education programs to effectively magnate these products. The potential effect on human health or the environment of additional volumes of POL products and waste oil is minor.

Alternatives 1, 2, and 3: The effects of using the ASV will be the same on all alternative courses of action. Army vehicles require preventive maintenance on a scheduled basis, regardless of where they operate. Installations receiving the ASV will have to adjust existing programs and procedures to manage additional volumes of POL products and waste oil. Using the ASV will have a minor effect on hazardous material or waste oil management.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. Vehicle maintenance is generally divided between the hull (automotive) and turret functions. The principal hazardous wastes associated with hull maintenance pertain to engine oil and hydraulic fluid. The principal

hazardous material associated with turret maintenance, which applies to the ASV and not to the HMMWV, pertains to hydraulic fluid (Table 4.9). For both hull and turret maintenance, solvents are also infrequently used to clean vehicle parts as well as tools used by maintenance personnel.

Normal operating procedures to control release of POL products include using drip pans to prevent fluids from falling on the ground. Rags are used liberally in maintenance procedures. Upon completion of maintenance activities, spent fluids and rags are collected and stored for disposal in accordance with standard operating procedures that are based on regulatory requirements to preclude environmental contamination.

The only fluid listed in Table 4.8 that is changed regularly is engine oil. Under normal operating conditions the service interval for the HMMWV is every six months or 3,000 miles, whichever comes first (U.S. Army, 1996, pp. g-16); quarterly preventive maintenance (PM) services are performed every three

Table 4.8 Petroleum, oil, and lubricants required for the M1025 HMMWV and M1117 ASV

Component	M1025 HMMWV	M1117 ASV
Fuel	25 gal	50 gal
Engine coolant system	26 qt	50 qt
Engine oil	8 qt	20 qt
Transmission oil	6 qt	22 qt
Transfer case	3.5 qt	22 qt
Differentials (each)	2 qt	2 qt
Wheel ends (each)	n/a	0.8 qt
Winch	n/a	1.25 qt
Hydraulic Reservoir	n/a	20 qt
Brake accumulator	1.2 pt	3 qt
Air Conditioning Refrigerant (R134A)	n/a	6 oz

References: U.S. Army, 1996; U.S. Army, 2003

months or 3,000 miles or whichever comes first. Semi-annual PM services are performed every six months or 6,000 miles, whichever comes first. Annual PM service performed every 12 months or 12,000 miles, whichever comes first (U.S. Army, 2003a, pp. 4-26.) The normal service for the ASV requires changing the engine oil and filter which requires 20 quarts of oil; 8 quarts for the HMMWV. Under normal operating conditions, an MP company equipped with ASV's will generate approximately 768 quarts (192 gallons) per year more of used oil than if the same unit were equipped only with HMMWVs (Table 4.9). An MP platoon equipped with the ASV organic to a Brigade Combat Team will generate approximately 384 quarts (96 gallons) per year more of waste oil than the same unit equipped only with HMMWVs (Table 4.10).

Frequency of lubrication services are increased when operating abnormal conditions, such as high or low temperatures, prolonged high speed driving, or extended cross-country operations (U.S. Army, 1996; U.S. Army, 2003a). Such operating conditions would require more frequent preventive maintenance services, and accordingly, generate more used oil.

As a large quantity generator of used oil, Army installations must comply with the provisions of Title 40 Code of Federal Regulations, Part 279, Standards for the Management of Used Oil. This regulation prescribes all aspects of managing waste oil and waste oil filters. The increased volume of waste oil generated by ASV-equipped MP units may require some combination of increased frequency to pick-up the material or increased storage capacity.

Table 4.9 Used oil generated by ASV-and HMMWV-equipped MP companies.[1]

	Vehicles	Service Interval	Crankcase volume per vehicle (qt)	Annual waste oil generated per company (qt)
MP Company without ASVs	47 HMMWV	3,000 miles or semi-annually	8	752
MP Company with ASVs	35 HMMWV	3,000 miles or semi-annually	8	560
	12 ASV	3,000 miles or quarterly	20	960
			Total	1,520
			Difference	1,520 - 752 = 768

1. Based on normal vehicle operations and operating conditions.

Table 4.10 Used oil generated by ASV- and HMMWV-equipped MP platoons[1]

	Vehicles	Service Interval	Crankcase volume per vehicle (qt)	Annual waste oil generated[1] per platoon (qt)
MP Platoon without ASVs	14 HMMWV	3,000 miles or semi-annually	8	224
MP Company with ASVs	8 HMMWV	3,000 miles or semi-annually	8	128
	6 ASV	3,000 miles or quarterly	20	480
			Total:	608
			Difference	608 – 224 = 384

1. Based on normal vehicle operations and operating conditions.

Other liquids used in vehicle operations are either consumed (diesel fuel), or are within closed systems that are changed only with major overhauls (Table 4.8). As such, they generate minimum quantities of waste oils that must be managed under the provisions of existing federal regulations (40 CFR 279). Petroleum, oils and lubricants required for the ASV are either required for the HMMWV, or are standard products used in other vehicles (e.g., hydraulic fluid). The ASV has a centralized air conditioning system, and uses 6 ounces of R134A refrigerant.

This refrigerant is commercially available, is broadly used in commercial and stationary applications, and has an American Society of Heating, Refrigeration and Air-conditioning Engineers (ASHRAE) safety classification of A1 (DuPont, 2007).

The increased quantities of petroleum products may require either increased frequency of delivery, or increased storage capacity for these products at the maintenance company of ASV-equipped units.

4.3.9 Energy

Effected Environment. This subject area evaluates the potential for the proposed action on energy requirements. This includes changes to fixed facilities that may require increased energy consumption for heating or cooling, as well as energy requirements for mobile (vehicle) sources.

Conclusion of effect. Using the ASV will have minimal effect on facility energy requirements if it is determined additional maintenance facility is required, and that only if existing maintenance facilities (which accommodate the HMMWV) are too small for the ASV. If an additional structure, or modification of existing structures are needed, there will be some minor to moderate increase in energy to provide heat lighting to the facility. There will be no effect on facility energy if additional maintenance facilities are not required.

