

APPENDIX B

AIR QUALITY APPLICABILITY ANALYSIS

APPENDIX B: AIR QUALITY APPLICABILITY ANALYSIS

This air quality applicability analysis was conducted to identify potential increases or decreases in criteria air pollutant emissions associated with the proposed implementation of six projects on Area B at Fort Detrick in Frederick County, Maryland. The projects would include an 18-Hole Golf Course, Indoor Shooting Range, Paintball Fields, Recreational Vehicle (RV) Park, Relocation of seven antenna towers from Area A to Area B, and the Area B Perimeter Fence.

Since the project will occur within a U.S. EPA designated ozone non-attainment area, it is subject to the federal conformity requirements. The purpose of the analysis is to further determine the applicability of the Federal General Conformity Rule established in 40 CFR, Part 93 entitled: *Determining Conformity of Federal Actions to State or Federal Implementation Plans* to the action.

The federal conformity rules were established to ensure that federal activities do not hamper local efforts to control air pollution. In particular, Section 176(c) of the Clean Air Act (CAA) prohibits federal agencies, departments or instrumentalities from engaging in, supporting, licensing, or approving any action, in an area that is in non-attainment of the National Ambient Air Quality Standards (NAAQS), which does not conform to an approved state or federal implementation plan. Therefore, the agency must determine whether or not the project would interfere with the clean air goals in the State Implementation Plan (SIP).

1.0 Project Description

The proposed action involves the implementation of the following six projects on Area B at Fort Detrick: an 18-Hole Golf Course, Paintball Fields, Indoor Shooting Range, RV Park, Antenna Relocation, and the Perimeter Fence.

In an effort to meet long-term mission and personnel requirements, the Department of the Army (DA) has developed a Morale, Welfare, and Recreation (MWR) program. This program, designated by AR 215-1, was designed to attract and retain an elite work force of active duty personnel. These personnel can be and are called upon at a moment's notice to deploy overseas to defend the country's interests. A key element in the MWR program is improving quality of life for military members and authorized patrons who work and reside at various Army installations. The program is designed to meet the needs of the installation community, which includes soldiers, units, retirees, civilian employees, and their families. In an effort to increase and improve community services at Fort Detrick, four recreational facilities (18-hole golf course, indoor shooting range, paintball fields and RV park), are being proposed. None of the four recreational facilities being proposed currently exist at Fort Detrick. In addition to the recreational mission of the indoor shooting range, this facility will also support small-arm training and annual qualification for military personnel.

In addition to the recreational mission of the indoor shooting range, this facility will also support small-arm training and annual qualification for military personnel. The indoor shooting range would be utilized by soldiers, police, and guards to practice marksmanship proficiency and complete annual small arms recertification requirements, as required under AR-190-14 – *Carrying of Firearms and Use of Force for Law Enforcement and Security Duties*. This regulation states, "Military police, DA civilian investigators, DA civilian police and security guards, and contracted or contractor security forces will qualify annually." The mission of the Fort Detrick PMO, which operates under SPO, is committed to providing the highest quality of police services by empowering our members and the community to work in partnership with the goal of improving the quality of life in Fort Detrick, while at the same time, maintaining respect for individual rights and human dignity. In order to provide high quality police service the Fort Detrick PMO train and perform required annual qualifications at the City of Frederick's shooting range. This is an

outdoor shooting range; therefore, use of the range is weather dependent. During periods of inclement weather pistol training and qualification was completed at Fort Ritchie, located in Washington County, Maryland. Due to the closure of Fort Ritchie this alternative shooting range is no longer an option. Additionally, military units at Fort Detrick are currently traveling to other local military installations (e.g., Fort Indiantown Gap, Pennsylvania) for training and annual small-arms recertification.

The U.S. Military Affiliate Radio System (MARS) operates nine antennas at Fort Detrick. Presently, all nine antennas are located on Area A at Fort Detrick and two are located in Area B. Of the nine antennas located on Area A, seven will be relocated to Area B. All

In accordance with AR 190-11, Physical Security of Arms, Ammunition, and Explosives, 12 February 1998, and AR 525-13, Antiterrorism, 4 January 2002, installations are required to take measures to protect the installation's facilities and personnel. To meet this requirement Fort Detrick is proposing to replace the existing four foot farm fence that currently surrounds Area B with an eight foot high chain-link fence with barbed wire above. In addition to improving the internal security for Area B, the proposed fencing will improve the safety for the surrounding communities and neighbors as a result of the operations of the proposed activities (recreational and antennae field) at Area B. Safety improvements will be realized through better access restriction to Area B.

