4 IMPACTS OF THE PROPOSED ACTION AND ALTERNATIVES

This chapter provides an assessment of the potential environmental impacts that would result from the proposed action. In performing this environmental assessment, the short and long-term environmental impacts of the Proposed Action Alternative and the No Action Alternative are evaluated.

This chapter is organized similarly to Chapter 3. Subchapters 4.1 through 4.10 address the impacts on specific resources. Subchapters 4.11 through 4.14 address cumulative impacts; unavoidable adverse impacts; mitigation measures of impacts; the relationship between local short-term uses of the environment and the enhancement of long-term productivity; and irreversible and irretrievable commitments of resources.

4.1 Impacts on Land Use, Plans, Aesthetics, and Coastal Zone Management

4.1.1 Proposed Action Alternative

4.1.1.1 Existing and Planned Land Use

The Proposed Action Alternative would result in a larger worker population, more infrastructure, and a larger landholding at the station. However, the overall use of the station would be the same – for intelligence gathering, interpretation, and communication. It would continue to fit with the existing industrial, commercial, residential, and institutional uses of Piney Mountain Community, particularly the UVA Research Park at North Fork. The Proposed Action Alternative would be consistent with the Light Industrial zoning designation for the area.

The proposed new structures would not exceed the building height restrictions (780 ft above msl absolute elevation for the NGIC, and slightly greater for the JUIAF) in the AIA associated with the Charlottesville-Albemarle Airport (Delta Airport Consultants, Inc., July 2004).

The purchase of the 50 acres across Boulders Road would result in this land becoming part of a federal installation and would remove this acreage from the county tax rolls. The economic impacts to the county would be slight, and are addressed in Subchapter 3.5.

The Proposed Action Alternative would have little overall short or long-term impact on land use at the station or within the area surrounding the station.

4.1.1.2 Aesthetics

The proposed action would change the observer's perception of the visual aspect of the site, from one that is characterized by farm fields interspersed with patches of woods, to an office or research park with well-separated buildings, surface parking, lawns, and landscaping. While perception is subjective, the addition to the NGIC, the parking garage, and new JUIAF building have been designed to fit well with the existing infrastructure and to enhance the landscape, and would not adversely impact the overall aesthetic perception of the site. The new structures would add a greater variety of materials and surfaces to the site, resulting in a visually more interesting environment.

4.1.1.3 Coastal Zone Management

As indicated in Subchapter 3.1.3, Rivanna Station is not within, and would therefore have no effect on, any Coastal Management Zone.

4.1.2 No Action Alternative

The No Action Alternative would have no impact on land use, plans, aesthetics, or coastal zone resources. Existing conditions at Rivanna Station would continue for the foreseeable future.

4.2 Impacts on Transportation and Traffic

4.2.1 Proposed Action Alternative

4.2.1.1 Traffic Impacts

Short-term and long-term minor adverse effects on traffic would be expected. The changes would be primarily contributable to construction vehicles and increases in localized traffic patterns due to the additional employees at Rivanna Station.

Traffic congestion would increase in the area due to additional construction vehicles and traffic delays near construction sites. These effects would be temporary in nature and would end with the construction phase of the Proposed Action. The local road infrastructure would be sufficient to support any increase in construction vehicle traffic. In addition, accommodations to facilitate utility system work would be expected, creating short-term traffic delays. Such effects would be minimized by placing construction staging areas where they interfere with traffic the least, and limiting construction vehicle movement during peak traffic hours. All construction vehicles would be equipped with backing alarms, two-way radios, and Slow Moving Vehicle signs when appropriate.

LOS is a qualitative measure of the operating conditions of an intersection or other transportation facilities. There are six LOS (A through F) defined. LOS A represents the best operating conditions with no congestion, and LOS F is the worst with heavy congestion. Traffic patterns would be unstable and normally unacceptable to individuals attempting to use roadways and intersections with LOS E or F. The NGIC expansion would accommodate approximately 220 people and the JUIAF would employ 830 people. The 2015 traffic delays and LOS were determined at the intersection of Seminole Trail and Boulders Road with the implementation of the Proposed Action. Analysis was performed for both normal and event-day operations (Tables 4.2-1 and 4.2-2). The increased green light time associated with the natural increase in background traffic along Seminole Trail would allow the left turn into Rivanna Station to operate at LOS A. This would continue to benefit the A.M. entering traffic and maintain high levels of service and minimal queues for those entering the facility on both normal and event-days.

Table 4.2-1

2015 Intersection Delays and Level of Service

Seminole Trail and Boulders Road - Normal Operations

Approach	Movement	A.M. Peak		P.M. Peak	
		Delay	LOS	Delay	LOS
Westbound	Left	41.1	D	53.8	D
Westbound	Right	40.8	D	37.2	D
Northbound	Through	8.8	A	162.4	F
Northbound	Right	8.9	A	8.7	A
Southbound	Left	4.4	A	30.1	C
Southbound	Through	28.1	C	9.7	A
Intersection		21.1	C	97.9	F

Source: (LDG, 2007)

Table 4.2-2

2015 Intersection Delays and Level of Service

Seminole Trail and Boulders Road - Event Day Operations

Approach	Movement	A.M. Peak		P.M. Peak	
		Delay	LOS	Delay	LOS
Westbound	Left	41.1	D	65.4	E
Westbound	Right	40.8	D	39.3	D
Northbound	Through	8.8	A	162.4	F
Northbound	Right	9.5	A	8.7	A
Southbound	Left	5.6	A	30.1	C
Southbound	Through	28.1	C	9.7	A
Intersection		20.9	C	98.3	F

Source: (LDG, 2007)

During the P.M. peak traffic period however, the increase in background traffic along Seminole Trail would impede the left turn movements exiting the facility. Delays exiting Rivanna Station would continue to increase as through-traffic on Seminole Trail demands more of the green time at the signal. This turning movement would operate at a LOS E. The signal timing could be adjusted to give greater priority to side street traffic, and thereby minimize the delay increases on Boulders Road, but this would increase overall intersection delays. In addition, the northbound through traffic during the P.M. peak period would degrade from LOS A to LOS F between 2007 and 2015. This would be due to both the naturally occurring increase in background traffic and the increase in the trips generated by Rivanna Station.