The ASV consumes approximately 63% more fuel than the HMMWV it replaces. An ASV-equipped company will consume approximately 19% more fuel than the same unit equipped only with HMMWVs. An ASV-equipped platoon organic to a Brigade Combat Team will consume approximately 37% more fuel than the same unit equipped only with HMMWVs. The additional fuel required for the ASV may require either construction of additional fuel storage assets in the cantonment area or more frequent deliveries of fuel. Despite the additional fuel consumption, with its larger (50-gallon) fuel tank the ASV will require less frequent re-fueling than the HMMWV.

Alternative 1. Preferred Alternative. The ASV operates on all roads, ranges and maneuver areas: Operating the ASV on paved, unpaved roads, and off-road during training operations will likely have a minor effect on energy. There may

be some additional facility energy required if additional vehicle maintenance facilities need to be built.

Alternative 2. The ASV operates only on the installation's paved roadways: The ASV's operational profile is 50% on paved roads, 30% on unpaved roads and 20% off-road. Operating the ASV only on paved roads may reduce the total amount of fuel required because the vehicle would be limited to operations only within the cantonment area or the limited amount of paved roads in the installation's training and maneuver area. Under these conditions, it is likely that it will actually operate fewer hours, and require less total fuel, than the HMMWV it replaces. Operating the ASV only on paved roads would have de minimus effect on energy.

Alternative 3. The ASV operates only on the installations roadways: Operating the ASV on paved and unpaved roadways on an installation constitutes approximately 80% of the vehicle's operational profile. Under these conditions, the ASV will consume almost as much fuel as that consumed under alternative 1. Operating the ASV on paved and unpaved roads would have a minor effect on energy.

Alternative 4: The No Action Alternative will have the same effect as is currently experienced with the HMMWV-equipped MP units.

Discussion. Energy consumption is a major budgetary and infrastructure issue for the Army. In the context of an Environmental Assessment, this subject would normally include the issue of energy consumption necessary to support real property (heating, air conditioning, and lighting of buildings). This issue is relevant only if an installation is required to construct, or significantly modify, existing structures to conduct maintenance operations on the ASV. The primary energy issue relating to the proposed action is the potential effect(s) of increased fuel consumption of the ASV compared with the HMMWV it replaces.

The ASV has a larger engine (6-cylinder, 8.3 liter, 260 hp) than the HMMWV (8-cylinder, 6.5 liter, 160 hp). The ASV is also 19,260 pounds heavier than the HMMWV. Accordingly, the ASV will consume more diesel fuel than the HMMWV to accomplish the same mission. Fuel use by diesel engines can be calculated from the following equation (Polley, 2007):

$$\text{Fuel use (gallons per hour)} = (0.4 \times \text{bhp}) / 7.2 \qquad (2)$$

In this equation, fuel use is in terms of gallons per hour; bhp is brake horse power, and 7.2 is the weight (pounds) of one gallon of diesel fuel.

The ASV's engine is rated at 260 hp (U.S. Army, 2006); using that number in equation (2), the ASV consumes approximately 14.44 gallons of diesel fuel per hour. The HMMWV's engine is rated at 160 hp (AM General, 2007), and

consumes approximately 8.88 gallons of fuel per hour. The ASV's fuel consumption exceeds that of the HMMWV by approximately 5.56 gallons of fuel per hour.

The following discussion assumes that each ASV will operate the same number of hours and miles as the HMMWV it replaces in an MP company. On a unit basis, an MP company equipped with ASVs will consume approximately 66.7 gallons of fuel per hour more than an MP unit equipped only with HMMWVs. An ASV-equipped company will consume approximately 16% more fuel than the same unit equipped only with HMMWVs (Table 4.11). On a unit basis, an MP platoon, organic to a Brigade Combat Team, will consume approximately 33 gallons per hour more diesel fuel than the same unit equipped only with HMMWVs. An ASV-equipped platoon will consume approximately 37% more fuel than the same unit equipped only with HMMWVs (Table 4.12)

Table 4.11 Fuel consumption for HMMWV and ASV-equipped MP company

	Vehicles	Vehicle fuel consumption (gal/hr)	Unit fuel consumption (gal/hr)
MP Company with HMMWVs	47 HMMWVs	8.88	417.4
MP Company with ASVs	35 HMMWVs	8.88	310.8
	12 ASVs	14.44	173.3
		Total	484.1
		Difference	484.1 - 417.4 = 66.7

The additional fuel required for the ASV may require construction of additional fuel storage assets in the cantonment area or require more frequent deliveries of fuel. Dividing the vehicle's fuel capacity by the fuel consumption rate determines an estimated re-fuelling frequency. The refueling frequency of the ASV is approximately 3.5 hours; for the HMMWV, 2.8 hours. The ASV will require less frequent refueling than the HMMWV it replaces. This creates a slight positive factor for the ASV particularly during field training maneuvers where refueling while on pervious surfaces poses a higher risk to the environment than refueling at a fixed facility with a concrete surface.

The total amount of fuel consumed by an MP unit is directly related to its operational temp. Operational temp is a measure of the number of hours and miles it operates its vehicles. A more detailed site-specific analysis of fuel consumption will require installation-level data of historic operational tempo of its MP units.

Table 4.12 Fuel Consumption for ASV and HMMWV-equipped MP Platoon

	Vehicle	Vehicle fuel consumption (gal/hr)	Unit fuel consumption (gal/hr)
MP Platoon with HMMWVs	14 HMMWV	8.88	124.3
MP Platoon with ASVs	8 HMMWV	8.88	71.0
	6 ASV	14.44	86.6
		Total	157.6
		Difference	157.6 – 124.3 = 33.0

4.4 CUMULATIVE EFFECTS

4.4.1 Introduction

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 cumulative VECs is independent of a particular proposed project or action. Once identified, the evaluation of cumulative effects on these VECs can be readily accomplished.