2.0 Meteorology/Climate

Temperature is a parameter used in calculations of emissions for air quality applicability. The average annual temperature at Fort Detrick is 54 degrees Fahrenheit (°F). Temperature extremes in the area range from -12 °F in the winter to 109 °F in the summer. The climate in Frederick County is characterized by four distinct seasons with short, warm, and occasionally humid summers and mild winters with occasional cold periods. In Frederick County average annual precipitation and snowfall are 40.8 inches and 26.4 inches respectively. Prevailing winds in the Fort Detrick area are west-southwesterly and have an annual average velocity of 7.4 miles per hour (USGA, Fort Detrick, 2003a).

3.0 Current Ambient Air Quality Conditions

The EPA has designated the Washington, DC Metropolitan area, which includes Frederick County, Maryland and Area B of Fort Detrick, as in severe non-attainment for the NAAQS pollutant ozone. This can be attributed primarily to mobile sources.

4.0 Air Quality Regulatory Requirements

The EPA defines ambient air in 40 CFR Part 50 as “that portion of the atmosphere, external to buildings, to which the general public has access.” In compliance with the 1970 Clean Air Act (CAA) and the 1977 and 1990 Clean Air Act Amendments (CAAA), the EPA has promulgated NAAQS. The NAAQS were enacted for the protection of the public health and welfare, allowing for an adequate margin of safety. To date, the EPA has issued NAAQS for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO₂), particles with a diameter less than or equal to a nominal 10 micrometers (PM₁₀), ozone (O₃), nitrogen dioxide (NO₂), and lead (Pb). Areas that do not meet NAAQS are called non-attainment areas. The EPA classified the Washington, DC Metropolitan area, including the project area, as in severe non-attainment for ozone. The NAAQS for ozone is presented in Table 1.

Table 1. Ambient Air Quality Standards For Ozone

Pollutant	Federal Standard	Maryland Standard
Ozone (O ₃) ¹		
1-Hour Average	0.12 ppm	0.12 ppm
8-Hour Average	0.08 ppm	0.08 ppm

¹ Federal primary and secondary standards for this pollutant are identical.

Source: EPA 2003

To regulate the emission levels resulting from a project, federal actions located in non-attainment areas are required to demonstrate compliance with the general conformity guidelines established in 40 CFR Part 93 *Determining Conformity of Federal Actions to State or Federal Implementation Plans* (the Rule). The project area is located within a severe ozone non-attainment area; therefore, a General Conformity Rule applicability analysis is warranted.

Section 93.153 of the Rule sets applicability requirements for projects subject to the Rule through establishment of *de minimis* levels for annual criteria pollutant emissions. These *de minimis* levels are set according to criteria pollutant non-attainment area designations. Projects below the *de minimis* levels are not subject to the Rule. Those at or above the levels are required to perform a conformity analysis as established in the Rule. The *de minimis* levels apply to direct and indirect sources of emissions that can occur during the construction and operational phases of the action.

Direct emissions are those caused by, or initiated by, the federal action that occur at the same time and place as the action. Indirect emissions are those caused by the action, but which occur later in time and/or at a distance removed from the action itself, yet are reasonably foreseeable and the federal agency responsible for the action can maintain control as part of the actions program responsibility. To determine the applicability of the Rule to this action, emissions must be estimated for the ozone precursor pollutants nitrogen oxides (NO_x) and volatile organic compounds (VOC). Annual emissions for these compounds were estimated for the project to determine if it would be below or above the *de minimis* levels established in the Rule. The *de minimis* for severe ozone areas is 25 tons per year (tpy) for both NO_x and VOC.

In addition to evaluation of air emissions against *de minimis* levels, emissions are also evaluated for regional significance. A federal action that does not exceed the threshold emission rates of criteria pollutants may still be subject to a general conformity determination if the direct and indirect emissions from the action exceed ten percent of the total emissions inventory for a particular criteria pollutant in a non-attainment or maintenance area. If the emissions exceed this ten percent threshold, the federal action is considered to be a “regionally significant” activity, and thus, the general conformity rules apply.

5.0 Conformity Applicability Analysis

This project construction- and operations-related General Conformity analysis needs to be performed for the six proposed projects for Fort Detrick, Area B. This conformity analysis and air emissions evaluation will follow the criteria regulated in 40 CFR Parts 6, 51, and 93, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans; Final Rule* (November 30, 1993).

5.1 Construction Phase Emissions

Construction emissions would result from the operation of heavy equipment, the commuter vehicle traffic from the construction crew, and the painting of parking spaces and building surfaces. The project would utilize a mix of heavy equipment for construction, mainly associated with building construction and paving for parking lots and road ways.

5.1.1 Emissions from Heavy Equipment

Annual emissions were calculated for various types of diesel construction vehicles using EPA's document *Exhaust Emission Factors for Nonroad Engine Modeling—Compression-Ignition* (Report No. NR-009A, 1998). Truck emission levels were calculated using EPA's *MOBILE6* model for an average temperature of 54° F. The total annual emissions, in tons per year, were determined for each vehicle based on the number of vehicles used and the number of operating hours per year. The estimated construction period for each project would be as follows:

- 18-Hole Golf Course – 260 days
- Paintball Fields – 60 days
- Indoor Shooting Range – 60 days
- RV Park – 30 days
- Relocation of 7 Antennas – 21 days
- Perimeter Fence – 60 days

Construction personnel were assumed to commute an average of 30 miles per day over the construction period for each project. Emissions factors used for construction vehicles, under all projects, are shown in Table 2.