Because the natural traffic growth is a significant contributing factor to the reduction in service at the intersection of Seminole Trail and Boulders Road, and this reduction in service would take

place eventually with or without the implementation of the Proposed Action Alternative, the adverse effects of the Proposed Action Alternative on traffic can be considered minor. In addition, the widening of Seminole Trail is a planned project under the Virginia Department of Transportation's long range Plan (VDOT, 2007). This widening to six lanes would bring relief to P.M. peak hour traffic and provide opportunities to increase capacity of the exiting lanes on Boulders Road as well.

4.2.1.2 Proposed Action Parking Impacts

The Proposed Action Alternative would have a minor beneficial effect to parking resources. The construction of a 260-space parking garage on the north half of the existing NGIC parking lot would alleviate the existing parking shortage and provide parking for new NGIC employees. It is anticipated that NGIC would continue to lease the gravel parking area on the north side of Boulders Road until the completion of parking garage construction in 2008. The proposed JUIAF facilities would include ample parking for the new employees located at that facility.

4.2.1.3 Proposed Action Impacts to Transit Services

The Proposed Action Alternative would have no adverse effects to transit services.

4.2.2 No Action Alternative

Selecting the No Action Alternative would result in minor adverse effects to traffic when compared to the existing conditions. The population of Albemarle County and the associated Seminole Trail traffic would continue to increase while the LOS at the intersection of Seminole Trail and Boulders Road would continuously decrease. This future traffic condition used the comparative baseline to determine impact of the proposed action. To improve future traffic conditions, VDOT's long-term transportation plans includes widening Seminole Trail to six lanes north to Greene County, and to post signs prohibiting U-turns at the Boulders Road median break (VDOT, 2007). No changes in the current traffic from Rivanna Station would be expected. No improvements to the current parking or transit services would be expected.

4.3 Air Quality

This EA evaluates potential changes to air quality that would result from implementation of the Proposed Action and No Action Alternatives. Direct and indirect air emission and their potential impacts are addressed. For the purpose of this analysis air pollution impacts would be considered significant if project emissions would be expected to exceed 100 tons per year (tpy) of any criteria pollutant or 10 tpy of any hazardous air pollutant, would be regionally significant, or would contribute to a violation of air regulations.

4.3.1 Proposed Action Alternative

Both short-term and long-term minor increases in emissions would be expected with the implementation of the Proposed Action Alternative. However, these minor increases would not be expected to exceed 100 tons per year (tpy) of any criteria pollutant or 10 tpy of any hazardous air pollutant, would be regionally significant, or would contribute to a violation of air regulations.

The general conformity rules require federal agencies to determine whether their action(s) would increase emissions of criteria pollutants above preset threshold levels (40 CFR 93.153(b)). These *de minimis* (of minimal importance) rates vary depending on the severity of the nonattainment and geographic location. Because Rivanna Station is in an attainment AQCR, the air conformity regulations do not apply. The closest non-attainment or maintenance areas to Rivanna Station are AQCR 47 and AQCR 225. AQCR 47 is moderate nonattainment for the 8-hour O_3 and the $PM_{2.5}$ NAAQS. AQCR 225 is a maintenance area for the 8-hour O_3 NAAQS.

The total direct and indirect emissions associated with the implementation of the Proposed Action Alternative were estimated (Table 4.3-1). Both construction and operation related emissions were included. Air emission factors and subsequent air emissions were estimated using URBEMIS2007v9.2 air emissions model. The operational emissions would primarily be due to vehicle operation, and the proposed boilers and back-up generators at the new facilities.

"Based on our analysis, total direct and indirect emissions associated with the Proposed Action Alternative are not expected to exceed 100 tpy of any criteria pollutant or 10 tpy of and

hazardous air pollutant. Due to the limited size and scope of the Proposed Action Alternative and the level of existing development in the region, it is also not anticipated that the estimated emission increases from the Proposed Action Alternative would equal 10 percent or more of regional emissions for any criteria pollutant and would therefore not be regionally significant. Detailed breakdown of construction and operation emissions are located in Appendix A.".

Table 4.3-1

Estimated Emissions Resulting from the Proposed Action Alternative

Construction Year	VOC [tpy]	NO_x [tpy]	SO_2 [tpy]	$PM_{2.5}$ [tpy]	*De minimis* threshold [tpy]	Would emissions exceed *applicability* levels? [Yes/No]
2008	5.1	11.7	0.0	1.0	100	No
2009	4.0	6.3	0.0	0.4	100	No
Operational Emissions	26.3	42.8	0.3	8.0	100	No

Notes:
tpy = tons per year

4.3.1.1 Mobile Sources

Mobile sources of concern include primarily automobiles and vehicular traffic. The primary air pollutants from mobile-sources are CO, NO_x, and VOCs. Lead emissions from mobile sources have declined in recent years through the increased use of unleaded gasoline and are extremely small. Potential SO_2 and particulate emissions from mobile sources are small compared to emissions from point sources, such as power plants and industrial facilities. Air quality impacts from traffic are generally evaluated on two scales: meso-scale and micro-scale.

- ***Meso-scale:*** Meso-scale analysis is performed at the regional level. Changes in traffic patterns in AQCR 224 resulting from the Proposed Action Alternative would introduce negligible changes in regional pollutant levels. Therefore, meso-scale analysis is not necessary for this EA.
- ***Micro-scale:*** CO is a site-specific pollutant with higher concentrations found adjacent to roadways and signalized intersections. Micro-scale analysis is performed to identify localized hot spots of criteria pollutants. Micro-scale analysis is often conducted on a project-specific basis in regions where CO is of particular concern. Albemarle County, and therefore Rivanna Station, is not a nonattainment or maintenance areas for CO; therefore, micro-scale analysis is not necessary for this EA.