Cumulative effects from using the ASV will include the potential of multiple MP units on an installation. Cumulative impacts from using the ASV will be site-specific and are not readily addressed by a PEA. Rather, such cumulative impacts should be evaluated using the 11 CEQ steps for each effected valued environmental component (VEC) (NEPA Analysis Guidance Manual Chapter 2.1). Quick Look questions found in Chapter 4 of the NEPA Analysis Manual for each VEC will assist users of this PEA in determining the relevant direct and indirect effects from BES use at their ranges.

4.4.2 Cumulative Effects Analysis Requirements for this PEA

The Armored Security Vehicle (ASV) is a tactical combat vehicle. The geographic scope for this analysis is Army installations with Military Police companies or Brigade Combat Teams in which the ASV will be used. The vehicle's primary use on an Army installation will be training on the weapons ranges, and training and maneuver areas designated for that purpose. It will normally be kept at the established parking area (motor pool) of its owning unit along with the units' other vehicles. Repairs and preventive maintenance will be performed in existing facilities used by the units' current wheeled vehicles. No changes to the number personnel, or their skill identifiers, will occur to units

receiving the ASV. The ASV can be expected to be used at the same operational level (e.g., number of operating hours or miles) as the HMMWV it replaces. The baseline conditions for cumulative effects analysis would be the same MP company equipped only with HMMWVs. The ASV is expected to operate with specified loads under an on-road/off-road mission profile of 50% primary (paved) roads, 30% secondary (unpaved) roads and 20% off-road operations (U.S. Army TACOM, 1997).

As discussed in Section 2.5.1, the ASV is heavier than the HMMWV it replaces and will have a higher bearing pressure on the soil. The ASV has a Military Load Classification of 15. Off-road operations will be conducted within the context of the MP mission (see Section 2.3.1), and operate on established training ranges and maneuver areas on Army installations. It is very probable the ASV will operate on land previously used by other, and heavier, tactical vehicles.

4.4.3 Air Quality

Conclusion of effect: Combustion emissions resulting from training would be primarily from mobile sources and be widely distributed both spatially and temporally and not likely cause a cumulative effect on air quality. The presence of multiple ASV-equipped units on an installation would increase both combustion emissions and fugitive dust. Fugitive dust emissions remain a localized issue and should be addressed as an opacity issue if activities are close enough to installation boundaries that visible emissions leave the installation. Given the wide distribution of emissions, it is not anticipated that regional air quality would be significantly affected. However, the installation environmental office may need to evaluate results of air quality modeling to evaluate the potential effects of using the ASV, based on the proposed operational tempo of the ASV-equipped units and the local/regional air quality conditions.

Discussion: The emissions for the ASV-equipped MP company and MP platoon are higher for nitrogen oxides (NO_x), hydrocarbons (HC), and particulates, and slightly lower for carbon monoxide (CO) than that of a comparable MP units equipped only with HMMWVs (See Tables 4.1 and 4.2).

Combustion emissions resulting from training would be primarily from mobile sources and be widely distributed both spatially and temporally. The presence of multiple ASV-equipped MP units would increase the level of exhaust emissions. Fugitive dust emissions remain a localized issue and should be addressed as an opacity issue if activities are close enough to installation boundaries that visible emissions leave the installation. Given the wide distribution of emissions, it is not anticipated that regional air quality would be significantly affected. However, the installation environmental office should evaluate the potential effects of using the ASV, based on the proposed operational tempo of the ASV-equipped units and the local/regional air quality conditions.

4.4.4 Cultural Resources.

Conclusion. The presence of multiple ASV-equipped units will not have any cumulative effects to cultural resources.

Discussion. Off-road operations of the ASV will be conducted within the context of the MP mission (see Section 2.3.1), and operate within established limits on existing training ranges and maneuver areas on Army installations. Other larger and heavier tactical vehicles have earlier traveled the same training ranges and maneuver areas. It is unlikely the ASV will have a cumulative effect on cultural resources. Traveling on established roadways, both paved and unpaved will have no effect on cultural resources.

4.4.5 Noise

Conclusion of effect: Increased noise from operating the ASV will localized and temporary, and the cumulative effects of increased numbers of ASV-equipped units would be minor. Because there are more weapon systems in an ASV-equipped unit, it will take more time to process each weapon through their respective ranges. Weapons firing from ASV-equipped units will not generate larger volume of noise than from HMMWV-equipped units, however, ASV-equipped units will generate the same volume of noise for about 25 percent longer period of time. The increased time when noise is generated is expected to have little or no effect on the noise contours from these ranges.

Discussion: The ASV has the same basic mission of the HMMWV, except it provides increased protection for the crew. It is not expected to increase the level or intensity of military training. With the same mission and weapon systems as the as the HMMWV, the ASV will operate in the same firing ranges and training areas as the HMMWV.

Because the ASV is equipped with both the .50 caliber machine gun and the 40mm GMG, an ASV-equipped MP company will have 25 percent more weapons (59 vs. 47). Firing same weapons from an ASV on the same ranges will not generate more noise than when the weapons are fired from the HMMWV. However it can reasonably be expected to take longer, depending on the number of firing lanes, to process every weapon through a range. This will have minimal, if any, affect on the noise contours on either the 40mm GMG or .50 caliber machine gun range. Over a period of time, multiple ASV-equipped units will each spend more time on the ranges to train and qualify their crews on the weapon system. The net result is more time spent generating noise, but not an increased volume of noise. The increased time when noise is generated is expected to have little or no effect on the noise contours from these ranges.

Noise levels from operating the ASV are discussed in Section 4.3.3. Noise caused by a moving vehicle is spatial and temporary. The noise levels of this

vehicle under normal operations will alter existing noise contours on an installation. Under normal operating conditions, the ASV generates slightly higher levels of noise than the HMMWV. However, increased noise from operating the ASV will be localized and temporary, and will not cause negative cumulative effects on either the natural or human environment. Increased numbers of the ASV on an installation may increase the noise in the immediate area near the vehicle, but should not increase noise level to the extent that installation noise contours would change or on-post or off-post residents would complain. The cumulative effect of multiple ASV-equipped MP units on noise levels would be minor.

