National Institutes of Health Animal Center

Dickerson, Maryland

Draft Environmental Impact Statement for NIH Animal Center Draft Master Plan September 2012

National Institutes of Health
US Department of Health and Human Services
Office of Research Facilities Development and Operations
Division of Facilities Planning

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DRAFT ENVIRONMENTAL IMPACT STATEMENT

For

NIH ANIMAL CENTER DRAFT MASTER PLAN

September 2012

Prepared by:

U.S. Department of Health and Human Services
National Institutes of Health

Office of Research Facilities Development and Operations
Division of Facilities Planning

With Assistance From:

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ENVIRONMENTAL IMPACT STATEMENT
NIH ANIMAL CENTER DRAFT MASTER PLAN

NATIONAL INSTITUTES OF HEALTH
MONTGOMERY COUNTY
DICKERSON, MARYLAND
SEPTEMBER 2012

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ABSTRACT

The National Institutes of Health (NIH) is developing a 20-year Master Plan for the NIH Animal Center (NIHAC) located approximately 4.5 miles west of Poolesville in Dickerson, Maryland. The need for the NIHAC Master Plan, and the campus improvements prescribed therein, is driven by both institutional policy and the inability of existing facilities to support current and projected mission requirements at NIHAC. The Master Plan provides a planning framework for siting and development of facilities. The Master Plan is part of broader long-term planning efforts at the Department of Health and Human Services (HHS) and is a requirement for all HHS-owned campuses.

Two alternatives were considered in detail in the Draft Environmental Impact Statement. The Proposed Action would implement the NIHAC Master Plan. The No-Action Alternative would continue current NIHAC operations and implement only those projects that would receive funding prior to finalization of the Master Plan. Comments on the Draft Environmental Impact Statement will be accepted for 60 days following the Notice of Availability in the Federal Register. Comments should be sent to Valerie Nottingham at the above address.

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SUMMARY

Background

The National Institutes of Health Animal Center (NIHAC) is set on a 513-acre campus near the Potomac River, approximately 4.5 miles west of Poolesville in rural Montgomery County, Maryland. The NIHAC property was a dairy farm until the National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services (HHS), purchased the property in 1960. NIH has developed less than five percent of the campus, which still retains the pastures, streams, and forested areas of the former farmland. The campus is located 30 miles northwest of the NIH Bethesda campus and provides a rural setting for the care and use of animals in support of NIH in the greater Washington, DC Metropolitan Area.

The campus is home to both animal holding and behavioral research programs. The Division of Veterinary Resources (DVR) supports NIH research through the procurement, housing, quarantine and care of animals used by the NIH Institutes in the Washington, DC Metropolitan Area. DVR-managed facilities are located primarily in the north section of the NIHAC campus. The Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) provides a shared animal research facility primarily focusing on behavioral research and operates the associated animal housing facilities on the south section of the campus. Several other NIH institutes use their animal care services. Key among them are the National Institute of Allergy and Infectious Diseases, the National Cancer Institute, and the National Institute of Mental Health.

Purpose and Need for Action

The Master Plan analyzed in this Environmental Impact Statement (EIS) reflects NIH's vision for the physical development of the NIHAC campus and for a flexible strategy for implementation. NIH is ever evolving and needs flexible, integrative and collaborative support spaces to effectively promote scientific research. The overall purpose of the Master Plan analyzed in this EIS is to accomplish the following:

- Establish a comprehensive and coordinated framework for the physical consolidation of the NIHAC campus. This framework would result in an appropriate scale, density, and character for the site; satisfactorily address the infrastructure constraints that presently limit growth on the campus; ensure appropriate campus and facility utilization and functional land use; and minimize disruption to behavioral research and animal holding operations during development of new facilities.

- Create a framework for growth and change that is flexible and can adapt to the dynamic nature of NIH research, changes in technology, procedures and regulations, and the dependence on annual funding.

- Develop a campus plan that contains sustainable design components that would support the implementation of sustainable building and operations practices.

The need for the NIHAC Master Plan, and the campus improvements prescribed therein, is driven by both institutional policy and the inability of existing facilities to support current and projected mission requirements at NIHAC. HHS, the parent agency of NIH, considers the Master Plan an integral part of broader, long term planning efforts. HHS requires Master Plans for all of its campuses and installation sites comprising two or more independent buildings or activities. HHS' operating divisions are required to update Master Plans at least every five years to determine and coordinate site improvements as well as to guide orderly, comprehensive physical development to improve functioning and appearance. Within NIH, Master Plans aid the Office of Research Facilities (ORF) in its decision-making while accommodating changing circumstances and agency priorities. The most recent NIHAC Master Plan, completed by NIH in 1996, is outdated and no longer reflects NIH's vision for the physical development of the NIHAC campus.

While NIH commissioned the NIHAC Master Plan in response to institutional policy, the campus improvements prescribed therein are needed to address real deficiencies with the existing NIHAC facilities, including the following:

- Facilities are aging and/or were designed only to accommodate temporary use.
- Animal housing facilities do not provide adequate space for projected increases in animal populations associated with projected expansion of operations, and they are not configured to hold the types of animals expected with this expansion of operations.
- Research support facilities are not adequate to sustain current and projected programs.

Proposed Action

The Proposed Action is a Master Plan to guide the physical development of NIHAC over the next 20 years. The Master Plan emphasizes quality research and animal care and efficient operations. The Master Plan provides a planning framework for siting and development of facilities. Full execution of the Master Plan would increase the employee population from the current population of 199 to 212 by 2030.

The plan consolidates the research, animal care and support facilities on the northern section of the campus, retaining buildings in good condition and fully utilizing the central utility plant and infrastructure in place. Aging, deteriorating and inappropriate buildings are phased out. On the southern campus, existing resources in good condition are retained and upgraded to current standards.

Realization of the Master Plan at any given time will depend on HHS and NIH priorities, governmental policy decisions, as well as budgetary considerations. The Master Plan represents neither the pre-approval of any individual project nor the pre-approval of the particular needs of specific programs to be accommodated on the campus. The Master Plan is, therefore, designed as a flexible framework and a guide for the orderly future development of the campus, if and as it occurs.

Below is a summary of the new construction, demolition, and other improvements that NIH would execute under the Master Plan.

New Construction, Additions, Renovation, and Demolition

- Shared Imaging and Diagnostic Facility. This facility would provide 43,400 gross square feet (GSF) of clinical support space for researchers, with imaging and procedure rooms, and laboratories. This facility would provide key personnel support spaces, including a data center and shelter-in-place.

- Behavioral Research Facility. This facility would provide 80,800 GSF of flexible animal housing and research space with procedure rooms, cage-wash, personnel support and related services. NIH would use the facility for behavioral research and it would serve to replace aging facilities and accommodate the serious space shortfall expected as a result of the projected increase in research.

- Multi-Species Animal Holding Facility. This facility would provide 103,100 GSF of flexible animal housing with personnel offices and support facilities that would accommodate a projected increase in animal population and replace inappropriate facilities. This facility would include procedure rooms, cage-wash, personnel support, and related services.

- Building 102 A Wing Renovation. NIH would renovate the A Wing of Building 102 to provide animal holding facilities appropriate for non-human primates (NHPs).

- Breeding Colony. This facility would provide 4,200 GSF of shelter, an observation post and open acreage for non-human primate breeding.

- Addition to Building 132. This addition would provide an observation area for non-human primates. The Master Plan would not otherwise modify the existing outdoor habitat.

- Entrance Security and Visitors' Center. This 1,400-GSF facility would allow for reception and screening of visitors and support space for the NIH security personnel.