The traffic associated with the Proposed Action Alternative is not anticipated to be an air quality concern for PM because it does not involve new highways or expressways, and the intersections affected are primarily secondary arterial roads (USEPA 2006). In addition, Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the CAA. The MSATs are compounds emitted from highway vehicles and non-road equipment. As with PM, traffic from these intersections is not anticipated to be an air quality concern for MSAT because the intersections affected are primarily secondary arterial roads and new traffic is expected to be very small. Quantitative procedures to address MSAT analysis have not yet been standardized and are not standard practice for nontransportation projects on secondary arterials; therefore not included in this EA (FHWA 2006).

4.3.1.2 Regulatory Review

New sources of emissions may be subject to both federal and state permitting requirements. These requirements include, but are not limited to, new source review (NSR), prevention of significant deterioration (PSD), and new source performance standards (NSPS) for selected categories of industrial sources. In addition, under the National Emission Standards for Hazardous Air Pollutants (NESHAP), new and modified stationary sources of air emissions may be subject to Maximum Achievable Control Technology (MACT) requirements if their potential to emit Hazardous Air Pollutants (HAPs) exceeds either 10 tons per year of a single HAP, or 25 tons per year of all regulated HAPs (Table 4.3-2).

The exact size and type of new stationary sources are unknown at this time. For the purposes of this EA it was assumed NGIC would be equipped with two (2) additional 1,000 kW emergency generators; JUIAF would be equipped with three (3) 2,500 kW emergency generators; and both would have combustion-based sources of heating for the additional facilities. Therefore, federal and state air permitting regulations for new point sources of air emissions would apply. The combustion units would have to be recorded and included in Rivanna Station's annual emissions statement. Rivanna Station is a minor source of air emissions under the Title V provisions. If with the additional sources the potential to emit (PTE) exceeds major source thresholds, federally enforceable limits on the operation of the facility would be established so the source does not trigger Title V applicability.

Table 4.3-2

Air Quality Regulatory Review for Proposed Stationary Sources

Regulation	Project Status
Nonattainment New Source Review (NNSR)	Rivanna Station is in an attainment region. Therefore, NNSR would not apply.
Prevention of Significant Deterioration	Potential emissions would not exceed the 250-tpy PSD threshold. Therefore, the project would not be subject to PSD review.
New source Review and Title V Permitting	Rivanna Station is a minor source of air emissions. If with the additional sources the potential to emit exceeds major new source thresholds, federally enforceable limits on the operation of the facility would be established so the source does not trigger Title V applicability
National Emission Standards for Hazardous Air Pollutants	Potential HAP emissions would not exceed NESHAP thresholds. Therefore, the use of MACT would not be required.
New Source Performance Standards	Boilers rated greater than 10 million BTU/hrs heat input and all generators would have to comply with NSPS.

In addition, all construction would be accomplished in full compliance with the Virginia Regulations for the Control and Abatement of Air Pollution, particularly 9 VAC 5, Chapter 40, Part II. Articles of particular relevance are:

- Article 1, Visible Emissions and Fugitive Dust/Emissions (9 VAC 5-40-60 to 120);
- Article 40, Open Burning (9 VAC 5-40-5600 to 5645); and
- Article 42, Portable Fuel Containers Spillage Control (9 VAC 5-40-5700 to 5770).

4.3.2 No Action Alternative

Selecting the No Action Alternative would result in no impact to ambient air-quality conditions. No construction would be undertaken and no changes in operations or traffic would be expected. Ambient air-quality conditions would remain as described in Sections 3.3.

4.4 Impacts on Infrastructure and Utilities

4.4.1 Proposed Action Alternative

Due to highly sensitive operations conducted at the NGIC Building and the proposed JUIAF, the implementation of the Proposed Action Alternative would not cause short-term disconnections and reconnections of buried and aboveground infrastructure items, such as communications and electrical lines. It would result in long-term minor increases in demand for utility services such

as electricity, potable water, sanitary wastewater conveyance and treatment, solid waste removal, and stormwater quantity and quality management.

The proposed JUIAF building would be connected to the existing water distribution system via an 8-in pipe for fire protection water service and a 4-in pipe for domestic water service. Domestic hot water would be supplied from building electric or gas-fired water heaters. In the short term, additional potable water would be required for the mixing of cement, mortar, washing and dust suppression during the expansion of the NGIC Building and the construction of the JUIAF. Over the long term, the increase in workforce (approximately 1,050 people by 2015) would increase the demand for potable water by approximately 16,800 gpd. Both the short and long term increase in demand is within the capacity of the RWSA to supply with the planned improvements described within Subchapter 3.4.1.

The proposed JUIAF building would connect to the existing sanitary sewer system via an 8-inch sewer line. The increase in workforce would approximately double sewage discharge after the completion of the proposed NGIC addition and the construction of the JUIAF. This increase in demand is well within the capacity of the RWSA to supply with the planned improvements described within Subchapter 3.4.1.

Upgrades to the existing lift stations and pumps may be needed to handle the doubled sewage discharge. Sewage pipes may also need to be upgraded, depending on their condition. The additional sewage discharge falls within current capabilities and planned growth as per Albemarle County Comprehensive Plan. The relocation of sanitary sewer lines located within the NGIC addition, the proposed JUIAF, and any proposed hardscape feature may be necessary.

Through careful design and use of LID principles and practices, Rivanna Station would first attempt to minimize any increase in stormwater flows. The project would comply with the Virginia Stormwater Management Regulations and the Fairfax County Chesapeake Bay Preservation Area ordinance, and have minimal adverse effect on stormwater quantity and quality.

The JUIAF facility would be connected to the current natural gas line. If required, the proposed NGIC expansion and JUIAF could be serviced by natural gas. The natural gas distribution system serving the current NGIC building has the capabilities to support the system. The use of natural gas in the generators and other equipment could help reduce geothermal systems air pollutants. A new gas main would have to be constructed to service the proposed JUIAF. The existing equipment at the NGIC could also be converted to natural gas.