Table 2. Emissions Factors for Construction Vehicles

Construction Vehicle Type	Emissions Factors lbs/hr-vehicle (kg/hr-vehicle)	
	NO _x	VOC
Construction		
Bulldozer	5.542	0.470
Backhoe	1.521	0.093
Grader	2.956	0.250
Concrete Truck	3.042	0.186
Curb & Gutter Former	1.978	0.121
Paver	1.978	0.121
Concrete Cutting Saw and Masonry Saw	0.761	0.081
Vibratory Roller	2.206	0.135
Pneumatic Tire Roller	1.293	0.138
Steel Wheel Roller	1.293	0.138
Concrete Pumper Truck	3.042	0.186
Crane	1.521	0.093
Pick-up Truck	1.30	1.78*
Dump Truck	12.00*	0.560*
Delivery Truck (heavy duty)	12.00*	0.560*

*units are in grams/mile/vehicle (lb/km/vehicle)

In determining the amount of roadway to be constructed, for the various projects, where applicable, it was assumed that 12-foot lanes with 6-foot shoulders would be constructed. For parking spaces it was assumed that each parking space would require 400 square feet of paved area. The estimated amount of roadway and parking, as well as new building space, to be constructed under each project is shown in Table 3.

Table 3. Impervious Surface to be Constructed

Project	Roadway in square feet	Parking in square feet	Building in square feet	Total Impervious Surface in square feet (acres)
18-Hole Golf Course	192,800 ¹	20,000	5,000	217,800 (5)
Paintball Fields	119,680 ¹	10,000	1,000	130,680 (3)
Indoor Shooting Range	43,120 ¹	10,000	34,000	87,120 (2)
RV Park	81,120 ¹	2,000 ²	4,000	87,120 (2)
Antenna Relocation	---	---	112 ³	112 (0.003)
Perimeter Fence	---	---	---	0 (0)

Notes:

1 - This includes golf cart paths and sidewalks and assumes asphalt construction.

2 - This includes 50 concrete RV sites.

3 - This includes 16 SF concrete pads for 7 antennas.

For this project, it was assumed that pick-up trucks, delivery trucks, and dump trucks would be utilized. It was assumed that pick-up trucks would travel 20 miles per trip, making three trips a day, for a total of 60 miles a day traveled by pick-up truck. Delivery trucks and dump trucks would both travel 30 miles per trip, with delivery trucks making two trips a day and dump trucks making four trips a day for a total of 60 miles and 120 miles traveled, respectively.

5.1.1.1 Calculations for Construction Emissions

Using the emissions factors in Table 2, annual construction emissions were calculated for the six projects in Area B. Using the assumptions described above, the annual emissions in tons per year of NO_x and VOC for construction emissions were calculated for each vehicle type using the appropriate equations displayed in Table 4.

Table 5 through Table 10 summarize total annual emissions for the heavy equipment used during construction of the Area B projects, based upon hours of usage, for each project.

Table 4: Equations for Construction Emissions Calculations

Emission Source	Equation	Sample Calculation
Heavy Equipment Emissions, On-Site Activities	(# of vehicle type) (Emission factor) (Total # of days in operation) (percent usage) (hours/day) (1 ton/2000 lbs) = TPY of air emissions	(1 grader) (2.956 lbs/hr/vehicle) (36 days in operation) (100% usage) (8 hours/day) (1 ton/2000 lbs) = 0.426 TPY of NO_x emissions
Construction Crew, Commuting	(# of vehicles) (#miles/day) (#days) (emissions factor grams/mile) (1 lb/453.59 grams) (1ton/2000 lb) = TPY of Vehicle Emissions	(30 vehicles) (30 miles/day) (260 days) (0.946 grams/mile/vehicle) (1 lb/453.59 grams) (1ton/2000 lb) = 0.24 TPY NO_x of Vehicle Emissions

Table 5. Total Emissions from On-Site Construction Activity – 18- Hole Golf Course

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Golf Course Construction				
Bulldozer	1	36	0.78	0.68
Scraper	1	54	1.995	0.169
Grader	1	36	0.426	0.036
Road Construction				
Paver	1	2	0.016	0.001
Steel Wheel Roller	1	2	0.010	0.001
Pneumatic Tire Roller	1	2	0.010	0.001
Building Construction				
Concrete Truck	1	4	0.049	0.003
Curb and Gutter Former	1	2	0.016	0.001
Concrete Cutting Saw and Masonry Saw	3	36	0.329	0.035
Vibratory Roller	1	10	0.088	0.005
Concrete Pumper Truck	1	4	0.049	0.003
Backhoe	1	36	0.219	0.013
Crane	1	2	0.012	0.001
Delivery Truck	1	36	0.029	0.001
Dump Truck	1	36	0.057	0.003
Total Emissions			4.102	0.325