4.4.6 Natural Resources and Soils

Conclusion of effect: The ASV will have a minor localized cumulative effect on soil and vegetation resulting from increased soil compaction. The overall effect and risk to increasing soil erosion is relatively minor.

Discussion: The overall effect and risk to increased soil erosion is relatively minor considering: (1) the small number of ASVs in a unit, (2) the small amount (20%) of off-road operations performed in conducting the MP mission, and (3) the ground pressure is the same as the vehicle's tire pressure of 23 psi. The ASV's recommended tire pressure when operating off road is 23 psi. The HMMWV's normal tire pressure is 31 psi. Multiple MP ASV-equipped units would likely have a minor negative effect on natural resources and soils, which would be mitigated through continued effective implementation of the installation's sustainable range program, mandated by Army regulation (U.S. Army, 2005).

The potential effect of increased soil compaction is mitigated, to an extent, by the expected off-road use of the ASV of approximately 20% of its overall operations. Additionally, the maneuver impact mile (MIM) of the ASV is approximately 0.0032. This is 3.2% of the MIM of a single M1 main battle tank. Multiple ASV-equipped MP units combined have a fraction of the impact on the landscape of a single M1 tank. The effects of ASV operations off-road are only cumulative to the time when that land is taken out of the training cycle and land restoration actions implemented. The presence of the ASV on training lands may increase the level of effort, and associated cost, required to restore training lands.

4.4.7 Threatened and Endangered Species

Conclusion. With its low off-road usage (20%) of the ASV within established limitations on existing training ranges and maneuver areas used by other Army tactical vehicles, it will have de minimus effect on the soil, or any subsurface species or threatened or endangered plants. The slightly higher noise levels may cause a minor cumulative effect on endangered species with habitat near maneuver areas. If so, it may be necessary for the installation to modify its operational range for the ASV.

Discussion. The operational profile anticipates approximately 20% ASV operations will be off-road (U.S. Army TACOM, 1997). Off-road operations are expected to occur on existing training ranges and maneuver areas. Even with multiple ASV-equipped MP units, with the full spectrum of existing Army tactical vehicles operating on the same terrain, the ASV is not expected to have any contributory negative effect on T&E species. During drive-by noise measurements, at a distance of 50 feet the ASV generated higher levels of noise than the HMMWV; 85 and 74.7 dB, respectively. It is possible this noise level may affect an endangered species, and the installation may need to adjust its operational overlays accordingly. With its low off-road operational profile and operate within established limits on existing training ranges and maneuver areas on Army installations it is unlikely the vehicle will have cumulative effect on endangered plants or sub-surface species.

4.4.8 Water Resources

Conclusion: The presence of multiple ASV-equipped MP units could have a minor to moderate cumulative effect on surface water resulting from fording operations. A possible mitigation action would be to limit ASV fording operations to hardened crossings. The ASV will have no effect on groundwater resources.

Discussion: Because of its larger size and weight, the ASV may have a moderate effect on stream banks and stream bottoms during fording operations (See Section 4.3.6). Using the ASV will not affect groundwater quality. The presence of multiple ASV-equipped MP units on an installation may cause the cumulative effect to increase. Monitoring the condition of training lands, and developing and implementing corrective/restorative actions is the purview of the Sustainable Range Program (SRP). The SRP, mandated by Army regulation (U.S. Army 2005), will have a positive effect on assessing site-specific risks from ASV fording operations. The SRP can assess the conditions and identify and program corrective actions as needed. The presence of multiple ASV-equipped MP units could have a moderate cumulative effect on surface water resulting from fording operations. A possible mitigation action would be to limit ASV fording operations to hardened crossings.

4.4.9 Facilities

Conclusion. The presence of multiple ASV-equipped units on an installation should have minor cumulative effects on facilities. The presence of multiple ASV-equipped MP companies may require expansion of motor pools, construction of additional fuel storage facilities, and establishing routes to avoid facilities (bridges) with MLC less than 15. In each case, an installation will modify or amend existing practices or policies, such as storm water management plans. The presence of multiple ASV-equipped units on an installation should have minor cumulative effects on facilities.

Discussion. The increased size and turning radius (Table 2.1) of the ASV may require an ASV-equipped unit to increase either the size of their motor pool or maintenance facility, or both. Widening the vehicle bay door of a building would have no effect on the environment. Increasing the size of a unit motor pool will increase impervious surface that will generate increased level of storm water runoff for the life of the facility. This, in-turn, may require modification of storm water management infrastructure, and of the installation's storm water management plan. If expansion of motor pools is required, an installation will modify existing stormwater management plans, and apply current best management practices to the expanded motor pool(s).

The ASV has the same weapon systems as the HMMWV it replaces, and will fire the same weapons on the same ranges. The presence of additional MP units will require more frequent weapon firing, and the increased number of weapons in an MP unit will require additional time to process each weapon through its respective range. The presence of additional ASV-equipped MP units may require more frequent maintenance and repair actions on weapons ranges, but will pose de minimus cumulative effect on human health or the environment.

An ASV-equipped MP unit consumes more diesel fuel than the same unit equipped only with HMMWVs (Section 4.3.9). The ASV's additional fuel consumption may require an installation to either build additional storage assets, or require more frequent deliveries of fuel. Any new fuel storage facility would be built in compliance with appropriate specifications and standards.

The ASV has a Military Load Classification (MLC) of 15, compared to the HMMWV's MLC of 4. While the MLC of the ASV is greater than the HMMWV it replaces, an MLC of 15 not significant considering that a large number of current tactical vehicles (see next paragraph) have comparable MLC values. However, if an installation has a bridge or other facility with an MLC of 15 or less, it should develop new, or modify appropriate existing, guidance preventing the ASV from using that facility.