- Miscellaneous additions and improvements. Interior improvements to Buildings 102 and 103 would upgrade outmoded animal procedure space. NIH would upgrade facilities throughout the campus to meet modern energy and water efficiency standards and would continue to provide ongoing maintenance.

- Demolition. NIH would demolish 29 aging and inefficient buildings, trailers, and temporary facilities throughout the campus for a total of 131,564 GSF of demolition.

Land Use Plan

The land use plan establishes functional zones within the campus to organize the program. These zones include a campus center, outdoor NHP zones, utility and service zone, entrance and primary circulation, perimeter buffer, residential zone, north parcel support, and open space. The land use plan directs future development while responding to existing building adjacencies, natural features, neighboring influences and the anticipated nature of future facilities.

Landscape Plan

Elements of the landscape plan include vegetation restoration, preservation areas and associated water features, pasture reduction, and the potential development of a constructed wetland for wastewater treatment. The goal of the landscape plan is to increase local biodiversity by means such as reducing carbon-based maintenance activities within the campus and ensuring that stormwater is managed in accordance with state and federal requirements. The plan also introduces new landscape elements that harmonize with existing historical landscape patterns, protect agricultural views, restore wildlife habitats and create visually rich, and seasonally appealing, landscape.

Parking and Circulation Plan

The planned improvements at the NIH campus that consolidate activities and facilities on the north campus also would incorporate various modifications to the parking layout, security entrance, and access points, as well as make various other transportation improvements to the network. NIH would implement the parking and circulation plan in phases that would parallel related facility construction.

Engineering and Site Utilities

The planned improvements to the site utilities would improve performance while accommodating the anticipated growth at NIHAC by replacing aging and energy-inefficient buildings and fully utilizing the capacity of the recently-constructed Central Utility Plant (CUP). The Master Plan encompasses the following improvements to the site utility systems.

- <u>Heating and Cooling Systems</u>. Under the Master Plan, chilled water and steam from the CUP would supply all major facilities on the north campus. The two proposed facilities located on the south campus (entrance security and the shelter for the NHP breeding colony) would have energy efficient dedicated mechanical systems and would use alternative energy sources to generate both heat and electricity, where feasible.

- <u>Electrical System</u>. The existing electrical infrastructure and emergency generators have sufficient capacity to support the growth associated with the Master Plan. NIH would install two additional below-grade, vaulted fuel tanks under the Master Plan to support the CUP. Construction of new facilities in the north campus likely would require rerouting of the incoming electrical service from Club Hollow Road.

- <u>Potable Water System</u>. NIH expects the Master Plan to generate an overall increase in potable water demand due to increased campus populations of both humans and NHPs as well as the increased steam demand. To stay within the permitted allowance of 90,000 gallons per day (gpd), NIH would implement the following measures to reduce the peak flow demand: take measures to conserve water and reduce projected future potable water use by 15 percent; reduce future steam loads through energy conservation and heat recovery by 20 percent; repair additional system leaks and maintain a leak monitoring system; and expand the use of non-potable water to reduce potable water use for certain applications.

- <u>Non-Potable Water System</u>. With the planned development on the north campus under the Master Plan, the make-up water rate for the cooling tower system would increase by approximately 42 percent. The Master Plan would improve the treatment of non-potable water (i.e., gray water) to reduce this water demand. The Master Plan would reduce the total dissolved solids content of gray water used in the cooling towers by installing a scale inhibiting system to mitigate the build-up of scale on the condenser water piping system.

- <u>Sanitary System</u>. The campus wastewater treatment plant (WTP) is at, or beyond, its capacity with the current development on the site. The Master Plan recommends installation of an additional filter at the WTP to increase the treatment capacity. The Master Plan also would construct a shed over the drying bed for sanitary sludge to protect it from the elements. Installation of the new filter, combined with implementation of the potable water conservation measures described above for existing and proposed facilities, should provide sufficient capacity to accommodate wastewater generated at NIHAC. However, if these measures are not implemented or the actual building designs result in greater than anticipated flows, the WTP would likely require replacement or a major component upgrade. Such an upgrade would require additional planning to define the scope of necessary improvements and cannot be defined with precision within this Master Plan.

- Stormwater System. There appears to be adequate capacity in the stormwater system to support the Master Plan. The Master Plan would implement a rain capture and re-use system for new buildings to minimize the potable water usage of the site.

Security Plan

The Master Plan would provide an entrance security and screening center, 100-foot vehicle separation from buildings, access control at loading docks, perimeter fence repair, and an emergency access for the campus to meet recently enacted safety requirements for government facilities.

Sustainable Design Plan

The Master Plan would incorporate sustainable design and energy efficiency as core principles. Daylighting, energy efficiency, water efficiency, stormwater management, vehicle-trip reduction, adaptive reuse, heat gain and wind moderation, landscape stewardship, appropriate planting, and renewable energy are key site-specific strategies that would be implemented under the sustainable design plan.

No-Action Alternative

The No-Action Alternative would not implement the NIHAC Master Plan. The No-Action Alternative would maintain the present course of action at NIHAC by continuing ongoing research, management, and maintenance activities. The No-Action Alternative would not affect the number of employees at NIHAC.

The No-Action Alternative would include the execution of certain projects that are expected to receive funding (or have already been funded) prior to finalization of the Master Plan. These include the following:

- Installation of two 50,000-gallon, below-grade vaulted storage tanks at the CUP, which would double the capacity of fuel supply for the boilers and emergency generators.

- Continued detection and repair of leaks in the potable water system.

- Consolidation and elimination of one building (T18) and six trailers (TR18A, TR18B, TR101, TR110, TR112A, and TR130A).

Decision to be Made

Based on the environmental analysis, public comments on the Draft EIS, and consideration of other factors, NIH will decide whether to proceed with the Proposed Action or the No-Action Alternative. The scope of the EIS is confined to issues and potential environmental consequences relevant to the above decisions.

The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) require consideration of environmental effects and prescribe mitigation where practical to limit those effects. Reconsideration of previous NIHAC decisions or programmatically prescribing mitigation or standards for future NIHAC activities is beyond the scope of this document.

The No-Action Alternative would not meet the purpose and need criteria defined earlier. As a result, NIH considered the No-Action Alternative to be less desirable than the Proposed Action.