Table 6. Total Emissions from On-Site Construction Activity – Paintball Fields

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Building Construction				
Concrete Truck	1	2	0.024	0.001
Curb and Gutter Former	1	1	0.008	0.0005
Paver	1	1	0.008	0.0005
Concrete Cutting Saw and Masonry Saw	3	30	0.274	0.029
Vibratory Roller	1	10	0.088	0.005
Concrete Pumper Truck	1	10	0.122	0.007
Pick-up Truck	1	30	0.003	0.003
Delivery Truck	1	3	0.024	0.001
Dump Truck	2	5	0.016	0.001
Total Emissions			0.566	0.049

Table 7. Total Emissions from On-Site Construction Activity – Indoor Shooting Range

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
8 Support Piles				
Crane	1	4	0.024	0.001
Backhoe	1	4	0.024	0.001
Parking Construction – 25 Spaces				
Paver	1	1	0.008	0.0005
Bulldozer	1	1	0.018	0.001
Backhoe	1	1	0.006	0.000
Grader	1	1	0.010	0.001
Steel Wheel Roller	1	1	0.005	0.001
Moving Tent				
Crane	1	20	0.122	0.007
Building Construction				
Bulldozer	1	8	0.146	0.009
Backhoe	1	30	0.183	0.011
Grader	1	2	0.019	0.001
Concrete Truck	1	10	0.122	0.007
Paver	1	5	0.040	0.002
Concrete Cutting Saw and Masonry Saw	3	30	0.274	0.029
Vibratory Roller	1	2	0.018	0.001
Pneumatic Tire Roller	1	2	0.010	0.001
Steel Wheel Roller	1	2	0.010	0.001
Concrete Pumper Truck	1	10	0.122	0.007
Pick-up Truck	1	30	0.003	0.003
Delivery Truck	1	30	0.024	0.001
Dump Truck	2	30	0.095	0.004
Berm Construction				
Bulldozer	1	5	0.091	0.006
Backhoe	1	5	0.030	0.002
Grader	1	2	0.019	0.001
Vibratory Roller	1	2	0.018	0.001
Pick-up Truck	1	5	0.000	0.001
Dump Truck	2	5	0.016	0.001
Front End Loader	1	5	0.084	0.005
Roadway Construction				
Paver	2	3	0.024	0.001
Steel Wheel Roller	1	2	0.010	0.001
Pneumatic Tire Roller	1	2	0.010	0.001
Bulldozer	1	2	0.037	0.002
Grader	1	2	0.019	0.001
Concrete Truck	1	10	0.122	0.007

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Curb & Gutter Former	1	1	0.008	0.0005
Concrete Cutting Saw and Masonry Saw	3	50	0.456	0.049
Vibratory Roller	1	1	0.009	0.001
Pick-up Truck	1	2	0.000	0.000
Dump Truck	2	2	0.006	0.000
Front End Loader	1	2	0.033	0.002
Total Emissions			2.276	0.174

Table 8. Total Emissions from On-Site Construction Activity – RV Park

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Building Construction				
Bulldozer	1	5	0.091	0.006
Backhoe	1	10	0.061	0.004
Grader	1	5	0.049	0.003
Concrete Truck	1	1	0.012	0.001
Paver	1	5	0.040	0.002
Concrete Cutting Saw and Masonry Saw	3	10	0.091	0.010
Vibratory Roller	1	2	0.018	0.001
Concrete Pumper Truck	1	1	0.012	0.001
Pick-up Truck	1	10	0.052	0.070
Delivery Truck	1	10	0.480	0.022
Dump Truck	1	10	0.960	0.045
RV Space Construction – 50 Spots				
Concrete Cutting Saw and Masonry Saw	3	10	0.091	0.010
Backhoe	1	10	0.061	0.004
Concrete Truck	1	10	0.122	0.007
Concrete Pumper Truck	1	10	0.122	0.007
Steel Wheel Roller	1	10	0.052	0.006
Road Construction				
Paver	1	5	0.040	0.002
Steel Wheel Roller	1	5	0.026	0.003
Pneumatic Tire Roller	1	5	0.026	0.003
Concrete Cutting Saw and Masonry Saw	1	5	0.015	0.002
Vibratory Roller	1	5	0.044	0.003
Pick-up Truck	2	5	0.052	0.070
Delivery Truck	1	5	0.240	0.011
Dump Truck	2	5	0.480	0.022