The operation of the ASV should not have a cumulative effect on existing roadways, either paved or unpaved. The MLC of the ASV is 15, and is lower than the MLC of other wheeled vehicles (e.g., M925, 5-Ton Truck (loaded), 16; M1083 Standard Cargo Truck (loaded), 16), that travel the roadways on a military installation.

4.4.10 Hazardous Materials and Hazardous Waste.

Conclusion. The ASV uses many of the petroleum oil and lubricant (POL) products as the HMMWV, however in larger quantities (Table 4.8). Regularly scheduled preventive maintenance services in an ASV-equipped MP company will annually generate an additional 192 gallons of waste oil. This may require an installation to provide either additional storage or more frequent collection of

waste oil. These actions would be managed within the context of existing programs and procedures for managing hazardous materials – and would not cause an installation to develop new processes, procedures or education programs. The hazardous materials and waste oil resulting from multiple ASV-equipped MP units will likely pose minor cumulative effect on human health or the environment.

Discussion. The ASV uses many of the same petroleum, oil and lubricant (POL) products as the HMMWV it replaces, however in larger quantities. The ASV is air conditioned and uses 6 ounces of a CFC-compliant refrigerant (DuPont, 2007). As stated in Section 4.4.10, an ASV-equipped MP company will generate approximately 768 quarts (192 gallons) more waste oil per year than (48 gallons per quarter) when it was equipped only with HMMWVs. The presence of multiple ASV-equipped MP units on an installation will cause a proportional increase in the waste oil generated, and petroleum products required to service and maintain the vehicle.

The presence of additional ASV-equipped units increases the volume POL products and waste oil an installation has to manage. It does not require an installation to develop new education or environmental compliance programs. The ASV may require additional POL products, and generate increased volumes of waste oil, but the presence of multiple ASV-equipped units represents a minor effect on the natural or human environment.

4.4.11 Energy

Conclusion. The cumulative effect of either alternative (more storage or more frequent delivery of fuel) will have a minor cumulative effect. Less frequent fueling of the ASV will pose a lower cumulative risk to the environment than the HMMWV.

Discussion. Information about fuel consumption of the ASV and HMMWV is provided in Section 4.3.9. The presence of multiple ASV-equipped MP units would cause a proportional increase in total fuel consumption on the installation. The additional fuel required for an ASV-equipped MP company may require more frequent delivery of fuel, or installation of additional fuel storage faculties (see Section 4.4.11). Building more storage or more frequent delivery of fuel will have a minor cumulative effect.

With its 50 gallon fuel tank (see Table 2.1) the ASV, even with a higher fuel consumption, will require less frequent refueling than a HMMWV. This is a slight advantage over the HMMWV, and will have a nominal positive cumulative effect because less frequent fueling will pose a lower risk to the environment from fuel spills.

4.4.12 Conclusions

Using the ASV will have some cumulative effects on the environment, primarily as a result of off-road operations. These effects include increased soil compaction, resulting in increased damage/mortality to vegetation. These conditions, in turn create the potential for increased soil erosion. An increase of ASVs conducting fording operations at non-hardened fording sites will likely have a moderate cumulative effect on surface water quality. Operations of multiple ASV-equipped MP companies within established limits on existing training and maneuver areas will have minor cumulative effects on facilities, hazardous materials and waste oil, noise and threatened and endangered species. The ASV is not expected to have any effect on cultural resources.

Potential mitigation to the moderate cumulative effects of multiple ASV-equipped units on an installation include requiring (vice recommending) the vehicle to operate off-road with a tire inflation of 23 psi; limit fording operations to hardened crossings, and ensure effective implementation of the installations Sustainable Range Program.

SECTION 5.0: CONCLUSIONS

5.0 CONCLUSIONS

Using the ASV and authorizing its use on all roads, training ranges and maneuver areas will have a moderate effect on soil erosion and surface water. Overall, the ASV's exhaust emissions considered are minor because the vehicle is a mobile source whose emissions are spatially and temporally dispersed. The potential effect on air quality is site specific and largely depends on the site specific conditions of air quality at each installation where the ASV is used. There would be a minor effect on noise, air quality, hazardous materials, facilities, and threatened and endangered species. There would be no effect on cultural or historic resources.

Using the ASV under the conditions of Alternative 1 (The ASV operates on all roads, training ranges and maneuver areas) would have a significant and positive effect on the Military Police mission and the survivability of MP soldiers. Soldier and unit training under Alternative 1 would be enhanced and would permit soldiers to train as they fight, which is current Army training doctrine. Using the ASV only on established paved roads (Alternative 2) or on paved and unpaved roads (Alternative 3) would not allow MP Soldiers or units to conduct the full spectrum of training that is inherent with their mission.

Using the ASV, and restricting its use to either paved roads (Alternative 2), or paved and unpaved roads (Alternative 3), would have slightly less effect on the valued environmental components discussed above. However, both of these alternatives would have lasting, and significant negative effects on unit and soldier readiness, and would be a detrimental effect on the ability of the Military Police to achieve its mission to support a combatant commander.

Based on a review of valued environmental components on a broad-scale evaluation of impacts associated with the Army implementation of the proposed action, and given the existing Army management and control systems; the proposed action, implemented in compliance with existing environmental regulations and best management practices, will have no significant direct, indirect, or cumulative impact on the human or natural environment. A checklist and REC, attached in Appendix A, can be used to validate and certify the assumptions, analyses, and determinations in this PEA.

Once this REC checklist has been completed and the appropriate determinations have been made, the REC can constitute final statutory and regulatory compliance with NEPA, as well as the provisions in 32 CFR 651. Installation environmental and proponent staff will be able to use these screening and evaluation criteria to evaluate what changes or modifications to infrastructure, and/or processes necessary to insure that appropriate steps are being taken to

safeguard the environment. The REC signature page certifies that the installation proponent and environmental office understands these requirements and are committed to meeting specified technical and economic (or fiscal) requirements.

Table 5.1 provides a matrix showing the potential effects of using the ASV under the four alternative courses of action (See Section 3.0).