Summary of Environmental Effects and Mitigation Measures

The Proposed Action would result in temporary impacts from construction, renovation, and demolition activities, as well as some minor continuing impacts due to operation of the new facilities and the slight increase in NIHAC personnel. The No-Action Alternative would result in minimal impacts, such as temporary impacts from demolition activities. The environmental effects and mitigation measures associated with the Proposed Action and the No-Action Alternative are described in Table S-1 below.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Land Use and Socio-economics	*Land Use and Regional Planning*	Effects: • Minor change in configuration of existing land use types within NIHAC. Continued preservation of open space and natural features. • No impact on land use outside NIHAC. The campus is expected to remain consistent with the county plan and zoning regulations. Mitigation: • No mitigation necessary.	Effects: • No impact on land use or land use planning. Mitigation: • No mitigation necessary.
	Social Resources	Effects: • Minimal impact on population, housing, and education trends due to the projected increase in number of staff from 199 to 212. • No disproportionate impact on children, minorities, or low income populations. • Minimal cumulative effect on availability of social resources to support projected local and regional population growth. Mitigation: • No mitigation necessary.	Effects: • No impact on population, housing, or educational resources. • No impact on sensitive populations. Mitigation: • No mitigation necessary.
	Economic Resources	Effects: • Minimal permanent beneficial impact on the local economy by generating 13 new jobs. • Beneficial impact on regional economy by supporting NIH's mission to conduct and support innovative biomedical research, a key driver of Montgomery County's economy. • Short term economic benefits to the local community during demolition and construction activities (e.g., meals and incidentals for construction workers). Mitigation: • No mitigation necessary.	Effects: • No impact on local or regional employment or income. • Inadequate support of NIH's mission, which is a key driver of Montgomery County's economy. Mitigation: • No mitigation necessary.
	Parks and Recreation	Effects: • No impact on recreational activities or the use of nearby parks. • No conflict with regional plans to expand the park system near NIHAC. Mitigation: • No mitigation necessary.	Effects: • No impact on recreational activities or the use of nearby parks. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Transportation		Effects: • Minor increase in vehicle use within and outside the campus due to the projected increase in personnel. This increase would be partially offset by the consolidation of facilities within the campus and a reduction in animal transport between NIHAC and the NIH Bethesda campus. • Minor improvement of parking availability and distribution within NIHAC. • Long-term improvement of campus ingress and egress due to improved secured entrance and new emergency access point. • Temporary increases in traffic during construction and demolition activities. • Temporary minor delays for campus ingress and egress during improvements to secured entrance. • Minimal contribution to cumulative increase in traffic volume associated with projected local and regional population growth. Mitigation: • No mitigation necessary.	Effects: • No impact on the external transportation network or traffic levels. • No change in vehicle use within or outside the campus. • No improvement of campus ingress or egress or parking availability. Mitigation: • No mitigation necessary.
Utilities and Infrastructure	*Potable Water Supply*	Effects: • Increase in potable water demand/groundwater withdrawal from approximately 58,180 gpd to 89,480 gpd due to increased campus population for both humans and NHPs and increased steam load. This estimate incorporates a 20 percent factor of safety. • Withdrawal amount would remain under the 90,000 gpd permit limitation. Mitigation: • Implementation of water conservation and reuse strategies such as reduction of onsite potable water system leaks, decrease of water use intensity through water efficiency improvements and conservation measures, and reduction of steam make-up water requirements through implementation of energy conservation and heat recovery measures. • Expansion of gray water use (see *Wastewater and Gray Water*).	Effects: • No increase in potable water consumption or supply. • Withdrawal amount would remain within the MDE permit limitation. Mitigation: • Continued potable water leak detection and repair program.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Utilities and Infrastructure *(Continued)*	*Wastewater and Gray Water*	Effects: • Increase in sanitary wastewater generation and discharge due to increased cooling load and increased campus population for both humans and NHPs. Effluent discharge to Broad Run during the summer would increase by approximately 72 percent (from 36,180 gpd to 62,280 gpd). Effluent discharges during the winter would increase by approximately 49 percent (from 60,180 gpd to 89,480 gpd). • Installation of an additional filter to resolve deficient WTP capacity. • NIH would continue to operate the WTP in accordance with the applicable NPDES permit limitations. Mitigation: • Implementation of water conservation and reuse strategies (see *Potable Water Supply*). • Implementation of wastewater reduction strategies such as removal of roof leaders directly connected to the sanitary sewer system and implementation of a scale inhibitor system at the CUP to reduce the amount of cooling tower blow down. • Potential expansion of gray water applications (e.g., for cage washing) by installing stormwater cisterns and/or biological filtration, pending further evaluation by NIH.	Effects: • No increase in sanitary wastewater discharge. • No increase in gray water consumption or supply at NIHAC. • No improvement of WTP capacity; collection rate would continue to occasionally exceed capacity. Mitigation: • No mitigation necessary.
	Stormwater and Stormwater Manage-ment	Effects: • Increase in total impervious area (TIA) at NIHAC by approximately 101,201 SF, increasing the percent TIA from 4.5 to 5.0 percent of the campus. Associated increase in stormwater generation. • Improvement of existing stormwater management practices to meet the intent of local, state, and federal rules and regulations. Mitigation: • Implementation of Low Impact Development (LID) and environmental site design (ESD) measures, such as vegetated swales with check dams, vernal pools, permeable paving, and curbless parking lots or curbs with cut-ins. • Potential installation of stormwater cisterns at new facilities for reuse as gray water, which may result in an overall decrease in stormwater runoff.	Effects: • Decrease in TIA by approximately 10,864 SF. Associated slight decrease in stormwater generation. • No improvement of existing stormwater management practices to meet the intent of local, state, and federal rules and regulations. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Utilities and Infrastructure *(Continued)*	*Energy Systems - Electricity*	Effects: • Moderate increase in electrical demand by 38 percent due to operation of lighting systems, laboratory equipment, and HVAC systems associated with new buildings. • Improvement of emergency electrical supply due to installation of two additional fuel tanks at the CUP. • Improvement of energy efficiency. • Temporary impact on NIHAC electrical distribution system due to rerouting of the incoming electrical service from Club Hollow Road. • Minimal contribution to cumulative regional increase in electrical demand. Mitigation: • No mitigation necessary.	Effects: • No impact on electrical infrastructure or demand. • No improvement of energy efficiency. • Improvement of emergency electrical supply due to fuel tank installation. Mitigation: • No mitigation necessary.
	Energy Systems - Heating and Cooling	Effects: • Moderate increase in heating demand (steam load) by up to 37 percent and cooling demand by up to 42 percent due to expanded facility space. • Improvement of insulation and HVAC efficiency of new facilities. • Improvement of emergency steam supply due to installation of two additional fuel tanks at the CUP. Mitigation: • No mitigation necessary.	Effects: • No increase in heating and cooling demand. • No improvement of energy efficiency. • Improvement of emergency steam supply due to fuel tank installation. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action (NIHAC Master Plan)	No-Action Alternative
Sustainable Development	Effects: • Moderate overall improvement to campus sustainability through replacement of inefficient facilities. Sustainability features could include daylighting, energy efficient building systems, renewable energy systems, expanded gray water use, and improved stormwater management. • Improvement of transportation efficiency by reducing vehicle trips within NIHAC and between NIHAC and Bethesda for animal transport. • Improvement of indoor environmental quality through improved ventilation and thermal comfort, moisture control, and daylighting. • Short-term and continuing commitment of resources (e.g., raw construction materials, fossil fuels) to support facility construction and operation. Mitigation: • NIH would obtain LEED or Green Globes certification for new construction projects that have a total project cost equal to or greater than $3 million.	Effects: • No improvement of existing inefficient facilities. • Improvement of water efficiency due to continued leak detection and repair program. • No improvement of transportation efficiency. • No improvement of indoor environmental quality. • No new commitment of resources to support facility construction and operation. Mitigation: • No mitigation necessary.
Light Pollution	Effects: • Overall negligible change in light trespass outside the campus boundary from new exterior lighting. • Potential increase in light trespass from interior lighting due to skylights and windows in proposed facilities and circulation path. Mitigation: • Continued use of automatic lighting controls.	Effects: • No impact on light pollution. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Noise		Effects: • Overall negligible change in routine noise levels. • Minor increase in noise due to installation of new air-handling units, exhaust fans, and emergency generators. • Decrease in noise in the south campus due to removal of emergency generator, HVAC, and boiler units associated with facilities to be demolished. • Temporary increase in noise during construction activities. Mitigation: • Limitation of construction activities to normal daytime working hours. • Potential temporary relocation of animals to avoid undue stress and research disruptions that could result from construction-related noise.	Effects: • No change in ambient noise levels. • Temporary, minor increase in noise during demolition and installation of fuel tanks. Mitigation: • Limitation of tank installation activities to normal daytime working hours.
Air Quality	*Ambient Air Quality*	Effects: • Moderate increase in air emissions from onsite stationary sources due to increased heating demand during normal operations and increased electrical demand during power outages. • Potential increase in emissions of criteria pollutants, mercury, and dioxin associated with offsite incineration of medical pathological waste (MPW). • Minor increase in transportation-related emissions due to increase in number of commuting personnel; offset by reduction in vehicle use within NIHAC and between NIHAC and Bethesda for animal transport. • Temporary increase in emissions due to construction, demolition, and renovation activities. • Net change in emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, $PM_{2.5}$, and SO_2) would be well below Clean Air Act General Conformity Rule *de minimis* thresholds for each calendar year. Mitigation: • Implementation of best management practices (BMPs) to limit fugitive dust impacts from construction, demolition, and renovation activities. • Proper handling and disposal of asbestos and ozone-depleting substances (ODS) during demolition activities.	Effects: • No change in air emissions associated with operations. • Temporary, minor increase in emissions during demolition activities and installation of fuel tanks. • Minor recurring VOC emissions from new fuel tanks. Mitigation: • Implementation of BMPs to limit fugitive dust impacts from demolition activities. • Proper handling and disposal of asbestos and ODS during demolition activities.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Air Quality *(Continued)*	*Indoor Air Quality*	Effects: • Improvement of indoor air quality due to installation of new HVAC systems in new and renovated facilities. Mitigation: • No mitigation necessary.	Effects: • No improvement of indoor air quality. Mitigation: • No mitigation necessary.