The current copper and fiber-optic lines would be sufficient to accommodate the proposed NGIC expansion and increase in power usage. However, new copper and fiber-optic lines may be required to accommodate the JUIAF, VCC and RDF. New transformers may be needed to handle the increased power requirement for the NGIC addition and the JUIAF. The proposed NGIC addition and the JUIAF would use natural lighting, energy efficient lighting, and computerized power management systems.

The existing telecommunications service to the proposed NGIC addition and the JUIAF would be adequate to service the new facilities. The increased telecommunication services required to serve the site would fall within the current capabilities and planned growth for the county, as per the Albemarle County Comprehensive Plan.

Short term solid waste generation would increase as construction and demolition debris is generated from the construction of the JUIAF and NGIC building addition. This debris would be removed from the site and disposed of at an approved facility. The construction and demolition debris should be minimal and contain small sections of pavement, office partitions and a small amount of the building façade. Any potential building debris should not contain hazardous substances, such as asbestos or lead paint, since the current NGIC building was built after 1980.

Soils and bedrock that would be excavated during the construction of the proposed NGIC addition and the JUIAF may be used onsite as fill for a parking lot addition, or disposed of in some other appropriate manner. In the long term, solid waste generation and recyclable materials would increase by approximately 4,725 lbs, as the workforce increased. Non-hazardous wastes would be collected in onsite dumpsters, then collected and transported by a contract solid-waste

refuse firm to an approved landfill. Recyclable wastes would be separated for pickup at NGIC, in an effort to meet Department of Army waste diversion standards, which require monthly reporting by item description and weight of any materials removed for recycling or reuse by the contractor.

4.4.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on any of Albemarle County's utility systems. There would be no increases in demands for potable water, electricity, communications, or HVAC systems. No stormwater runoff, sanitary wastewater, or solid waste would be generated.

4.5 Socioeconomic Impacts

4.5.1 Proposed Action Alternative

4.5.1.1 Demography and Employment

The proposed expansions of Rivanna Station would bring 830 military and up to 220 contract personnel positions from the Washington, DC area to the station and Albemarle County. The 1,050 new personnel represents almost a doubling of the working population at Rivanna Station, but only about 2 percent of the worker population (51,286) in Albemarle County. Thus, the impact of the proposed action on employment in Albemarle County would be insignificant.

The Proposed Action Alternative would generate direct economic benefits for the contractors performing the job and their employees, as well as indirect benefits to the communities in which the construction workers are based. Additional earnings would generate spin-off benefits as these earnings are spent in the local economy. These positive impacts would be relatively small and temporary.

The Proposed Action Alternative would remove an additional 50 acres from the County's tax rolls. This amount of taxable acreage represents a fraction of a percent of the property generating tax income for the County at this time.

4.5.1.2 Environmental Justice

As indicated in Section 3.5.4, no areas near Rivanna Station qualify as Environmental Justice Communities. Thus, there is no potential for implementation of the Proposed Action Alternative to disproportionately affect minority or low income populations through traffic or construction-related air and noise impacts. Therefore, implementation of the Proposed Action Alternative does not raise Environmental Justice issues.

Nor would the proposed action disproportionately affect populations of children. While the Rivanna Station area (Census Tract 102) has a higher proportion of under-18 residents than the state as a whole (though not significantly greater), there are no residential areas near the station. Housing developments near Rivanna Station are over ¼ mile away, on the opposite side of US Route 29 – too far away to be affected by noise or air quality impacts.

4.5.2 No Action Alternative

Under the No Action Alternative, there would be no changes to the Rivanna Station working population and no impacts on demography, employment, Environmental Justice, or children.

4.6 Community Facilities and Services Impacts

4.6.1 Proposed Action Alternative

The Proposed Action Alternative would bring approximately 1,050 workers to Rivanna Station from the Washington, DC area. These additional personnel and their families would generate an increased demand for the use of community facilities in Albemarle County and the Charlottesville metropolitan area. While the additional working population at the station could potentially generate more fire and rescue calls, the increase would be small and is not expected to overtax the emergency services of Albemarle County. Nor would these additional people have significant impacts on area or regional recreational facilities. Expansion of Rivanna Station would not compromise the establishment of the County-proposed greenway along the North Fork Rivanna River. The establishment of the County-proposed greenway along the North Fork Rivanna River would have to be evaluated by NGIC security personnel.

4.6.2 No Action Alternative

The No Action Alternative would generate no impacts to community facilities.

4.7 Noise Impacts

4.7.1 Proposed Action Alternative

Short-term minor adverse effects to the noise environment would be expected with the implementation of the Proposed Action Alternative. The effects would be primarily due to heavy equipment noise during construction.

Individual pieces of construction equipment typically generate noise levels of 80 to 90 dBA at a distance of 50 feet. With multiple items of equipment operating concurrently, noise levels can be relatively high during daytime periods at locations within several hundred feet of active construction sites. The zone of relatively high construction noise typically extends to distances of 400 to 800 feet from the site of major equipment operations. Locations more than 1,000 feet from construction sites seldom experience noteworthy levels of construction noise. Table 4.7-1 presents typical noise levels (dBA at 50 feet) that EPA has estimated for the main phases of outdoor construction. Given the temporary nature of proposed construction activities, the limited amount of noise that construction equipment would generate, and the distance to the nearest off-post noise sensitive area - this effect would be considered negligible.

Table 4.7-1

Noise Levels Associated With Outdoor Construction

Construction phase	Sound level (dBA)
Ground clearing	84
Excavation, grading	89
Foundations	78
Structural	85
Finishing	89

Source: (USEPA, 1971)

Although construction-related noise effects would be small, the following best management practices would be used to reduce these already-limited noise effects further:

- Construction would predominately occur during normal weekday business hours in areas adjacent to noise-sensitive land uses such as residential areas, recreational areas, and any off-post areas; and
- Construction equipment mufflers would be properly maintained and in good working order.