Table 5.1 Matrix of Potential Environmental Effects of Using the M1117 Armored Security Vehicle

	Soldier & unit training	Natural Resources & Soils	Air Quality	Noise	Hazardous Materials	Facilities	Energy	Water Resources	Cultural Resources	Threatened & Endangered Species
1. ASV operates on all roads, ranges and maneuver areas.	+	⊘	⊙	⊙	⊙	⊙	⊙	⊘	○	⊙
2. ASV operates only on paved roadways	⊗	○	⊙	⊙	⊙	⊙	○	○	○	○
3. ASV operates only on paved or unpaved roadways	⊗	⊘	⊘	⊙	⊙	⊙	⊙	○	○	○
4. No Action Alternative	⊗	○	○	○	○	○	○	○	○	○

Key: ○ No effect anticipated
⊙ Minor effect anticipated
⊘ Moderate effect anticipated
⊗ Significant effect anticipated
\+ Beneficial impact

SECTION 6.0:
AGENCIES AND INDIVIDUALS CONTACTED, AND REVIEWERS

Anderson, Robert J (Jim). U.S. Forest Service on assignment with the Environmental Planning Support Branch, U.S. Army Environmental Command, Aberdeen Proving Ground, MD

Bennett, Steven R., Ph.D. Environmental Planning Support Branch, U.S. Army Environmental Command. Aberdeen Proving Ground, MD.

Booher, Alicia A. Environmental Planning Support Branch, U.S. Army Environmental Command. Aberdeen Proving Ground, MD.

Baetz, Linda. Program Manger, Hazardous and Medical Waste Management, U.S. Army Center for Health Promotion and Preventive Medicine. Aberdeen Proving Ground, MD.

Bouzide, Tamra, Deputy Product Director, Armored Security Vehicle. U.S. Army Tank-automotive and Armament Command. Warren, MI.

Cummings, Warren. Booz Allen Hamilton, Aberdeen, MD.

Funk, Jack, Combat Systems Division, U.S. Army Military Police Center and School. Fort Leonard Wood, MO.

Garnett, Teresa. Booz Allen Hamilton. McLean, VA.

Hatch, Jeffrey, Office of Counsel, U.S. Army Environmental Command. Aberdeen Proving Ground, MD.

Hirai, Lawrence, Environmental Support Branch, U.S. Army Environmental Command. Aberdeen Proving Ground, MD.

Kirklin, Percy, Bridge Group, U.S. Army Tank Automotive Research Center.

Polley, Troy, Cummins, Inc. Columbus, IN.

Reichard, Dan, Environmental Noise Program, U.S. Army Center for Health Promotion and Preventive Medicine. Aberdeen Proving Grounds, MD.

Rubinoff, Jay. Booz Allen Hamilton, Aberdeen, MD.

Salomon, Michelle, Consultant, Booz Allen Hamilton, Aberdeen, MD.

Stewart, Catherine, Environmental Noise Specialist, U.S. Army Center for Health Promotion and Preventive Medicine, Aberdeen Proving Ground, MD

Thies, Paul, Ph.D., Environmental Planning Support Branch, U.S. Army Environmental Command, Aberdeen Proving Ground, MD.

Weith, Gordon. Booz Allen Hamilton, Aberdeen, MD.

Williams, Tom T. Cummins, Inc. Columbus, IN.

Wills, Todd. Booz Allen Hamilton, Aberdeen, MD.

SECTION 7.0:
LIST OF PREPARERS

Team Leader:

Jeffery Springer, PE
Associate, Booz Allen Hamilton
B. S. Civil Engineering, Arizona State University
M.S. Civil Engineering, University of Delaware
Masters of City and Regional Planning, Morgan State University
Years Experience: 4

Team Members:

Anderson, Robert J. (Jim)
NEPA Specialist
U.S. Forest Service (Detailed to U.S. Army Environmental Command)
Aberdeen, MD
Years of Experience: 25

Cummings, Warren (Scott)
Air Quality Specialist
Associate, Booz Allen Hamilton,
Aberdeen, MD
Years of Experience: 9

Ramos, Roberto I., REP
NEPA Specialist
Senior Consultant, Booz Allen Hamilton
Aberdeen, MD
Years of Experience: 7

Rubinoff, Jay
Endangered Species Specialist
Associate, Booz Allen Hamilton
Aberdeen, MD
Years of Experience: 12

Stewart, Catherine
Environmental Noise Specialist
U.S. Army Center for Health Promotion and Preventive Medicine
Aberdeen, MD
Years of Experience: 12

Terry Garnett
NEPA Specialist
Booz Allen Hamilton
McLean, VA
Years of Experience: 21

Wills, Todd
Wetlands Specialist
Associate, Booz Allen Hamilton
Aberdeen, MD
Years of Experience: 18

SECTION 8.0:
ACRONYMS AND ABBREVIATIONS

ADNL	A-weighted day-night average sound level
ASV	Armored Security Vehicle
BDP	Battlefield Development Plan
BFV	Bradley Fighting Vehicle
BHP	brake horse power
BLM	Bureau of Land Management
BMP	Best management practices
Btu/hr	British Thermal Unit (btu) per hour (hr)
CDNL	C-weighted day-night average sound level
CEQ	Council on Environmental Quality
CO	Carbon monoxide
CFR	Code of Federal Regulations
CRMP	Cultural Resources Management Plan
CS	Combat Support
DA	Department of the Army
dB	Decibel, a measure of noise energy
dBP	Impulse (or peak) noise
DNL	Day-Night Level
DoD	Department of Defense
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESMC	Endangered Species Management Component - of the Integrated Natural Resource Management Plan (INRMP)
ESF	Event Severity Factor. The ESF is a multiplier that represents the relative impact of an event on land condition compared to the standard event – an Armor Battalion field training exercise (FTX). The ESF for the Armor Battalion FTX is 1.0. The ESF for an event that has 25% less impact on soil erosion than an Armor Battalion FTX would be 0.75.
FWS	Fish and Wildlife Service
GMG	Grenade Machine Gun
gm/hr	gram per hour
HC	Hydrocarbons
HMMWV	High Mobility Multi-purpose Wheeled Vehicle
ICRMP	Integrated Cultural Resources Management Plan
ICUZ	Installation Compatible Use Zone
IED	Improvised Explosive Device
ITAM	Integrated Training Area Management
LUPZ	Land use planning zone
LVOSS	Light Vehicle Obscuration Smoke System
MIM	Maneuver Impact Mile
MLC	Military Load Classification