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Bulldozer	1	5	0.091	0.006
Backhoe	1	5	0.030	0.002
Grader	1	5	0.049	0.003
Total Emissions			3.407	0.325

Table 9. Total Emissions from On-Site Construction Activity – Relocation of Antenna

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY	
			NO _x	VOC
Antenna Relocation				
Crane	1	21	0.128	0.008
Delivery Truck	1	21	0.017	0.001
Concrete Pad				
Concrete Truck	1	21	0.256	0.016
Concrete Cutting Saw and Masonry Saw	1	21	0.064	0.007
Concrete Pumper Truck	1	21	0.256	0.016
Pick-up Truck	1	21	0.002	0.002
Delivery Truck	1	21	0.017	0.001
Dump Truck	2	21	0.067	0.003
Total Emissions			0.660	0.041

Table 10. Total Emissions from On-Site Construction Activity – Perimeter Fence

Construction Vehicle Type	Number	Length of Operation (days)	Total Annual Emissions –TPY (kgpy)	
			NO _x	VOC
Delivery Truck	1	10	0.008	0.000
Concrete Truck	1	10	0.122	0.007
Concrete Cutting Saw and Masonry Saw	1	60	0.183	0.020
Pick-up Truck	1	60	0.000	0.000
Dump Truck	1	10	0.016	0.001
Backhoe	1	60	0.365	0.022
Total Emissions			0.741	0.053

5.1.2 Calculations for Trenching Activities

Trenching activities would be required for both the construction of the 18-Hole Golf Course and the RV Park. Assuming the construction rate will be approximately 300 linear feet per day working eight hours, trenching will take about 62 days for the Golf Course and 17 days for the RV Park. Two backhoes and one dump truck will be used for these activities for each project. Table 11 and Table 12 show total emissions associated with trenching activities for these projects.

Table 11. Total Emissions from Trenching Activity – 18-Hole Golf Course

Construction Vehicle Type	Number of Vehicles	Length of Operation (days)	Total Annual Emissions –TPY (KgPY)	
			NO _x	VOC
Backhoe	2	62	0.754	0.046
Dump Truck	1	62	0.000	0.000
Total Emissions			0.754	0.046

Table 12. Total Emissions from Trenching Activity – RV Park

Construction Vehicle Type	Number of Vehicles	Length of Operation (days)	Total Annual Emissions –TPY (KgPY)	
			NO _x	VOC
Backhoe	2	17	0.207	0.013
Dump Truck	1	17	0.000	0.000
Total Emissions			0.207	0.013

5.1.3 Emissions from Construction Crew Workers

Emissions from construction personnel traffic were calculated using the EPA's *MOBILE6*. The number of workers and construction period required for each project is shown in Table 13. For a conservative analysis, it was assumed each person will drive to the site. It is assumed that the average number of workers will drive approximately 30 miles each day. Based on *MOBILE6*, the emission factor for NO_x is 0.95 grams/mile/vehicle (0.001 pounds/kilometer/vehicle) and VOC is 1.48 grams/mile/vehicle (0.002 pounds/kilometer/vehicle) for the average fleet in Frederick, Maryland. The total emissions associated with the commuter vehicles from the construction crew are for each project are shown in Table 14.

Table 13. Construction Crew Assumptions

Project	Construction Period	Number of Construction Crew
18-Hole Golf Course	260 days	30
Paintball Fields	30 days	5
Indoor Shooting Range	60 days	30
RV Park	60 days	30
Antenna Relocation	21 days	5
Perimeter Fence	60 days	5

Table 14. Construction Crew Emissions Over Project

Project	NO _x	VOC
18-Hole Golf Course	0.24	0.37
Paintball Fields	0.01	0.01
Indoor Shooting Range	0.11	0.17
RV Park	0.06	0.08
Antenna Relocation	0.01	0.01
Perimeter Fence	0.02	0.03

5.1.4 Emissions from Painting Activities

To calculate the amount of interior space to be painted, it was assumed that facilities for each project would consist of a single room and would be one story. When calculating VOC emissions from painting interior surfaces, it was assumed that water-based latex paint would be used with a VOC content of one pound per gallon, and one gallon of paint covers an average for three coats of approximately 300 square feet. Three coats of paint would be applied (one primer and two finish) to all interior surfaces. The total amount of interior surfaces to be painted under each project and the amount of paint required would be as follows:

- 18-Hole Golf Course – This project would require 2,545 square feet of interior space to be painted, using approximately 25 gallons of paint. Painting of the interior surfaces would create VOC emissions of approximately 0.013 tpy.
- Paintball Fields – This project would require 1,140 square feet of interior space to be painted, using approximately 11 gallons of paint. Painting of the interior surfaces would create VOC emissions of approximately 0.006 tpy.
- Firing Range– This project would require 4,825 square feet of interior space to be painted, using approximately 48 gallons of paint. Painting of the interior surfaces would create VOC emissions of approximately 0.024 tpy.
- RV Park – This project would require 2,545 square feet of interior space to be painted, using approximately 25 gallons of paint. Painting of the interior surfaces would create VOC emissions of approximately 0.013 tpy.
- Antenna Relocation– This project would not require any interior painting and additional VOC emissions from this project would not be created.
- Perimeter Fence– This project would not require any interior painting and additional VOC emissions from this project would not be created.