Construction noise is expected to dominate the soundscape for all on-site personnel. Construction personnel, and particularly equipment operators, would don adequate personal hearing protection to limit exposure and ensure compliance with federal health and safety regulations. In addition, since construction noise is the only expected source of noise associated with the Proposed Action Alternative, no violation of the county noise ordinance is expect.

No long-term increases in the overall noise environment (e.g. ADNL) can be expected with the implementation of the Proposed Action Alternative. No military training activities, use of weaponry, demolitions, or aircraft operations would occur. Therefore, no changes in the existing noise environment associated with these sources would be expected.

4.7.2 No Action Alternative

Selecting the No Action Alternative would result in no impact on the ambient noise environment. No construction, changes in traffic, or changes operations at Rivanna Station would be expected. Ambient noise conditions would remain as described in section 3.7.

4.8 Impacts on Natural Resources

4.8.1 Physiographic and Soils Impacts

4.8.1.1 Proposed Action Alternative

With the exception of steep slopes, there are no unique or sensitive landforms or rock formations at the site. The Proposed Action Alternative would not significantly alter the geomorphology of the overall site. The proponent has planned the NGIC addition to utilize the area already altered by previous construction to the extent possible, to minimize any further encroachment on the

steep slopes toward the North Fork Rivanna River and its tributary, Herring Branch. Some excavation and blasting of bedrock would be needed to even out topography in the immediate area of construction.

Soils and bedrock would be removed for excavation of the basements for the proposed expansion of the NGIC building, construction of the proposed parking garage, and construction of the proposed JUIAF. The proposed buildings and surface parking would cover approximately 8.5 acres of currently permeable soils with impermeable surfaces. The designers are evaluating LID measures to offset the loss of stormwater infiltration.

The construction activity would cause short-term erosion and sedimentation during clearing and grading. Grading would result in minor, localized changes in slopes, soil infiltration rates, and surface runoff patterns. Because the proposed project would affect more than 1 acre, an erosion and sediment control plan (ESC) employing soil BMPs, and a VSMP would be required for the clearing and grading activities. The ESC plan would include measures consistent with the Virginia Erosion and Sediment Control Handbook, such as silt fences and super silt fences around the limits of clearing and grading, to reduce construction impacts.

4.8.1.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on existing physiographic or soil resources.

4.8.2 Impacts on Water Resources

4.8.2.1 Proposed Action Alternative

Implementation of the Proposed Action Alternative would have minor indirect effects on the stream resources (Subchapter 3.8.2). The nearest water features are: the existing pond located in the southern central portion of the site; Herring Branch located along the western property boundary; and, the North Fork Rivanna River along the southwestern property boundary. North Fork Rivanna River is located approximately 170 ft south of the current NGIC building. The existing pond is located approximately 170 ft south of the current parking lot. The Herring

Branch convergence with the North Fork Rivanna River is located approximately 205 feet southwest of the current NGIC building.

Implementation of the Proposed Action Alternative would create minor short and long-term impacts on the stream resources (Subchapter 3.8.2). Clearing, grading, and excavation during construction could produce short-term direct impacts to surface water flow and quality. During heavy rainfall, the increased sediment-laden runoff into swales would be transported downstream into the farm pond then eventually into the North Fork Rivanna River watershed. Best management practices (BMPs) to control erosion and sedimentation during construction would minimize impacts on the water quality of North Fork Rivanna River and its tributaries. The permanent increase in impermeable surface from proposed construction would, over the long term, increase surface water runoff. Compliance with Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code), namely maintenance of a RPA buffer and provision of nutrient control best management practices in the RMA, would minimize these impacts.

The increase in impermeable surface would reduce infiltration of stormwater to groundwater resources. The site for the Proposed Action Alternative is not near any groundwater recharge areas for Albemarle County. No withdrawal of groundwater would be necessary for the proposed action – potable water is supplied from the RWSA.

While design is conceptual at this stage, the design of stormwater management facilities would be required to comply with the sizing requirements of the Virginia Stormwater Management Regulations. Also, because Fort Belvoir acts consistently with the Fairfax County Chesapeake Bay Preservation Area regulations (Chapter 118 of the Fairfax County Code) in accordance with Fort Belvoir's MS-4 permit, a BMP would need to provide for the farm pond. Compliance with these regulations would ensure that the harmful effects of surface runoff on adjacent soils, steep slopes, the swales, and the surface water quality of North Fork Rivanna River and its tributaries would be minimized. Stormwater would be discharged, after treatment, into North Fork Rivanna River.

The Proposed Action Alternative would have a minor impact on the overall availability or quality of groundwater and surface water resources.

4.8.2.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on surface or groundwater resources.

4.8.3 Impacts on Environmentally Sensitive Areas

4.8.3.1 Proposed Action Alternative

Environmentally sensitive areas are defined as those areas where development would adversely affect the region surrounding that area, or where the engineering for development would incur excessive costs. Environmentally sensitive areas include wetlands, floodplains, and areas with steep topography, poor soils, endangered species habitat, and cultural resources (US Army Garrison Fort Belvoir, 2001b). NGIC has minimized encroachment on these areas to the extent practicable, by proposing to construct the NGIC addition to the northwest of the current building on land that is already disturbed, constructing a multi-storied parking garage to reduce the project footprint, and planning the JUIAF, VCC, and RDF on the relatively flat hilltops, away from steeply sloping areas.

The construction of the proposed NGIC addition would not impact any vegetated wetlands or floodplains because there are none of these resources near the proposed addition site. However, the construction of the JUIAF and parking lots and associated infrastructure may result in the loss of approximately 0.07 acres of wetlands (Figure 4-1). Prior to the start of construction, the exact impacts to the wetlands will be determined and the appropriate permits will be obtained from the Corps and DEQ. If final concept for the JUIAF building or parking requirements impact the RPA then appropriate mitigation measures for the long-term effects would be determined as part of the permitting process. Mitigation efforts currently under consideration for the project would include trees that were removed from the site would be replaced at a 2:1 ratio.

