APPENDIX A

General Conformity Rule Analysis

A.1 Clean Air Conformity

The 1990 amendments to the Clean Air Act (CAA) require federal agencies to ensure that their actions conform to the appropriate State Implementation Plan (SIP) in a nonattainment area. The SIP is a plan that provides for implementation, maintenance, and enforcement of the National Ambient Air Quality Standards (NAAQS), and it includes emission limitations and control measures to attain and maintain the NAAQS. Conformity to a SIP, as defined in the CAA, means conformity to a SIP's purpose of reducing the severity and number of violations of the NAAQS to achieve attainment of such standards. The federal agency responsible for an action is required to determine if its action conforms to the applicable SIP.

The US Environmental Protection Agency (USEPA) has developed two sets of conformity regulations, and federal actions are appropriately differentiated into transportation projects and non-transportation-related projects:

- Transportation projects are governed by the "transportation conformity" regulations (40 CFR Parts 51 and 93), which became effective on December 27, 1993 and were revised on August 15, 1997;

- Non-transportation projects are governed by the "general conformity" regulations (40 CFR Parts 6, 51 and 93) described in the final rule for *Determining Conformity of General Federal Actions to State or Federal Implementation Plans* that was published in the *Federal Register* on November 30, 1993. The general conformity rule became effective January 31, 1994 and has not been updated since then.

Since the Proposed Action is a non-transportation project, only the general conformity rule applies. This general conformity applicability analysis is prepared as an appendix to the Environmental Assessment for Construction of T Block and Structural Parking at Defense CEETA, Fort Belvoir, Va, that will occur as a result of the Proposed Action.

A.2 General Conformity

A.2.1 Attainment and Nonattainment Areas

The general conformity rule applies to federal actions occurring in air basins designated as nonattainment for the NAAQS or in attainment areas subject to maintenance plans (maintenance areas). Federal actions occurring in air basins that are in attainment with the NAAQS are not subject to the conformity rules.

A criteria pollutant is a pollutant for which an air quality standard has been established under the CAA. The designation of nonattainment is based on the exceedances or violations of the air quality standard. A maintenance plan establishes measures to control emissions to ensure the air quality standard is maintained in areas that have been redesignated as attainment from a previous nonattainment status.

Under the requirements of the 1970 Clean Air Act (CAA), as amended in 1977 and 1990, the USEPA established standards, known as the NAAQS, for six criteria pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3), inhalable particulate matter (PM 10 and PM 2.5), and lead (Pb).

Areas that meet the NAAQS standard for a criteria pollutant are designated as being in "attainment;" areas where the criteria pollutant level exceeds the NAAQS are designated as being in "nonattainment." Ozone nonattainment areas are subcategorized based on the severity of their pollution problem (marginal, moderate, serious, severe, and extreme). Particulate matter and carbon monoxide nonattainment areas are classified into two categories (moderate and serious). When insufficient data exists to determine an area's attainment status, it is designated unclassifiable (or attainment).

The Proposed Action is a federal action and would be located in Fairfax County, Virginia, an area currently designated as serious nonattainment for ozone, but classified as attainment with respect to all the other criteria pollutants.

A.2.2 *De Minimis* Emissions Levels

To focus general conformity requirements on those federal actions with the potential to have significant air quality impacts, threshold (*de minimis*) rates of emissions were established in the final rule. A formal conformity determination is required when the annual net total of direct and indirect emissions from a federal action, occurring in a nonattainment or maintenance area, equals or exceeds an annual *de minimis* level. Table A-1 lists the *de minimis* level by pollutant.

For ozone nonattainment areas, USEPA's conformity rules establish *de minimis* emission levels for both categories of ozone precursors [volatile organic compounds (VOC) and NO_x] on the presumption that both VOC and NO_x reductions will contribute to reductions in ozone formation. Since the project is located in a serious ozone nonattainment area, 50 tons per year (tpy) of VOCs or NO_x would apply.

Table A-1

De Minimis Emission Levels for Criteria Air Pollutants

Pollutant	Nonattainment Designation	Tons/Year
Ozone*	Serious	50
	Severe	25
	Extreme	10
	Other nonattainment areas outside ozone transport region	100
	Marginal and moderate nonattainment areas inside ozone transport region	50/100**
Carbon Monoxide	All	100
Sulfur Dioxide	All	100
Lead	All	25
Nitrogen Dioxide	All	100
Particulate Matter	Moderate	100
	Serious	70

Notes: * Applies to ozone precursors – volatile organic compounds (VOCs) and nitrogen oxides (NO_X).
** VOCs/NO_X

A.2.3 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 nonattainment 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 would apply.