	Greenhouse (GHG) Emissions	Effects: • Increase in annual GHG emissions from approximately 20,265 metric tons of CO_2 equivalents (MT CO_2e) to 25,452 MT CO_2e due primarily to increased electricity consumption and stationary combustion. • Improvement of overall campus energy intensity. • Temporary increase in GHG emissions associated with construction, renovation, and demolition activities. Mitigation: • Implementation of construction, renovation, and demolition BMPs.	Effects: • No increase in recurring GHG emissions. • No improvement of overall campus energy intensity. • Temporary, minor increase in GHG emissions during demolition activities and installation of fuel tanks. Mitigation: • Implementation of demolition BMPs.
Waste	*Municipal Solid Waste (MSW)*	Effects: • Moderate increase in MSW generation, storage, and handling due to expanded animal housing facilities. • Temporary generation of building debris associated with construction, renovation, and demolition activities. • Minor improvement of storage of sludge waste at the WTP through installation of a canopy over open air sludge beds. • Minimal cumulative effect on Montgomery County's capacity to accommodate projected increases in MSW generation. Mitigation: • No mitigation necessary.	Effects: • No increase in the long-term generation of MSW. • Minor, temporary generation of MSW associated with demolition activities. • No improvement to sludge storage conditions. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Waste *(Continued)*	*Medical and Pathological Waste*	Effects: • Moderate increase in MPW generation, storage, and handling due to expanded animal holding and testing facilities. • Minor improvement of MPW storage capacity. Mitigation: • No mitigation necessary.	Effects: • No change in the generation of MPW. • No improvement of existing inadequate MPW storage capacity. Mitigation: • No mitigation necessary.
	Hazardous and Chemical Waste	Effects: • Minor increase in hazardous and chemical waste generation, storage, and handling due to expanded laboratory activities. • Temporary generation of building and equipment debris, which may be contaminated with lead, asbestos, and polychlorinated biphenyls (PCBs). • Potential temporary generation of petroleum waste due to closing and disposal of underground storage tanks (USTs). Mitigation: • Contractors would remove materials suspected of containing asbestos, lead, or PCBs prior to demolition activities and keep materials separated from general demolition debris.	Effects: • No increase in the long-term generation of hazardous and chemical waste. • Temporary generation of demolition debris, which may be contaminated with lead, asbestos, PCBs. Mitigation: • Contractors would remove materials suspected of containing asbestos, lead, or PCBs prior to demolition activities and keep materials separated from general demolition debris.
	Radiological Waste	Effects: • Moderate increase in radiological waste generation, storage, and handling due to expanded laboratory and testing facilities. Mitigation: • No mitigation necessary.	Effects: • No change in the generation of radiological waste. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources	*Topography*	Effects: • Minor impact due to construction activities, which would require grading (mostly in previously disturbed areas). Minor changes to existing drainage patterns in the immediate vicinity of new facilities. Mitigation: • Implementation of conventional and sustainable stormwater management practices, such as native bioswales and vernal pools.	Effects: • No impact on topography. Mitigation: • No mitigation necessary.
	Soils and Farmland	Effects: • Moderate disturbance due to construction, demolition, and renovation projects that would impact both previously developed and undisturbed soils. • Potential impact on soil quality due to construction and demolition activities and fuel tank removal. • Potential loss of less than five acres of prime or unique farmland and farmland of state significance. Mitigation: • Implementation of sediment and erosion control (SEC) measures during earth disturbance. • Proper management of construction and demolition waste to prevent soil contamination.	Effects: • Minor soil disturbance and potential soil compaction associated with demolition, fuel tank installation and potable water system repairs. • Minor increase in risk of future soil contamination due to fuel tank installation. • No impact on prime or unique farmland or farmland of state significance. Mitigation: • Implementation of SEC measures during earth disturbance. • Proper management of demolition waste to prevent soil contamination.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources *(Continued)*	*Geology and Groundwater*	Effects: • Increase in potable water demand/groundwater withdrawal from approximately 58,180 gpd to 89,480 gpd due to increased campus population for both humans and NHPs and increased steam load. This estimate incorporates a 20 percent factor of safety. • Withdrawal amount would remain under the 90,000 gpd permit limitation. • Potential impact on groundwater quality during construction and demolition. • Reduction in potential for future groundwater contamination due to removal of underground fuel tanks and installation of new vaulted tanks. • No expected cumulative effects on groundwater availability for the Town of Poolesville. Mitigation: • Implementation of water conservation and reuse strategies to ensure that groundwater withdrawals do not exceed the current MDE permit limitations (*see Potable Water Supply*). • Expansion of gray water use (see *Wastewater and Gray Water*). • Implementation of appropriate pollution prevention measures during construction and demolition activities.	Effects: • No impact on groundwater consumption or supply. • Temporary, minor potential for groundwater contamination during demolition activities and installation of fuel tanks. Mitigation: • Continued potable water leak detection and repair program. • Implementation of appropriate pollution prevention measures during demolition activities and fuel tank installation.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources *(Continued)*	*Vegetation and Wildlife*	Effects: • Minor reduction in vegetated areas due to removal of grassy areas, urban landscape, and forested area associated with construction. Construction would require the clearing of approximately 21,130 SF (0.49 acres) of mature, hardwood forest and 75,703 SF (1.74 acres) of grassy area. • Minor improvement of urban landscape due to new federal requirements and proposed visual screening. • Potential impact on wildlife habitat associated with vegetation removal. No impact on habitats of concern (e.g., forest interior dwelling species) or federal or state-listed rare, threatened, or endangered species. • Temporary potential impact on wildlife due to noise during construction. Mitigation: • Replacement of trees removed within the campus in accordance with 1-to-1 replacement, resulting in no net long-term change to forested area. • Replanting of native grassy vegetation following disturbance. • Management of hardwood trees in such a way as to prevent the spread of the emerald ash borer. • Per the Migratory Bird Treaty Act, tree clearing would not occur between May 1 and August 31 unless it could be verified that no eggs and/or young are present. • Implementation of stormwater management and pollution prevention measures to prevent impact on aquatic habitat.	Effects: • Net increase in vegetated area. No tree removal. • Temporary disturbance of vegetated areas due to demolition activities, utility repair, and fuel tank installation. • No improvement of existing landscaped areas. • No impact on aquatic habitat in Broad Run and other surface waters. • No impact on federal or state-listed rare, threatened, or endangered species. • Negligible wildlife disturbance due to noise. Mitigation: • Replanting of native grassy vegetation following disturbance. • Implementation of stormwater management and pollution prevention measures during demolition and fuel tank installation to prevent impact on aquatic habitat.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources *(Continued)*	*Surface Waters*	Effects: • No direct impact on surface waters. • Minimal indirect impact on nearby surface waters due to emergency access road construction and modification of the perimeter fence. • Potential minor impact on an intermittent stream and Broad Run due to nutrient loadings in runoff from the proposed NHP breeding colony. • Minor net improvement of surface water quality and reduction in quantity of stormwater discharged to surface waters due to implementation of LID for new development and potential reduction in the effective TIA of the campus. • Moderate increase in effluent discharge from the WTP to Broad Run (see *Wastewater and Gray Water*). • Minimal potential for cumulative effects associated with population increases and development in Broad Run watershed. Mitigation: • Implementation of SEC and stormwater management techniques and pollution prevention measures to ensure that petroleum products and other contaminants do not migrate to surface waters during construction. • Implementation of water conservation and reuse strategies, wastewater reduction strategies, and gray water treatment strategies to minimize WTP discharges (see *Potable Water Supply* and *Wastewater and Gray Water*).	Effects: • No direct impact on surface waters. • Minor decrease in stormwater generation. • No implementation of LID. • No change in impacts due to runoff from construction or animal waste. • No change in effluent discharge from the WTP. Mitigation: • Implementation of appropriate SEC and pollution prevention measures during demolition activities and fuel tank installation.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources *(Continued)*	*Wetlands*	Effects: • Direct impact on approximately 0.5 acres of palustrine forested wetland due to construction of the emergency access road. • Potential impact on wetlands associated with perimeter fence modifications. • Minor net improvement to wetlands due to improved stormwater management (see *Stormwater and Stormwater Management* and *Surface Waters*). • Potential minor impact on wetlands adjacent to an intermittent stream and Broad Run due to nutrient loadings in runoff from the proposed NHP breeding colony. • No impact on tidal wetlands. • Minimal potential for cumulative effects associated with population increases and development in Broad Run watershed. Mitigation: • Incorporation of emergency access road design features such as culverts to maintain hydrologic connectivity between wetland areas up gradient and down gradient of proposed development. • Implementation of stormwater management and SEC strategies to prevent sediment transport into wetlands from construction activities.	Effects: • No direct impact on wetlands. • Minor decrease in stormwater generation. • No implementation of LID. • No change in impacts due to runoff from construction or animal waste. • No change in effluent discharge from the WTP. Mitigation: • Implementation of appropriate SEC and pollution prevention measures during demolition activities and fuel tank installation.
	Floodplains	Effects: • Potential minimal impact on the 100-year floodplain associated with modification to the perimeter fence. Mitigation: • No mitigation necessary.	Effects: • No impact on the 100-year floodplain. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource		Proposed Action (NIHAC Master Plan)	No-Action Alternative
Natural Resources *(Continued)*	*Environ-mentally Sensitive Areas (ESA)*	Effects: • Moderate impact on the ESA surrounding a Broad Run tributary and associated wetlands due to construction of the emergency access road. • Minor impact on the ESA surrounding an intermittent stream due to installation of the Building 101A security gate. • Potential impact on Broad Run ESAs due to modification of the perimeter fence. Mitigation: • See mitigation measures listed under *Surface Waters*, *Wetlands*, and *Floodplains*.	Effects: • No activities within ESAs. Mitigation: • No mitigation necessary.
Historic Properties	*Prehistoric Resources*	Effects: • No impact on known prehistoric archeological resources. • Minimal potential for cumulative effects to archeological sites in NIHAC vicinity due to presence of historical and county parks. Mitigation: • Completion of archeological investigations prior to earth disturbance in previously undeveloped areas (e.g., emergency access road). If eligible prehistoric resources are identified, NIH would work with appropriate consulting parties to develop mitigation or avoidance measures.	Effects: • No impact on prehistoric archeological resources. Mitigation: • No mitigation necessary.
	Historic Resources	Effects: • Demolition of two potentially historic buildings (T-7 and 101). • Minor indirect visual and/or acoustical impact on potentially historic properties within campus boundaries. • No impact on historic landscape elements or historic properties outside the campus. Mitigation: • Completion of eligibility determinations for NIHAC properties. If eligible historic resources are identified, NIH would work with appropriate consulting parties to develop mitigation measures.	Effects: • No impact on potentially historic properties. Mitigation: • No mitigation necessary.