Impacts on threatened and endangered species habitat, or lands containing cultural resources, are addressed in Subchapters 4.8.5 and 4.9, respectively. By letter dated September 12, 2007, the

VDCR-NH indicated that the DCR files do not indicate the presence of any State Natural Area Preserves under their jurisdiction in the project vicinity (VDCR, 2007).

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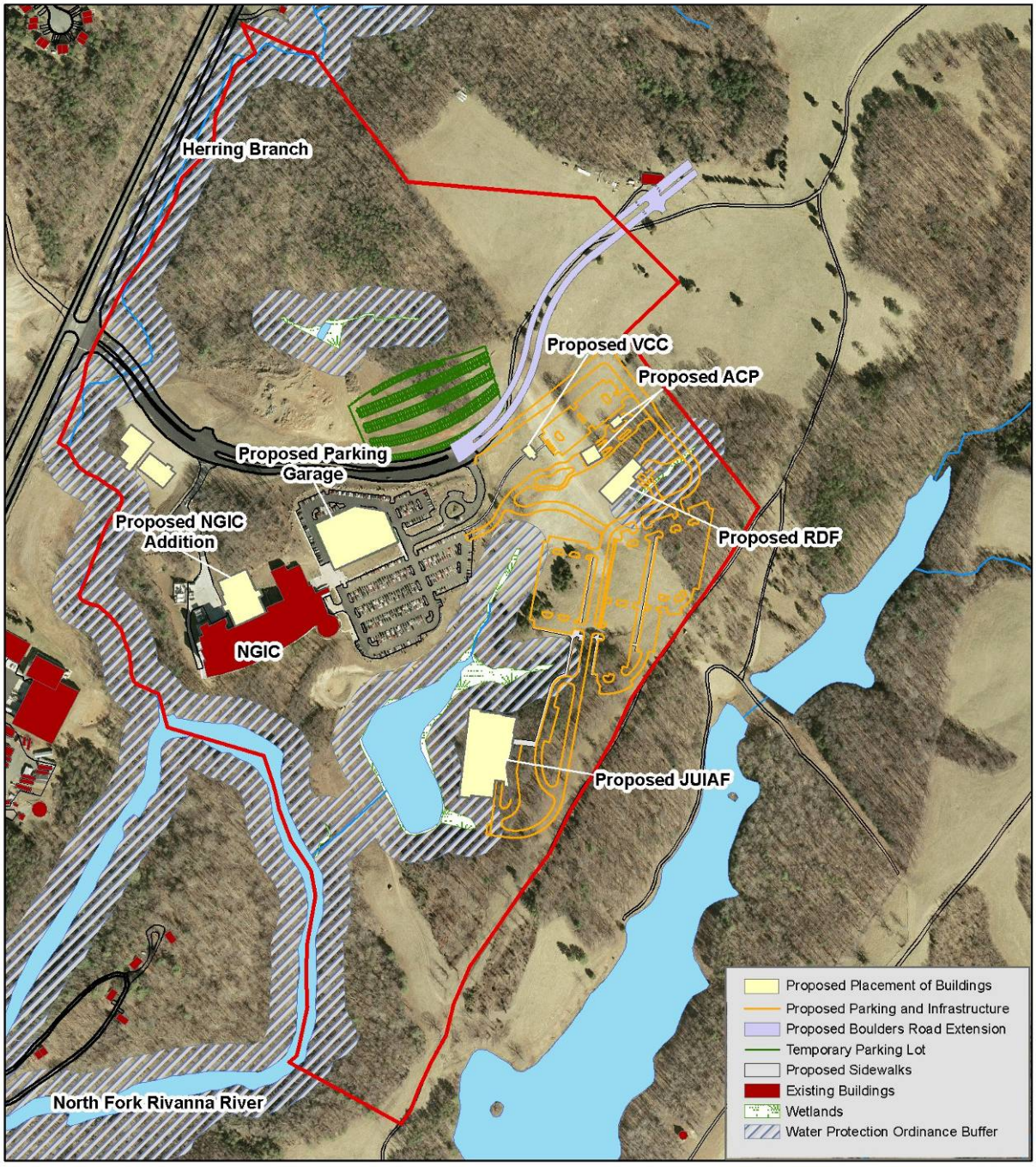
Herring Branch
Proposed VCC
Proposed ACP
Proposed Parking Garage
Proposed NGIC Addition
NGIC
Proposed RDF
Proposed JUIAF
North Fork Rivanna River
Proposed Placement of Buildings
Proposed Parking and Infrastructure
Proposed Boulders Road Extension
Temporary Parking Lot
Proposed Sidewalks
Existing Buildings
Wetlands
Water Protection Ordinance Buffer
N
W
E
S
0 125 250 500 Meters
0 250 500 1,000 Feet

Figure 4-1

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4.8.3.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on environmentally sensitive areas.

4.8.4 Impacts on Vegetation and Wildlife Habitats

4.8.4.1 Proposed Action Alternative

The plant community types and acreages potentially affected by the proposed project include a variety of forest types, as described in Subchapter 3.8.4.1. The NGIC building extension would affect a minimal amount of forest to the northwest of the current building. Construction of the JUIAF, parking lots and associated infrastructure to would result in the removal of approximately 7.5 acres of forest to the east and north. The construction of the RDF and VCC should result in the removal of approximately 0.15 acres of forest to the northwest of the current Nicholson Building.

The proposed action would reduce forested habitats within the project area, and would reduce the carrying capacity of these habitats for wildlife. However, NGIC and JUIAF will make every effort to limit these impacts.

At Rivanna Station, the major potential threats to amphibians and reptiles are habitat loss, degradation, and fragmentation, and chemical exposures. Amphibian survival depends on continuity among wet habitats as well as between upland and wet habitats. Limiting the intrusion caused by the proposed expansion to the hilltops above stream valleys associated with the North Fork Rivanna River and Herring Branch would maintain the continuity of wet habitats throughout this part of the installation.