Emissions from painting parking spaces were based on four-inch wide stripes. It was assumed that the average parking space is 9 feet wide by 19 feet long and every two parking spaces share a common line. Approximately 20 square feet would be painted for every two parking spaces. For parking spaces, it was assumed that alkyd paint would be used with a VOC content of three pounds per gallon and one gallon of paint covers approximately 200 square feet. It was also assumed that the Antenna Relocation and Perimeter Fence projects would not include parking areas and no painting of parking spaces would be required for these projects. One coat of paint would be applied to the parking surfaces. Based on these

assumptions, the amount of area to be painted, gallons required, and approximate VOC emission for each project are:

- 18-Hole Golf Course – Approximately 50 parking spaces would be painted, resulting in 25 two space areas (500 square feet), requiring 3 gallons of paint. Painting of the parking spaces would create VOC emissions of approximately 0.004 tpy.
- Paintball Fields – Approximately 25 parking spaces would be painted, resulting in 13 two space areas (260 square feet), requiring one gallon of paint. Painting of the parking spaces would create VOC emissions of approximately 0.002 tpy.
- Firing Range – Approximately 25 parking spaces would be painted, resulting in 13 two space areas (260 square feet), requiring one gallon of paint. Painting of the parking spaces would create VOC emissions of approximately 0.002 tpy.
- RV Park – Approximately 50 parking spaces would be painted, resulting in 25 two space areas (500 square feet), requiring 3 gallons of paint. Painting of the parking spaces would create VOC emissions of approximately 0.004 tpy.

The total emissions associated with painting activities under each project are shown in Table 15.

Table 15. Total VOC Emissions from Painting Activities

Project	Emission from Interior Painting	Emissions from Parking Space Painting	Total Painting Emissions
18-Hole Golf Course	0.013	0.004	0.016
Paintball Fields	0.006	0.002	0.008
Indoor Shooting Range	0.024	0.002	0.026
RV Park	0.013	0.004	0.016
Antenna Relocation	0.000	0.000	0.000
Perimeter Fence	0.000	0.000	0.000

5.1.4 Summary of Construction Emissions

After emissions analysis was performed for all aspects of construction, the totals were added to determine the combined construction emissions. Table 16 through Table 21 display a summary of the findings compared to the *de minimis* values for each project.

Table 16. Total Emissions from Construction Related Activities – 18-Hole Golf Course

Construction Activity	Total Annual Emissions –TPY		<i>De minimis</i> values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	4.102	0.325	25	25
Trenching	0.754	0.046		
Construction Crew Workers	0.242	0.367		
Painting	NA	0.016		
Total Emissions from Construction	5.10	0.750		

Table 17. Total Emissions from Construction Related Activities – Paintball Fields

Construction Activity	Total Annual Emissions –TPY		De minimis values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	0.566	0.049	25	25
Construction Crew Workers	0.009	0.014		
Painting	NA	0.008		
Total Emissions from Construction	0.576	0.71		

Table 18. Total Emissions from Construction Related Activities – Firing Range

Construction Activity	Total Annual Emissions –TPY		De minimis values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	2.276	0.174	25	25
Construction Crew Workers	0.112	0.169		
Painting	NA	0.026		
Total Emissions from Construction	2.388	0.370		

Table 19. Total Emissions from Construction Related Activities – RV Park

Construction Activity	Total Annual Emissions –TPY		De minimis values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	3.407	0.325	25	25
Trenching	0.207	0.013		
Construction Crew Workers	0.056	0.085		
Painting	NA	0.016		
Total Emissions from Construction	3.669	0.439		

Table 20. Total Emissions from Construction Related Activities – Antenna Relocation

Construction Activity	Total Annual Emissions –TPY		De minimis values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	0.660	0.041	25	25
Construction Crew Workers	0.007	0.010		
Painting	NA	0.000		
Total Emissions from Construction	0.667	0.051		

Table 21. Total Emissions from Construction Related Activities – Perimeter Fence

Construction Activity	Total Annual Emissions –TPY		De minimis values –TPY	
	NO _x	VOC	NO _x	VOC
Use of Heavy Equipment (on –site construction)	0.741	0.053	25	25
Construction Crew Workers	0.019	0.028		
Painting	NA	0.000		
Total Emissions from Construction	0.712	0.079		

5.2 Operational Emissions

Emergency Power Generation

It is assumed that facilities constructed under each project would not require boilers. It was assumed that the only stationary emergency generator required would be for the Antenna Relocation project and would require a 50 KW emergency generator. It is also assumed that mobile emergency generators would be located in recreational vehicles utilizing the RV Park. Assumptions for emergency generator emissions use the EPA's *Report No. NR-009A Exhaust Emission Factors for Nonroad Engine Modeling – Compression-Ignition* to determine NO_x and VOC emissions.