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(Continued)

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

AADT	Annual Average Daily Traffic
ACHP	Advisory Council on Historic Preservation
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
BAS	Building Automation System
BOD	Biochemical oxygen demand
Btu	British thermal units
BWI	Baltimore Washington International Airport
C&O	Chesapeake and Ohio
CAA	Clean Air Act
CAD	Computer-aided design
CDR	Construction, demolition, and renovation
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	Methane
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalents
COMAR	Code of Maryland Regulations
CUP	Central utility plant
CWA	Clean Water Act
CY	Cubic yards
DCA	Ronald Reagan Washington National Airport
DEP	Department of Environmental Protection
DRM	Design Requirements Manual
DVR	Division of Veterinary Resources
EIS	Environmental Impact Statement
EISA 2007	Energy Independence and Security Act of 2007
EMS	Environmental Management System
EO	Executive Order
ESD	Environmental site design
FEMA	Federal Emergency Management Agency
FHA	Federal Highway Administration
FIDS	Forest Interior Dwelling Species
FY	Fiscal year
gal	gallon
GCR	General Conformity Rule
GHG	Greenhouse gas
gpd	Gallons per day
GSA	General Services Administration
GSF	Gross square feet
HAP	Hazardous air pollutant
HEPA	High efficiency particulate air
HFC	Hydrofluorocarbon
HHS	U.S. Department of Health and Human Services
HLW	High-level waste
HVAC	Heating, ventilation, and air conditioning

(Continued)

IAD	Washington Dulles International Airport
IAQ	Indoor air quality
IBI	Index of biotic integrity
IDA	International Dark Sky Association
IES	Illuminating Engineering Society
IPCC	Intergovernmental Panel on Climate Change
kW	kilowatt
LEED®	Leadership in Energy and Environmental Design
LID	Low Impact Development
LLW	Low-level waste
LOD	Limit of disturbance
M-NCPPC	Maryland-National Capital Park and Planning Commission
Maryland Register	Maryland Register of Historic Properties
MACT	Maximum Achievable Control Technology
MARC	Maryland Regional Commuter Train Service
MBSS	Maryland Biological Stream Survey
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MDOT	Maryland Department of Transportation
MHT	Maryland Historical Trust
MMBtu	million British thermal units
MOA	Memorandum of Agreement
MPW	Medical and pathological waste
MRA	Maryland Recycling Act
MSMG	Maryland Stormwater Management Guidelines
MSW	Municipal solid waste
MT	Metric tons
MTA	Maryland Transit Authority
MWCOG	Metropolitan Washington Council of Governments
N_2O	Nitrous oxide
NAAQS	National Ambient Air Quality Standards
National Register	National Register of Historic Places
NCI	National Cancer Institute
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHP	Non-human primate
NHPA	National Historic Preservation Act
NIAID	National Institute of Allergy and Infectious Diseases
NICHD	The Eunice Kennedy Shriver National Institute of Child Health and Human Development
NIH	National Institutes of Health
NIHAC	National Institutes of Health Animal Center
NIMH	National Institute of Mental Health
NIOSH	National Institute for Occupational Safety and Health
NMIM	National Mobile Inventory Model
NOI	Notice of Intent