Fort Belvoir controls the potential threats from pesticides by following an Integrated Pest Management (IPM) program. The Fort Belvoir IPM would be modified to include Rivanna Station. IPM methods would continue to limit chemical contamination of soils at the site and water bodies adjacent to the site through application of IPM techniques and principles. Similarly, compliance with Virginia Stormwater Management regulations and the application of Chesapeake Bay BMP requirements would limit transport of excess nutrients and other chemical

contaminants to receiving waters, as well as control habitat degradation by controlling sedimentation.

4.8.4.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on vegetation and wildlife habitat.

4.8.5 Impacts on Threatened and Endangered Species

4.8.5.1 Proposed Action Alternative

Strict adherence to state and local erosion and sediment control, and stormwater management laws and regulations, should protect the habitat of the James spinymussel (*Pelurobema collina*) (VGIF, 2007) and Atlantic pigtoe (*Fusconaia masoni*) (VDCR, 2007). Surveys for the James spinymussel, the Atlantic pigtoe, and the Indiana bat (*Myotis sodalist*) would be completed prior to the commencement of construction activities. The project would not affect any documented state-listed plant or insects (VDCR, 2007). Based on the potential for suitable habitat for the Appalachian grizzled skipper (*Pyrgus wyandot*), Fort Belvoir requested a study to identify the possibility of shale barrens which provide the habitat for the Appalachian grizzled skipper. S&ME, Inc. conducted a geotechnical investigation in 2007 for the JUIAF sites #1 and #1 in the southeastern portion of the site. The geotechnical investigation report stated that the bedrock was composed of granite and gneiss. Mr. Matthew Heller of the Virginia Department of Mines, Minerals, and Energy (VDMME) (2007) stated that the potential for shale barrens at the site is low. Based on a review of the geotechnical report and correspondence with Matthew Heller, the required shale barrens for the Appalachian grizzled skipper habitat are not likely to be present, since the bedrock types encountered were granite and gneiss.

4.8.5.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse impact on threatened or endangered species or their critical habitat.

4.9 Impacts on Cultural Resources

4.9.1 Proposed Action Alternative

As indicated in Section 3.9, there are no National Register-listed or -eligible architectural resources within Rivanna Station. Two archaeological sites (44AB0514 and 44AB0528) are known to exist on the compound, and it is likely that construction of the proposed expansion of the NGIC building, construction of the JUIAF and associated parking would not disturb these sites. Both sites have been determined to be non-eligible for listing in the National Register of Historic Places. If the cemetery (44AB0528) is disturbed, Fort Belvoir will conduct a formal boundary determination and comply with all relevant Federal, State and Local statutes regarding the protection and relocation of cemeteries. In accordance with the SHPO, Fort Belvoir will maintain a minimum of a 50 foot buffer around the cemetery.

As a result of the historic resources identification and evaluation efforts, the proposed action would not affect cultural resources under Section 106 of the NHPA. The SHPO concurred with this finding in a letter dated June 15, 2007 (Appendix B).

4.9.2 No Action Alternative

Under the No Action Alternative, there would be no adverse impacts to cultural resources. The two known archaeological sites on the Rivanna Station would remain undisturbed.

4.10 Impacts of Hazardous Substances

4.10.1 Proposed Action Alternative

Construction of the Proposed Action Alternative would result in a short-term increase in the use of construction materials such as fuels and oils, asphalt substances, fertilizers, and would generate solid and sanitary waste. Some of these substances may be considered “hazardous” if released. Various types of control measures would be implemented to minimize such releases.

The expansion of the NGIC building and the construction of the JUIAF may require the installation of new emergency generators, which would require the installation of additional

USTs to fuel the generators. All state and local requirements would be followed to ensure the safe storage and transfer of fuel to the USTs. If a fuel spill were to occur, the Fort Belvoir Master Spill Plan would be followed and ENRD would be notified of any problems. The Fort Belvoir Master Spill Plan would be revised to include Rivanna Station. Any hazardous substance or petroleum contaminants and contaminated soils generated would be disposed of in accordance with state and federal regulations. A tank activity permit is required to be submitted to Fort Belvoir ENRD prior to installation of USTs. Permits and inspections by the VDEQ are required for installation, upgrade, repair or closure of USTs.

4.10.2 No Action Alternative

Under the No Action Alternative, there would be no short or long-term adverse increase in the production of hazardous substances or waste.

4.11 Cumulative Impacts

Cumulative impacts have been defined by the CEQ as:

> *Impacts on the environment, which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.*

The CEQ regulations require NEPA environmental analyses to address connected, cumulative, and similar actions in the same document. This requirement prohibits segmentation of a project into smaller components to avoid required environmental analysis. Expansions and development may occur in the future as mission changes are defined and the need for additional facilities arises, but the Proposed Action Alternative analyzed herein is not dependent on such future actions.

Fort Belvoir is in the process of revising the long-term component of its Master Plan (Subchapter 3.1), which will include Rivanna Station. There is the potential for development of the property

proposed to be acquired to the north of Boulders Road. The potential development may consist of a Community Support Facility.

The size and scope of the changes in the transportation systems associated with the Proposed Action Alternative would be extremely small when compared to other planned transportation related projects in the area. As a result, the traffic impacts would not contribute appreciably to cumulative effects.

No long-term noise increases are associated with the Proposed Action Alternative. Therefore, it is not anticipated that it would contribute to adverse cumulative effects to the noise environment.

The Commonwealth of Virginia takes into account the effects of all past, present, and reasonably foreseeable emissions during the development of the State Implementation Plan (SIP). The Commonwealth of Virginia accounts for all significant stationary, area, and mobile emission sources in the development of this plan. Estimated emissions generated by the Proposed Action Alternative would be *de minimis* and would not be regionally significant. Therefore, it is not anticipated that the Proposed Action Alternative would contribute significantly to adverse cumulative effects to air quality.