For the stationary generator associated with the Antenna Relocation, assuming that a new generator would be used at the site, emission factors for a generator between 25 and 50 horsepower that has a model year after 2004 (classified as Tier 2 Regulation) were used, resulting in NO_x emissions of 0.011 lb/hp-hr and VOC emissions of 0.001 lb/hp-hr. Using the above stated emission factors and assuming that the generator would operate at 50 horsepower for a total of 300 hours per year. The 300 hours include up to 10 hours per month of scheduled tests plus an allowance for emergency use. Using these assumptions, the emissions of NO_x and VOC for the emergency generator for the Antenna Relocation was calculated to be 0.00017 tpy and 0.0002 tpy respectively.

To calculate emissions from emergency generators associated with recreational vehicles. It was assumed that the average generators on an recreational vehicle is 3.6 KW or 4.8 horsepower. Further, it was assumed that there would be approximately 7 outages a year, lasting 24 hours each, for a total of 168 hours and all 50 vehicles would use generators. Assuming that the RVs would contain newer model generators, emission factors for generators under 11 horsepower that have a model year after 2005 (classified as Tier 2 Regulation) were used, resulting in NO_x emissions of 0.04 lb/hp-hr and VOC emissions of 0.02 lb/hp-hr. Using these assumptions, the emissions of NO_x and VOC for the mobile emergency generators associated with RV Park was calculated to be 0.168 tpy and 0.084 tpy respectively.

Commuter Traffic

The 18-Hole Golf Course, Paintball Fields, Indoor Shooting Range, and RV Park are all expected to create an increase in commuter traffic to Area B on Fort Detrick. No additional commuter traffic would be created from the Antenna Relocation or Perimeter Fence projects. Assumptions for the amount of additional commuter traffic for each project are as follows:

- **18-Hole Golf Course** – The 18-Hole Golf Course would create approximately 320 additional trips to Area B at Fort Detrick. These trips are expected to come from approximately 15 miles away and occur 360 days of the year.

- Paintball Fields – The Paintball Fields would create approximately 110 additional trips to Area B at Fort Detrick. These trips are expected to come from approximately 20 miles away and occur 156 days of the year.
- Indoor Shooting Range – The Indoor Shooting Range would create approximately 120 additional trips to Area B at Fort Detrick. These trips are expected to come from approximately 20 miles away and occur 260 days of the year.
- RV Park – During the course of a year, approximately 1,138 large recreational vehicles (650 during peak season and 488 during off-peak season) and 1,138 small/medium recreational vehicles (650 during peak season and 488 off-peak season) are expected to utilize the RV Park. These vehicles would be expected to come from approximately 30 miles away.

Emissions generated from additional commuter traffic under each project are shown in Table 22.

Table 22. Additional Commuter Emissions per Project (Annual)

Project	NO _x	VOC
18-Hole Golf Course	3.58	5.42
Paintball Fields	0.72	1.09
Indoor Shooting Range	1.29	1.96
RV Park	0.72	0.23
Antenna Relocation	0.00	0.00
Perimeter Fence	0.00	0.00

Lawn Maintenance

The operation of the 18-Hole Golf Course would require lawn maintenance as part of daily operations. It was assumed that lawn maintenance would occur on a daily basis for approximately 275 days a year, which excludes lawn maintenance in the winter months. Lawn maintenance operations were assumed to require one large lawnmower, one small lawnmower, and four other lawn and garden tools such as leaf blowers and edgers on a daily basis, with each piece of equipment operating approximately 6 hours a day. Assumptions for lawn maintenance emissions use the EPA's *Report No. NR-009A Exhaust Emission Factors for Nonroad Engine Modeling – Compression-Ignition* to determine NO_x and VOC emissions. Assuming that new equipment would be used at the site, emission factors for equipment under 11 horsepower that has a model year after 2005 (classified as Tier 2 Regulation) were used, resulting in NO_x emissions of 0.04 lb/hp-hr and VOC emissions of 0.02 lb/hp-hr. Using these assumptions, it was calculated that lawn maintenance activities for the 18-Hole Golf Course would result in 0.198 tpy of NO_x emissions and 0.099 tpy of VOC emissions.

5.3 Combined Emissions

There is a potential that one or more of these projects could be constructed and operating at the same time. Table 22 and Table 23 show that if all projects were constructed or operated at the same time, the combined emissions would be below the *de minimis* values.