(Continued)

NOx	Nitrogen oxides
NO_2	Nitrogen dioxide
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRCS	Natural Resources Conservation Service
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
O_3	Ozone
ODS	Ozone-depleting substances
ORF	Office of Research Facilities
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCB	Polychlorinated biphenyls
PFC	Perfluorocarbon
PM	Particulate matter
POV	Privately owned vehicles
pph	Pounds of steam per hour
ppm	Parts per million
PTC	Permit to construct
PTE	Potential to emit
RCRA	Resource Conservation and Recovery Act
RDT	Rural Density Transfer
RHA	Rivers and Harbors Act
RO	Reverse osmosis
SBP	Sustainable Buildings Plan
SDWA	Safe Drinking Water Act
SEC	Sediment and erosion control
SF	Square feet
SF_6	Sulfur hexafluoride
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
SO_2	Sulfur dioxide
SSA	Sole Source Aquifer
SSPP	Strategic Sustainability Performance Plan
T-BACT	Best available control technology for toxics
TAP	Toxic air pollutant
TDR	Transfer of Development Rights
TDS	Total dissolved solids
TIA	Total Impervious Area
TMDL	Total Maximum Daily Load
TSCA	Toxic Substances Control Act
TSS	Total suspended solids
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service

(Continued)

USGBC	United States Green Building Council
USGS	United States Geological Survey
UST	Underground storage tank
VOC	Volatile organic compound
WLA	Waste load allocation
WMATA	Washington Metropolitan Area Transit Authority
WTP	Wastewater treatment plant

1. INTRODUCTION

1.1 Existing Conditions

The National Institutes of Health Animal Center (NIHAC) is set on a 513-acre campus near the Potomac River, approximately 4.5 miles west of Poolesville in rural Montgomery County, Maryland (Figure 1-1). The NIHAC property was a dairy farm until the National Institutes of Health (NIH), a part of the U.S. Department of Health and Human Services (HHS), purchased the property in 1960. NIH has developed less than five percent of the campus, which still retains the pastures, streams, and forested areas of the former farmland. Current land use on campus is shown on Figure 1-2. The campus is located 30 miles northwest of the NIH Bethesda campus and provides a rural setting for the care and use of animals in support of the NIH in the greater Washington, DC Metropolitan Area.

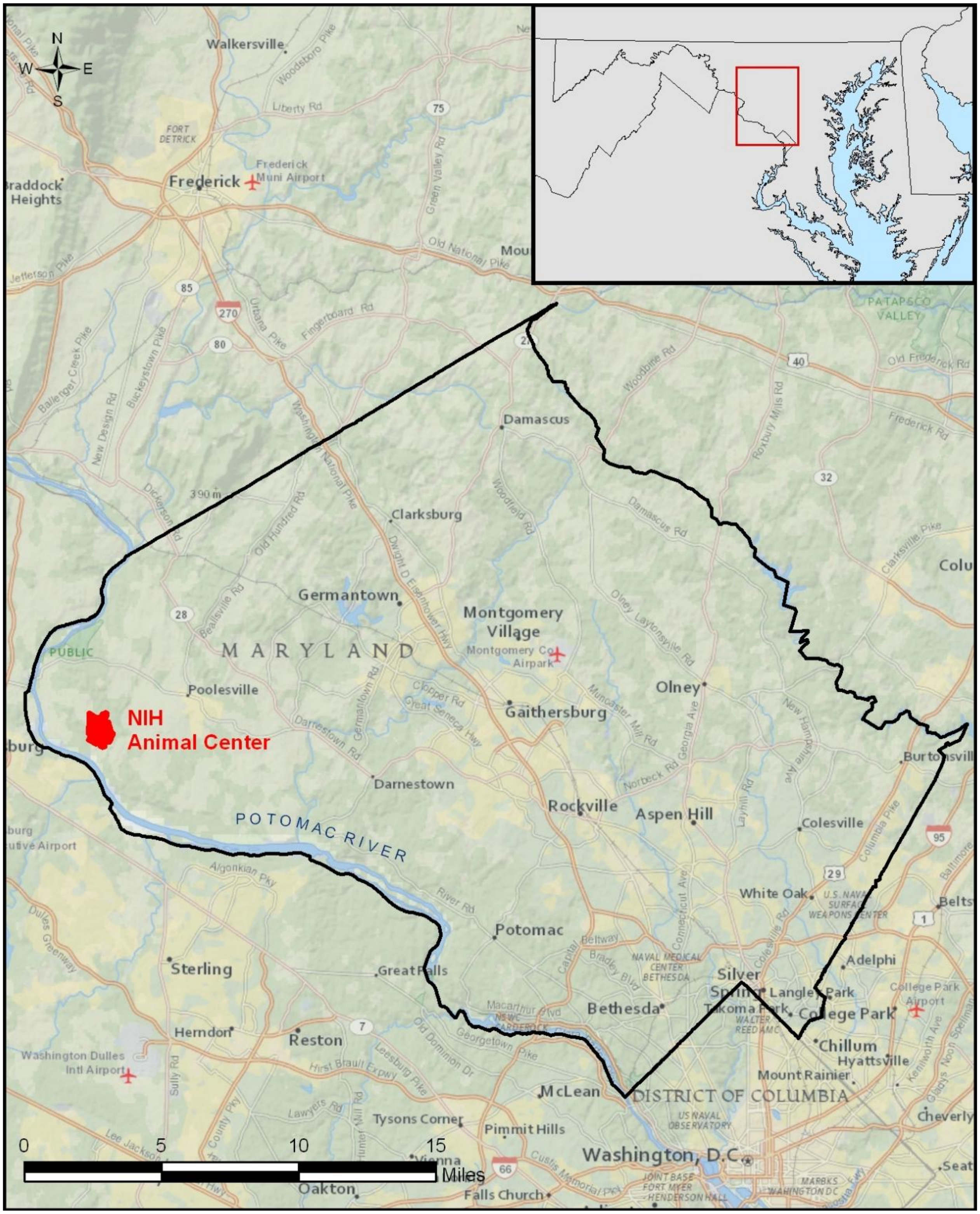
The campus is home to both animal holding and behavioral research programs. The Division of Veterinary Resources (DVR) supports NIH research through the procurement, housing, quarantine and care of animals used by the NIH Institutes in the Washington, DC Metropolitan Area. DVR-managed facilities are located primarily in the north section of the NIHAC campus. The Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) provides a shared animal research facility primarily focusing on behavioral research and operates the associated animal housing facilities on the south section of the campus. Several other NIH institutes use their animal care services. Key among them are the National Institute of Allergy and Infectious Diseases (NIAID), the National Cancer Institute (NCI), and the National Institute of Mental Health (NIMH).

1.2 Purpose and Need

The Master Plan analyzed in this Environmental Impact Statement (EIS) reflects NIH's vision for the physical development of the NIHAC campus and for a flexible strategy for implementation. NIH is ever evolving and needs flexible, integrative and collaborative support spaces to effectively promote scientific research. The overall purpose of the Master Plan analyzed in this EIS is to accomplish the following:

- Optimize the value of the NIHAC campus as an animal research support resource in an efficient and complimentary way, by establishing a comprehensive and coordinated framework for the physical consolidation of the NIHAC campus. The Master Plan would result in an appropriate scale, density, and character for the site and satisfactorily address the infrastructure constraints that presently limit growth on the campus, ensure appropriate campus and facility utilization and functional land use, and minimize disruption to behavioral research and animal holding operations during development of new facilities.