4.12 Unavoidable Adverse Impacts

Implementation of the Proposed Action Alternative would lead to permanent changes in vegetation and wildlife habitat. Forested areas would be displaced by open, herbaceous vegetation and "hardscaping." The proposed NGIC building extension, JUIAF, RDF, VCC, and associated infrastructure would intrude into currently undisturbed habitat to the north, east, and south of the current NGIC building. Long-term unavoidable adverse impacts would include the loss of approximately 7.8 acres of wildlife habitat.

Short-term unavoidable adverse impacts that would occur during construction include:

- Minor erosion of soils during grading.
- Expenditure of oil, gasoline, and construction materials for construction.

- Localized increase in noise and air emissions from operation of construction equipment.
- Localized increase in fugitive dust.

4.13 Mitigation Measures

Compliance with regulatory requirements is not considered mitigation by Fort Belvoir. Thus, construction of SWM/BMPs and use of ESC are not considered mitigation practices, although compliance with these requirements would help mitigate certain potential adverse effects of the proposed action.

NGIC and JUIAF would incorporate LEED and LID measures in their project design. For example, LEED and LID measures would include.

- Reduction in the footprint of the improvements through the shape and location of the building addition.
- Integration of Energy Star compliant cool roofing with a high reflectance and a high emissivity to reduce urban heat islands.
- Use of interior lighting programmed to automatically turn off during non-business hours. Use of exterior lighting for safety and comfort only to limit offsite light pollution.
- Utilization of native or drought-tolerant plants and high-efficiency irrigation strategies incorporating moisture and rain sensors To conserve water, incorporation of high efficiency water - conserving plumbing fixtures along with occupant sensors.

Virginia's air pollution control regulations require NGIC and JUIAF to incorporate the following additional measures:

- Minimize fugitive particle emissions during construction through use of standard control measures outlined in Virginia Standards for Fugitive Dust Emissions (9 VAC 5-50-90) and a Title V operating permit, which is in the process of being obtained. Use, where possible, water or chemicals for control of dust in the demolition of existing buildings or structures, construction operations, and the grading of roads or the clearing of land.
- Apply water or suitable chemicals on dirt roads, materials stockpiles, and other surfaces, which may create airborne dust.

- Cover open equipment for conveying or transporting material likely to create objectionable air pollution when in motion.
- Promptly remove spilled or tracked dirt or other materials from paved streets and dried sediments resulting from soil erosion.
- Perform periodic street sweeping.

To mitigate impacts on vegetation and wildlife habitat, the contractor will:

- Adopt site-planning techniques to protect existing trees to the extent feasible by removing only those trees that will interfere with proper alignment and grading for buildings and asphalt surfaces.
- Plant trees and shrubs to replace those lost after clearing and grading.
- Remove the least amount of native vegetation possible during clearing.
- Revegetate areas adjacent to the shoulder with herbaceous and woody species to provide for aesthetics and food and cover for wildlife.
- Implement infiltration practices that allow stormwater to make contact with sandy soils.
- Plant native wetland plants in storm drainage areas to promote water quality through infiltration and/or filtration.
- Designs will allow for solids to settle from stormwater prior to storms.
- Landscape with a mixture of deciduous shade and flowering trees, such as maple, southern red oak and eastern redbud. Seedlings, such as dogwood, viburnum, euonymus, and deerberry will be interspersed through out the landscaping.

Other mitigation measures the contractor will adopt are:

- Implement traffic management measures, such as reducing speeds and truck traffic restrictions. Speed reduction would result in unperceivable noise reduction. Typically, a 10 mph reduction would result in a 2-dBA decrease in noise level. Heavy equipment delivery will occur during non-peak traffic congestion hours or nocturnal hours.
- Mitigate noise impacts by restricting construction to daytime hours.
- Restrict construction to daytime hours to mitigate noise impacts.
- Collect and appropriately dispose of soils contaminated by leaks or spills from construction vehicle repair and refueling.

4.14 Relationship between Local Short-term Use of the Environment and the Enhancement of Long-term Productivity

Implementation of the Proposed Action Alternative would result in long-term benefits for the mission-critical facilities and personnel at NGIC and JUIAF with minor long-term impacts on the environment.

4.15 Irreversible and Irretrievable Commitments of Resources

The construction and operation of the proposed NGIC addition and the JUIAF would expend modest amounts of man-hours, fuel, and materials. The project would consume non-renewable resources (oil, gasoline) and modest amounts of money and man-hours to build and operate the new facilities.

4.16 Conclusion

The anticipated consequences of the Proposed Action Alternative and No Action Alternative are summarized in Table 4.16-1. These impacts represent a subjective rating that is representative of:

- Quality/uniqueness of the resources affected.
- Intensity and duration of the impact.
- Potential to minimize the impact through mitigation.

In summary, this EA described and identified the potential impacts of the Proposed Action Alternative and the No Action Alternative. The Proposed Action Alternative would not result in a significant impact on the quality of the human environment, and an EIS is not required.

Table 4.16-1
Summary of Impacts of Proposed Action and the No Action Alternatives

Resources	Proposed Action Alternative	No Action
Land Use		
Land Use	0	0
Plans	0	0
Aesthetics	0	0
Natural Resources		
Physiography		
Geology	0	0
Geomorphology	-L	0
Topography	-L	0
Soils	-L	0
Water Resources		
Groundwater	0	0
Surface Water	0	0
Environmentally Sensitive Areas		
Forest & Wildlife Corridor	-L	0
Floodplains	0	0
Wetlands	-L	0
Chesapeake Bay RPAs	0	0
Vegetation & Wildlife Habitats	-M	0
Threatened & Endangered Species	0	0
Cultural Resources	0	0
Air Quality	-L	0
Noise	-L	0
Hazardous Substances	-L	0
Infrastructure & Utilities	-M	0
Socioeconomics	0	0
Community Facilities & Services	0	0
Transportation & Traffic	L	0

0 = No Impact H = High Impact M = Moderate impact L = Low impact – = Adverse Impact + = Positive Impact

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