A.2.4 Analysis

The conformity analysis for a federal action examines the impacts of the direct and indirect net emissions from mobile and stationary sources. Direct emissions are emissions of a criteria pollutant or its precursors that are caused or initiated by a federal action and occur at the same time and place as the action. Indirect emissions, occurring later in time and/or further removed in distance from the action itself, must be included in the determination if both of the followings apply:

- The federal agency can practicably control the emissions and has continuing program responsibility to maintain control; and

- The emissions caused by the federal action are reasonably foreseeable.

Operational Activities

After implementation of the Proposed Action, the new building is expected to be heated by waste heat generated from existing cooling tower operations. Thus, there would be no net increase in the base-wide emissions due to heating sources.

Construction Activities

The Proposed Action consists of the construction a concrete masonry block and structural steel frame building with a combined gross size of approximately 100,000 square foot (ft^2) [9,300 square meter (m^2)] and the construction and paving of a parking structure that would accommodate 550 spaces.

Increased direct and indirect VOC and NO_x emissions from construction would result from the following potential activities:

- Use of construction equipment;
- Movement of trucks containing construction materials; and
- Construction workers commutation.

In estimating construction-related NO_x and VOC emissions, the usage of equipment and the likely duration of each activity for the construction were determined based information on the building size and field experience with similar types of building construction projects.

Manpower estimates for each activity were primarily obtained from *Heavy Construction Data* (Means, 2000) and additional modifications were made where necessary based on previous project experience. The weekly duration given for each activity is assumed to be eight hours per day and five days per week. It is assumed that construction would begin in spring of 2003 and be completed by November of 2004.

Stages and Duration

In order to develop the activity-specific equipment usage data and the related manpower data, the construction stages and the duration and manpower at each stage are assumed and estimated as follows:

- Mobilization – Setting up trailer and temporary facilities and clear existing pavement from parking lot. It is estimated this would take eight men (including the survey crew) three days.

- Construction of new roads and parking structure – Construction of the new roads and parking structure is estimated to take approximately four months (18 weeks) using 40 men. Construction of the roads and parking structure for 550 vehicles is briefly described in Chapter 2. The parking structure is assumed to be steel framed with concrete walls and decks. The road is assumed to be 1,000-ft (305-m) long and 30-ft (9-m) wide. The road and parking structure foundation is assumed to have 8-in (20.3- cm) of sub base, 4 in (10 cm) of binder course, and 2 in (5 cm) of to top course (wearing surface).

- T Block Building Construction – The building would be constructed of concrete, concrete masonry block and structural steel frame. Construction would include excavation, foundations, concrete, plumbing, HVAC, electrical, fire protection and other miscellaneous building items such as architectural and interior blocks. It would take approximately 16 months (70 weeks) using 40 workers on an average daily basis.

Construction Equipment

The number and type of equipment necessary for construction activities were determined for each stage. All equipment was assumed to be diesel-powered. Each piece of equipment is assumed to be operated continuously for 75 percent of the time during each working day. Several pieces of equipment to be used during each stage include, but are not limited to:

- Backhoes;
- Gas-engine vibrators;

- Scissor lifts;
- Hydraulic excavator
- Cranes;
- Loaders;
- Rollers;
- Pavers;
- Dump trucks; and
- Pickup trucks.

A.3 Emissions Determination

A.3.1 Operational Emissions

Under the current plans, the T-Block Building would be used for office and administrative activities. The space heating for the proposed T-Block building would be provided by heated waste water generated from the cooling towers in the existing power plant. Therefore, no new air emissions would occur via operation and heating of the T-Block Building.

A.3.2 Construction Emissions

Equipment Operation

Estimates of construction equipment emissions were based on the estimated hours of usage and emission factors for each motorized source for the project. Emission factors for NO_x and VOCs related to heavy-duty diesel equipment were obtained from *Non-Road Engine and Vehicle Emission Study Report* (USEPA, 1991). Emission factors are available for hydrocarbons (HC), which include all VOCs as well as other non-VOC constituents; therefore, HC emissions may be slightly higher than VOC emissions. For the purposes of this analysis the term VOC was used, but emission factors included all HC emissions.