- Create a framework for growth and change that is flexible and can adapt to the dynamic nature of NIH research, changes in technology, procedures and regulations, and the dependence on annual funding. The framework would provide flexibility for NIH to expand facility space incrementally, as needed and when funded, while being linked to an established circulation and service structure.



Source: National Geographic, 2012.

Figure 1-1. Location of the NIHAC Campus within Montgomery County, MD

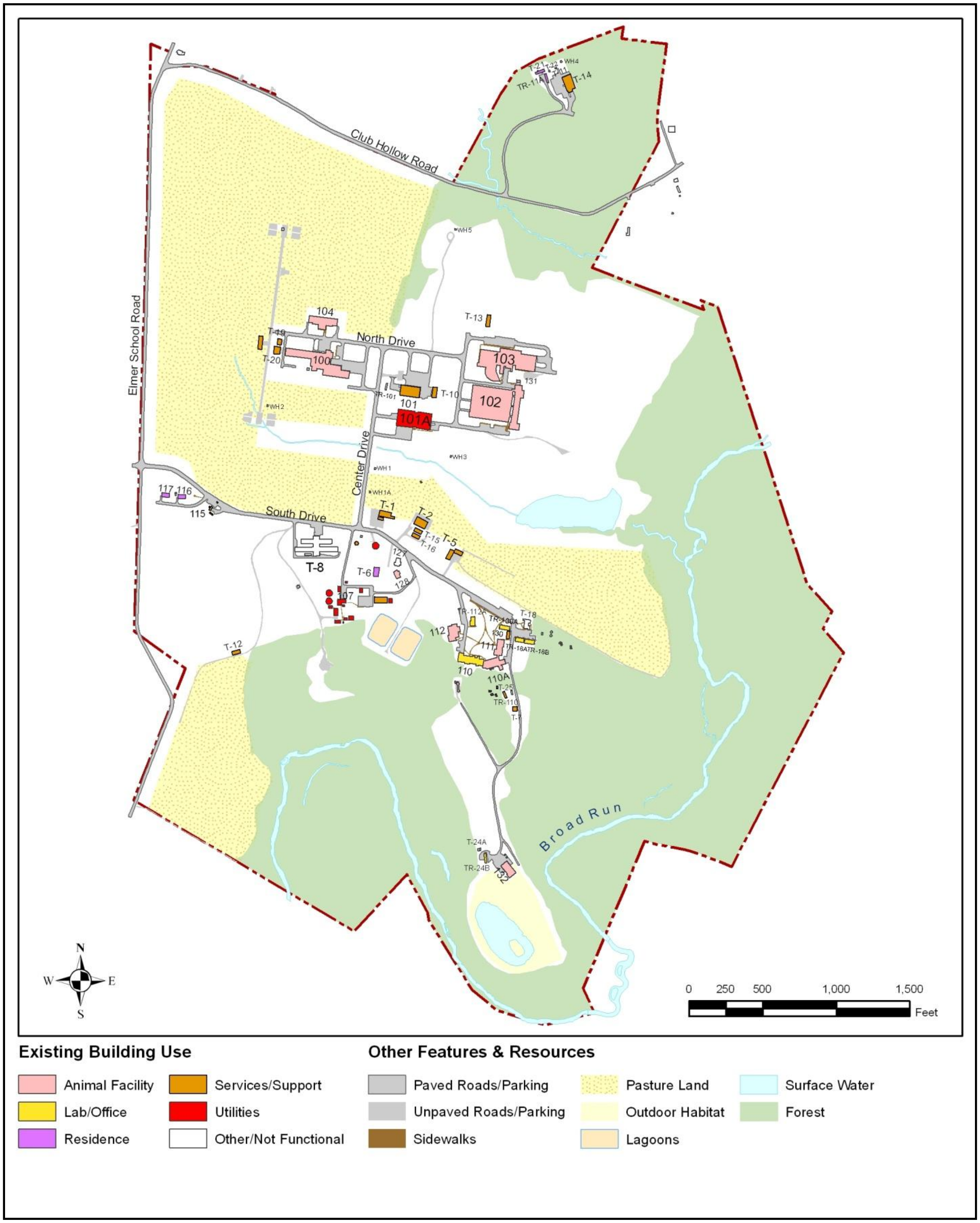


Figure 1-2. Existing Facilities and Land Use on the NIHAC Campus

- Develop a campus plan that contains sustainable design components that would support the implementation of sustainable building and operations practices in accordance with the Energy Independence and Security Act of 2007 (EISA 2007), *HHS Sustainable Buildings Implementation Plan*, the HHS *Strategic Sustainability Performance Plan* (SSPP), and the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Guiding Principles).

The need for the NIHAC Master Plan, and the campus improvements prescribed therein, is driven by both institutional policy and the inability of existing facilities to support current and projected mission requirements at NIHAC. HHS, the parent agency of NIH, considers the Master Plan an integral part of broader, long term planning efforts. HHS requires Master Plans for all of its campuses and installation sites comprising two or more independent buildings or activities. HHS' operating divisions are required to update Master Plans at least every five years to determine and coordinate site improvements as well as to guide orderly, comprehensive physical development to improve functioning and appearance. Within NIH, Master Plans aid the Office of Research Facilities (ORF) in its decision-making while accommodating changing circumstances and agency priorities. The most recent NIHAC Master Plan, completed by NIH in 1996, is outdated and no longer reflects NIH's vision for the physical development of the NIHAC campus.

While NIH commissioned the NIHAC Master Plan in response to institutional policy, the campus improvements prescribed therein are needed to address real deficiencies with the existing NIHAC facilities, including the following:

- Facilities are aging and/or were designed only to accommodate temporary use.

- Animal housing facilities do not provide adequate space for projected increases in animal populations associated with projected expansion of operations, and they are not configured to hold the types of animals expected with this expansion of operations.

- Research support facilities are not adequate to sustain current and projected programs.

The following subsections describe these factors in further detail.

Aging and Temporary Facilities

New and renovated facilities are necessary to replace aging facilities that have surpassed their expected operational life span, are unreliable, contain materials hazardous to human health (e.g., lead paint and asbestos), and require frequent repair and maintenance. In addition, more than 15 percent of the total campus space is housed in temporary structures and trailers including many of the support functions (e.g., office, storage, and shelter-in-place) for the south campus. These temporary structures required minimal capital investment, but in terms of lifecycle costs, they cannot be justified. The majority of them are at the end of their rated useful lives.

In terms of planning strategy, it is best to identify the buildings that are viable for retention based on their current use, physical condition, functional condition, and the viability of reuse with acceptable renovations and retrofits. Figure 1-3 illustrates existing facilities throughout NIHAC and indicates those whose conditions are no longer adequate to efficiently support continued operations.