MNS	Mission Needs Statement
MOA	Military Occupation Areas (refers to military airspace)
MOS	military occupational specialty
MP	Military Police
NAAQS	National Ambient Air Quality Standards
NBC	nuclear, biological and chemical
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
NO_x	nitrogen oxides
O&O	Operational and Organizational (plan)
ORD	Operational Requirement Document
PM	particulate matter
psi	pounds per square inch
pt	pint
qt	quart
RCRA	Resource Conservation Recovery Act
REC	Record of Environmental Consideration
ROC	Required Operational Capability
RONA	Record of non-applicability
rpm	revolutions per minute
sf	square feet
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SRP	Sustainable Range Program
TES	Threatened and Endangered Species
TNT	tri-nitro toluene; chemical abbreviation for an explosive compound
TSCA	Toxic Substances Control Act
UAHMMWV	Up-Armored High Mobility, Multi-purpose Wheeled Vehicle
µm	micro-meter, equal to $1x10^{-6}$ meter
USFS	U.S. Forest Service
VCF	Vehicle Conversion Factor. A multiplier that represents the width of the area impacted by a given vehicle, compared to the width of the area impacted by an M1A2 tank. The VCF is an objective value based on the width of the tires/tracks of the vehicle compared to the M1A2 tank.
VEC	valued environmental component
VOF	Vehicle Off-Road Factor. A multiplier that represents the portion of vehicle mileage typically driven off improved roads.
VOC	volatile organic compound
VSF	Vehicle Severity Factor. A multiplier that represents the relative impact of a vehicle on land condition as compared to the standard vehicle, the M1A2 tank.

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

This checklist is intended to provide a framework for the identification of any NEPA requirements beyond this PEA for using the M1117 Armored Security Vehicle (ASV) at an Army installation in the United States, and to 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 at the installation level, a Record of Environmental Consideration (REC) may be prepared, referencing this PEA, and using the ASV 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, and will culminate in either a separate Finding of No Significant Impact (FNSI) or a Notice of Intent (NOI) to prepare an EIS if significant affects are identified.

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, the following format is recommended:

- "Yes" implies an issue may require further NEPA analysis.
- "No" on the REC checklist implies applicability of this PEA
- "N/A" implies the question does not apply

The "Response Documentation" column may be used for any comments pertaining to the Proposed Action, or identify existing programs or best management practices, 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. This checklist references portions of Title 32, CFR Part 651, "Environmental Analysis of Army Actions."

MEMORANDUM FOR RECORD DATE:

SUBJECT: Evaluation, under the National Environmental Policy Act (NEPA) of the using of the M1117 Armored Security Vehicle (ASV) at (*installation name*).

1. Brief description: (Identify each unit receiving the ASV, the number of vehicles, and the approximate dates when each unit will receive the vehicles. Include other relevant details about the vehicle's expected use.)

2. It has been determined that using the M1117 Armored Security Vehicle (ASV) as described above (choose a. b. or c.):

a. Is adequately addressed in an existing: EA____ EIS____

Title and date:

b. Qualifies for Categorical Exclusion under provisions of 32 CFR Part 651, Appendix B, Paragraph _____.

c. Qualifies for a Record of Environmental Consideration, based on the evaluation of the criteria in the checklist below because the issues requiring consideration under the National Environmental Policy Act are addressed in the Programmatic Environmental Assessment entitled, "Programmatic Environmental Assessment for Using the M1117 Armored Security Vehicle at Army Installations in the United States," dated September 2007.

The following signatories certify their understanding of the Programmatic Environmental Assessment and the analyses therein, and certify compliance with the provisions and mitigations that are presented. This includes compliance of the procedures (Best Management Practices and Standing Operating Procedures) that are specified, and the funding necessary to insure that the required mitigations will be implemented.

_____	_____
proponent signature	Environmental Officer signature
_____	_____
proponent, printed name	Environmental Officer, printed name
_____	_____
e-mail and Phone number	e-mail and phone number

	CATEGORY	Yes,No,N/A	RESPONSE DOCUMENTATION (as needed)
	General NEPA		
1	The Operational Tempo for the Armored Security Vehicle (ASV) is anticipated to be greater than the HMMWV it replaces.		If yes, a REC may not be sufficient; further analysis may be required. If no, continue to question #2
	Natural Resources & Soils		
2	Off-road operations of the ASV are likely to significantly increase the level of damage to vegetation on training ranges and maneuver areas above that caused by current level of activities by MP units equipped only with HMMWVs.		If yes, identify potential mitigation actions. If the action cannot be mitigated, further analysis may be required. If no, continue to question #3
3	Off-road operations of the ASV-equipped MP units are likely to significantly increase soil compaction, rutting, or conditions above that caused by current level of activities on training ranges and maneuver areas.		If yes, identify potential mitigation actions. If the action cannot be mitigated, further analysis may be required. If no, continue to question #4
	Air Quality		
4	Using the ASV at this installation will contribute to a change in the air quality compliance status (e.g., from attainment to maintenance; from maintenance to nonattainment) in the region.		If yes, further analysis, and coordination with air quality permitting authority may be required. If no, continue to question #5
	Hazardous Materials & Used Oil		
5	The installation will need to build, or significantly modify, facilities necessary to store <u>waste</u> POL products in accordance with local/state/federal regulations.		If yes, ensure storage complies with provisions of Resource Conservation and Recovery Act (RCRA) regulations. Continue to question #6
6	The proposed action will require modification of the installation's Spill Prevention, Control and Countermeasures Plan (SPCCP).		If yes, make the necessary modifications. Continue to question #7