Emission factors in grams of pollutant per hour per horsepower were multiplied by the estimated running time and equipment associated average horsepower provided by the USEPA to calculate total grams of pollutant from each piece of equipment. Finally, these total grams of pollutant were converted to tons of pollutant.

The USEPA recommends the following formula to calculate hourly emissions from non-road engine sources such as loaders, cranes, excavators, etc.:

$$M_i = N \times HP \times LF \times EF_i$$

Where:

M_i = mass of emissions of ith pollutants during inventory period;
N = source population (units);
HP = average rated horsepower;
LF = typical load factor;
EF_i = average emissions of ith pollutant per unit of use (e.g., grams per horsepower-hour).

A sample calculation for a crane engine NO_x emissions during site mobilization is provided below:

Operational Hours = 260 hours
Operational Emissions = 260 hours x 194 hp x 43 % x 10.30 grams/hp-hr
= 0.25 tons (see Table A-2)

Motor Vehicle Operations

Truck and commuting vehicle operations would result in indirect emissions. However, the only activities that are subject to the general conformity determination include vehicle operations within Ft. Belvoir base, for which the Army would have control over. Motor vehicle operations within the base are conservatively assumed as follows:

- Pickup and dump trucks would travel at an average speed of 25 miles per hour (mph) onsite, for a total estimated run time of four hours per working day; and

- Each commuter vehicle would take a 20-minute round trip to commute within the base at an average speed of 25 mph.

Emission factors for motor vehicles were calculated for both dump trucks (heavy duty diesel vehicles) and commuter vehicles (light duty gasoline vehicles) using the USEPA Mobile 5b mobile source emission factor model associated with input parameters provided by the Metropolitan Washington Council of Governments (MWCOG) for an ozone season that is applicable to the Fairfax County area in Virginia (Tangirala, January 11, 2000). These emission factors were then multiplied by the vehicle operational hours to determine motor vehicle emissions (Table A-3).

Table A-2

Diesel Equipment Emissions Worksheet

Equipment Type (number)*	Total Weeks **	Total Hours of Operation	Horse power[1] (HP)	Load Factor[1] (%)	Emission Factor[1] (grams/HP-hr)		Emissions (tons)	
					VOC	NO_x	VOC	NO_x
Site Mobilization/Preparation (Total Construction Duration 3 days)								
backhoe/loaders (1)	3 days	18	158	54	0.84	10.30	0.00	0.02
Parking Structure Construction (Total Construction Duration 18 weeks)								
hydraulic excavator(1)	9	180	183	57	0.70	10.75	0.01	0.22
backhoe/loaders*** (3)	18	720	158	54	0.84	10.30	0.06	0.70
engine vibrator (1)	9	180	56	73	1.41	11.01	0.01	0.09
crane (1)	13	260	194	43	1.26	10.30	0.03	0.25
scissor lift (2)	13	520	43	46	1.57	14.00	0.02	0.16
Paver (1)	13	260	91	62	0.60	10.30	0.01	0.17
Roller (3)	13	780	99	56	0.8	9.30	0.04	0.44
T-Block Building Construction (Total Construction Duration 70 weeks)								
hydraulic excavator (1)	35	700	183	57	0.70	10.75	0.06	0.86
backhoe/loaders*** (3)	70	2,800	158	54	0.84	10.30	0.22	2.71
Crane (2)	52	2,080	194	43	1.26	10.30	0.24	1.97
engine vibrator (2)	35	1400	56	73	1.41	11.01	0.09	0.69
scissor lift (2)	52	2,080	43	46	1.57	14.00	0.07	0.63
TOTAL EMISSIONS (tons)							**0.86**	**8.91**

Source: [1] *Nonroad Engine and Vehicle Emission Study-Report*. USEPA, 1991.

Notes: * Emissions for concrete mixers were calculated under vehicular emissions.

** Weeks represent the estimated number of weeks during the construction duration period that a particular piece of machinery would be used.

*** Three backhoe/loaders would be located on site for the duration of the construction, however it is estimated that on average only two would be in use.