Table 20. Total Combined Emissions - Construction

Construction Activity	Total Annual Emissions –TPY		<i>De minimis</i> values –TPY	
	NO _x	VOC	NO _x	VOC
18-Hole Golf Course	5.10	0.75	25	25
Paintball Field	0.58	0.07		
Indoor Shooting Range	2.39	0.37		
RV Park	3.67	0.44		
Antenna Relocation	0.67	0.05		
Perimeter Fence	0.71	0.08		
Total Combined Emissions from Construction	13.11	1.76		

Table 21. Total Combined Emissions - Operations

Construction Activity	Total Annual Emissions –TPY		<i>De minimis</i> values –TPY	
	NO _x	VOC	NO _x	VOC
18-Hole Golf Course	3.80	5.52	25	25
Paintball Field	0.72	1.09		
Indoor Shooting Range	1.29	1.96		
RV Park	0.88	0.31		
Antenna Relocation	0.03	0.05		
Perimeter Fence	0.00	0.00		
Total Combined Emissions from Operations	6.71	8.92		

5.4 Regional Significance

In addition to *de minimis* values, actions are also evaluated for regional significance. An action is considered to be regionally significant if the annual increase in emissions would make up 10 percent or more of the available regional emission inventory. The *Final State Implementation Plan Revision, Phase I Attainment Plan* (MWWCOG, 1997) sets forth daily target levels of 637.1 tons per day of NO_x and 362.9 tons per day of VOC for the Washington Metropolitan ozone non-attainment area where Area B of Fort Detrick is located. The increase in annual emissions from the proposed construction and operations would not make up ten percent or more of the available regional emission inventory for VOC or NO_x and would not be regionally significant.

6.0 Overall Results

The table below summarizes the total emissions associated with the construction and operations of the six projects in Area B at Fort Detrick. Construction related emissions would be temporary and only occur during the development period for each project. Operational emissions associated with each project

would be long-term and occur throughout the life of the project. When compared to the *de minimis* values for this non-attainment area of 25 tpy each for NO_x and VOC, the emissions associated with implementation of the six projects in Area B fall below the *de minimis* values for all projects evaluated. As a result the six projects proposed for Area B at Fort Detrick are not subject to the General Conformity Rule requirements.

Table 21. Total Emissions from All Projects

Activity	18-Hole Golf Course		Paintball Fields		Indoor Shooting Range		RV Park		Antenna Relocation		Perimeter Fence	
	NO _x	VOC	NO _x	VOC	NO _x	VOC	NO _x	VOC	NO _x	VOC	NO _x	VOC
Construction Emissions												
Construction Equipment	4.102	0.325	0.566	0.049	2.276	0.174	3.407	0.325	0.660	0.041	0.741	0.053
Trenching	0.754	0.046	0.000	0.000	0.000	0.00	0.207	0.013	0.000	0.000	0.000	0.000
Construction Crew Commuters	0.242	0.367	0.009	0.014	0.112	0.169	0.056	0.085	0.007	0.010	0.019	0.028
Painting	NA	0.016	NA	0.008	NA	0.026	NA	0.016	NA	0.000	NA	0.000
Total Construction Emissions	5.10	0.750	0.576	0.71	2.388	0.370	3.669	0.439	0.667	0.051	0.712	0.079
Operation Emissions												
Emergency Generator	0.000	0.000	0.000	0.000	0.000	0.000	0.168	0.084	0.002	0.0002	0.000	0.000
Commuter Traffic	3.581	5.417	0.720	1.008	1.293	1.956	0.716	0.228	0.030	0.045	0.000	0.000
Lawn Maintenance	0.198	0.099	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total Operations Emissions	3.581	5.417	0.720	1.008	1.293	1.956	0.884	0.312	0.031	0.045	0.000	0.000

Appendix B References

- RS Means. 2001. *Facilities Construction Cost Data*. RS Means Company Inc: Kingston, MA.
- U.S. Environmental Protection Agency. 1998a. *Compilation of Air Pollutant Emission Factors, Volume I, Chapter 1 Supplement D: Stationary Sources, AP-42, 5th edition*.
- U.S. Environmental Protection Agency. 1998b. *Exhaust Emission Factors for Nonroad Engine Modeling-Compression-Ignition, Report No. NR-009A*. February 13, 1998, revised June 15, 1998.
- U.S. Environmental Protection Agency. 1997. *MOBILE5b Emission Factor Model, for Trucks year 2002 Vehicle Emissions*.
- U.S. Environmental Protection Agency. *National Primary and Secondary Ambient Air Quality Standards*. 40 CFR Part 50.
- U.S. Environmental Protection Agency. *Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved under Title 23 U.S.C. or the Federal Transit Act*. 40 CFR Part 51, Subpart T.
- U.S. Environmental Protection Agency. *Designation of Areas for Air Quality Planning Purposes, Subpart C: Section 107 Attainment Status Designations*. 40 CFR Part 81.