	CATEGORY	Yes,No,N/A	RESPONSE DOCUMENTATION (as needed)
	Noise		
7	Noise generated by normal operations of the ASV will likely affect sensitive wildlife populations, to include threatened and endangered species.		If yes, further analysis may be required. Consult with appropriate installation staff. If no, continue to question #8
8	Noise generated by the normal operations of the ASV will change existing noise contours on the installation.		If yes, further analysis may be required. If no, continue to question #9
	Facilities		
9	The Proposed action will require expansion of existing facilities for maintaining or parking the ASV involving more than 5.0 acres of land.		If yes, the installation may be required to prepare a supplemental EA. If no, continue to question #10
10	The installation has facilities (e.g., bridges) with MLC less than 15 that affect travel routes of the ASV on the installation.		If yes, revise standing operating procedures (SOP) to preclude ASV operating on facilities with MLC less than 15. If no, continue to question #11
	Water Resources		
11	The Proposed Action will require modification to the installation's Stormwater Discharge Prevention Plan.		If yes, make the necessary changes; coordinate with regulating agency(ies) as required. If no, continue to question #12
12	The Proposed Action will require the ASV to operate in areas not previously traveled by tactical vehicles, and require additional surveys to identify and delineate jurisdictional wetlands.		If yes, initiate survey. If no, continue to question # 13

	CATEGORY	Yes,No, N/A	RESPONSE DOCUMENTATION (as needed)
	Cultural Resources		
13	The Proposed Action will require the ASV to operate in areas not previously traveled by tactical vehicles, and thus require additional cultural resource surveys.		If yes, initiate preliminary survey. Further analysis may be required. If no, continue to question #14
	Threatened and Endangered Species		
14	Normal operational or training use of the ASV will significantly impact a federally listed, threatened or endangered species or their designated critical habitat more than the HMMWV it replaces.		If yes, consult with installation staff and INRMP. Further analysis may be required. If no, continue to question #15.
	Energy		
15	More frequent delivery of fuel will require revision of existing emergency response or spill response plans.		If yes, make necessary revisions. If no, continue to question #16.
	Cumulative Effects		
16	Other actions are underway, or proposed, that when combined with the potential affects of using ASV's on the installation, could have a significant effect on human health or the environment.		If yes, initiate further analysis, coordinate with the proponents of the other action(s); conduct further analysis as needed. If no, and all 16 questions have been answered as NO or N/A, continue to completion of a Record of Environmental Consideration.

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Appendix B
Air Emissions Calculations

The calculations on the tables in this Appendix are based on emission data for the ASV (Williams, 2007) and the HMMWV (Cummings, 2007). The calculations assume that both vehicles are operated under similar operating conditions.

Table B-1. NO_x Emissions from HMMWV and ASV equipped MP companies

	Vehicles	NO_x emissions (gm/hour)	Total NO_x emissions (gm/hour)
MP Company without ASVs	47 HMMWV	480	22,560
	35 HMMWV	480	16,800
MP Company with ASVs	12 ASV	1,210	14,520
		Total:	31,320
Net increase (decrease):			31,320 - 22,560 = 8,760 gm/hr

Table B-2. Hydrocarbon Emissions from HMMWV and ASV equipped MP companies

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Company without ASVs	47 HMMWV	37.5	1,763
	35 HMMWV	37.5	1,313
MP Company with ASVs	12 ASVs	153.4	1,840.8
		Total:	3,153.8
Net increase (decrease):			3,153.8 - 1,763 = 1,390.8 gm/hr

Table B-3. Carbon Monoxide (CO) Emissions from HMMWV and ASV equipped MP companies

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Company without ASVs	47 HMMWV	270.0	12,690
	35 HMMWV	270.0	9,450
MP Company with ASVs	12 ASVs	143.0	1,716
		Total:	11,166
Net increase (decrease):			11,116 - 12,690 = (1,524) gm/hr

Table B-4. Particulate Emissions from HMMWV and ASV equipped MP companies

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Company without ASVs	47 HMMWV	34.5	1,622
	35 HMMWV	34.5	1,208
MP Company with ASVs	12 ASVs	50.2	602.4
		Total:	1,810.4
Net increase (decrease):			1,810.4 - 1,622 = 188.4 gm/hr

Table B-5. NO_x Emissions from HMMWV and ASV equipped MP platoons

	Vehicles	NO_x emissions (gm/hour)	Total NO_x emissions (gm/hour)
MP Platoon without ASVs	14 HMMWV	480	6,720
	8 HMMWV	480	3,840
MP Platoon with ASVs	6 ASV	1,210	7,260
		Total:	11,110
Net increase (decrease):			11,110 -6,720 = 4,380 gm/hr

Table B-6. Hydrocarbon Emissions from HMMWV- and ASV- equipped MP platoons

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Platoon without ASVs	14 HMMWV	37.5	525
	8 HMMWV	37.5	300
MP Platoon with ASVs	6 ASV	153.4	920.4
		Total:	1,220.4
Net increase (decrease):			1,220.4 - 525 = 695.4 gm/hr

Table B-7. Carbon Monoxide (CO) Emissions from HMMWV- and ASV-equipped MP platoons

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Platoon without ASVs	14 HMMWV	270.0	3,780
	8 HMMWV	270.0	2,160
MP Platoon with ASVs	6 ASV	143.0	858
		Total:	3,018
Net increase (decrease):			3,018 - 3,780 = (762) gm/hr

Table B-8. Particulate Emissions from HMMWV- and ASV-equipped MP platoons

	Vehicles	HC emissions (gm/hour)	Total HC emissions (gm/hour)
MP Platoon without ASVs	14 HMMWV	34.5	483
	8 HMMWV	34.5	276
MP Platoon with ASVs	6 ASV	50.2	301.2
		Total:	577.2
Net increase (decrease):			577.2 - 483 = 94.2 gm/hr