Table A-3

Motor Vehicle Emissions Worksheet

Activity		Hours of Operation	VOC Emission Factor (lbs/hr)	NO_x Emission Factor (lbs/hr)	Emissions (tons)	
					VOC	NO_x
Mobilization Trucks						
Total Trucks =	3	36	0.096	0.456	0.00	0.01
Total Work Weeks* =	0.5					
Minutes on site per truck per day=	240					
Parking Facility Roadway Construction Trucks						
Total Trucks =	12	4,320	0.096	0.456	0.21	0.99
Total Work Weeks =	18					
Minutes on site per truck per day=	240					
T-Block Building Construction Trucks						
Total Trucks =	12	9,360	0.096	0.456	0.45	2.14
Total Work Weeks =	70					
Minutes on site per truck per day=	240					
Total Truck Emissions					**0.66**	**3.13**
Mobilization Commuter Vehicles						
Total Vehicles =	8	8	0.035	0.044	0.00	0.00
Total Work Weeks =	0.5					
Minutes on site round trip =	20					
Parking Facility Roadway Construction Commuter Vehicles						
Total Vehicles =	40	1,200	0.035	0.044	0.02	0.03
Total Work Weeks =	18					
Minutes on site round trip =	20					
T-Block Building Construction Commuter Vehicles						
Total Vehicles =	40	2,600	0.035	0.044	0.05	0.06
Total Work Weeks =	70					
Minutes on site round trip =	20					
Total Commuter Vehicle Emissions					**0.08**	**0.09**
TOTAL EMISSIONS (tons)					**0.72**	**3.21**
Notes: * A work week is five working days						

A.4 Conformity Applicability Determination

Under the general conformity rule, emissions resulting from proposed federal action must be compared to the applicable *de minimis* levels on an annual basis. Total annual emissions were determined for the Proposed Action based on the mobile-source emissions during operation and construction. As defined by the general conformity rule, if the emissions of a criteria pollutant (or its precursors) do not exceed the *de minimis* level, the federal action has minimal air quality impact and therefore the action is determined to conform for the pollutant under study and no further analysis is necessary. Conversely, if the total direct and indirect emissions of a pollutant are above the *de minimis* level, a formal general conformity determination is applicable for that pollutant in order to determine air quality impact significance.

As shown in Table A-4, the annual emission values for the Proposed Action would not exceed the *de minimis* criteria of 50 tpy (45 mtpy) of VOCs or NO_x; therefore, a formal conformity determination is not required and potential air quality impacts would not be significant. Furthermore, since The *Final State Implementation Plan Revision, Phase I Attainment Plan* (MWCOG, October, 1997) sets forth daily target levels of 362.9 tons per day (tpd) of VOCs and 637.1 tpd of NO_x for the Washington Metropolitan ozone nonattainment area where the Fairfax County area is included, the increase in annual emissions would not make up ten percent or more of the available regional emission inventory for VOCs or NO_x and would not be regionally significant. The Record of Non-Applicability is provided in Appendix B.

Table A-4

Proposed Action
Total Emissions Levels

Activity	Year	Emission Source	Pollutant (tons/year)	
			VOC	NO_X
Construction	2003	Equipment	0.43	4.46
		Motor Vehicles	0.36	1.61
Total Annual Emissions (Year 2003)			***.79***	***6.07***
Construction	2004	Equipment	0.43	4.46
		Motor Vehicles	0.36	1.61
Total Annual Emissions (Year 2004)			***.79***	***6.07***
De Minimis Levels			**50**	**50**

APPENDIX B

Record of Non-Applicability

Department of the Army
US Army Garrison Fort Belvoir
Directorate of Installation Support
9430 Jackson Loop, Suite 107
Fort Belvoir, Virginia 22060-5130

MEMORANDUM FOR RECORD

SUBJECT: Record of Non-Applicability (RONA) for the Construction of T Block and Structural Parking at Defense Communications Electronics Evaluation and Testing Activity (Defense CEETA), Fort Belvoir, Virginia.

Upon review, it has been determined that the construction and operation of an addition – T Block – to the Defense CEETA complex and associated structural parking do not require a Clean Air Act (CAA) General Conformity Analysis. This action will not result in criteria pollutant emissions above the applicable *de minimis* levels.

Patrick McLaughlin
Division Chief, ENRD