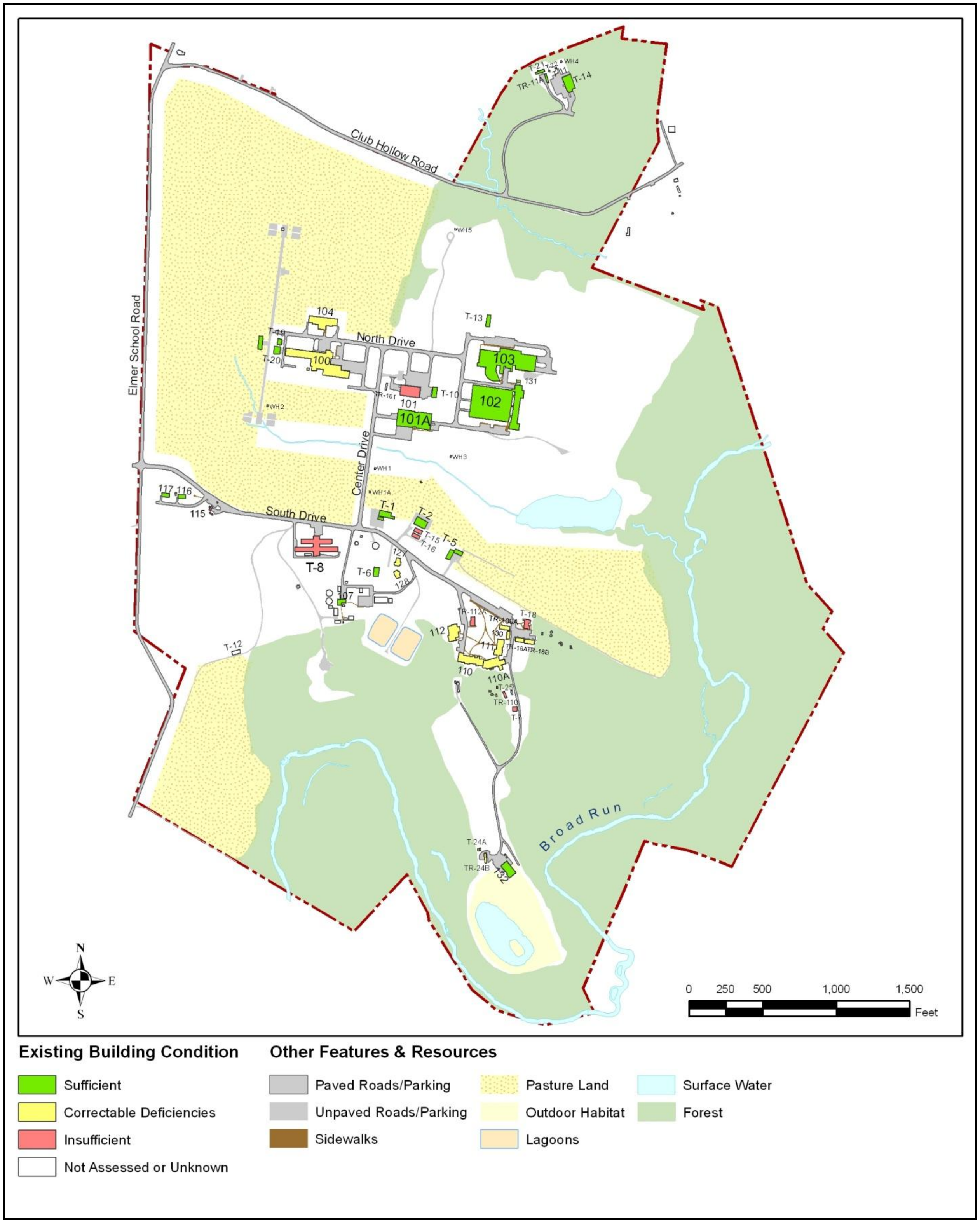


Figure 1-3. Existing Facility Conditions on the NIHAC Campus

Animal Housing Facility Inadequacies

Currently, the facilities on campus house a variety of animal species and provide capacity for approximately 1,010 mice, 226 large animals, and 3,023 non-human primates (NHPs). NIH's Facility Working Group and its appointed Animal Requirements Sub-Committee anticipate that this campus will house primarily NHPs in the future, with a limited number of large animals and mice. NIH projects that the campus will require capacity to accommodate approximately 3,795 NHPs by 2030, an increase of 26 percent beyond the current capacity.

DVR's facilities are not optimal from a functional and operational perspective, regardless of their physical condition. These buildings were designed to hold specific species of animals. As research programs and animal models change, so do the demands for facility space and resources. This is evidenced in the most recently constructed DVR animal facility, Building 104, which was originally built for ungulates (e.g., sheep and other hoofed mammals) and is now being used to house primates. Retrofitting species-specific animal facilities requires substantial investments in time and money, and would not be energy and resource efficient compared to new construction.

The NICHD-operated animal buildings are old buildings and some are not specifically designed for animal housing. For example, Building 112, which houses animal holding, a nursery, behavioral research spaces, procedure spaces, and cage washers, was a farm building that has been incrementally modified to meet the minimum functional standards. The 110-110A-111 group of connected buildings are able to support the current functional needs, but cannot be considered either optimal or efficient. The only exception is Building 132, which has undergone substantial modification and reconstruction to support its current and future housing and field habitat shelter functions at acceptable levels.

Research Support Limitations

Additional space is needed to satisfy a current shortfall in research facilities necessary for the NIHAC to fulfill its mission and support evolving research programs. Expanded imaging and diagnostic facilities are required to support projected research programs at NIHAC. In addition, space is needed to allow for co-location of research and procedure rooms to minimize transport of animals.

1.3 Public Scoping

Scoping is an early and open process for determining the range of significant issues to be analyzed in the EIS. A federal agency begins the scoping period for an EIS by publishing a Notice of Intent (NOI) in the Federal Register to let the public know that it is considering an action and will prepare an EIS. The NOI describes the proposed action and may provide background information on issues and potential impacts. During the scoping period, the public can provide comments on the proposed action, alternatives, issues, and potential environmental impacts to be analyzed in the EIS. Scoping may involve public meetings and other means to obtain public comments on the EIS.

NIH published an NOI for the EIS in the Federal Register on October 3, 2011. The NOI is provided in Appendix C. The 45-day public comment period ended November 18, 2011.

Public Meeting

NIH held a public scoping meeting on October 25, 2011, at the Town Hall in Poolesville, Maryland, to solicit input from the general public regarding the NIHAC Master Plan. NIH published a notification for the public meeting in the Washington Post on October 10, 12, 14, 17, 19, and 21; the Frederick News Post on October 9, 12, 14, 16, 19 and 21; and The Monocacy Monocle, which is published every two weeks, on October 7 and 21. NIH also posted fliers advertising the public meeting throughout the Town of Poolesville.

Seven members of the public, including one current NIHAC employee, attended the scoping meeting. NIH displayed a poster exhibit describing the National Environmental Policy Act (NEPA) process, suggestions for effective commenting, existing conditions at NIHAC, and a preliminary Master Plan concept. Following the poster session, NIH gave a brief presentation about the master planning process, the NEPA process, and public comment opportunities. None of the attendees provided formal oral statements following the presentation. However, during the poster session, two members of the public expressed concern regarding impacts of the Master Plan on local water supply.

Public Comments

Two members of the general public submitted comments on the NIHAC Master Plan, via phone and email, by the November 18, 2011 deadline. These comments were not solution-oriented or relevant to the scope of the Master Plan and therefore did not warrant further analysis in the EIS.

The Maryland-National Capital Park and Planning Commission (M-NCPPC) submitted three comments via email pertaining to a master planned trail system along the Broad Run Stream Valley, the quality and uniqueness of woods and hydrologic features at NIHAC, and the potential for future parkland acquisitions. In response to these comments, the scope of the EIS analysis includes impacts to parks and recreation, vegetation and wildlife, and water resources. In addition, NIH will provide M-NCPPC with a copy of the Draft EIS for review and comment.

The Montgomery Country Side Alliance submitted two comments via phone pertaining to increased impervious surfaces and water usage. In response to these comments and the oral comment received during the poster session, the scope of the EIS analysis includes impacts to potable water supply, stormwater and stormwater management, and geology and groundwater.

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2. ALTERNATIVES

2.1 Proposed Action

The Proposed Action is a Master Plan to guide the physical development of NIHAC over the next 20 years. The Master Plan emphasizes quality research and animal care and efficient operations. The Master Plan provides a planning framework for siting and development of facilities. Full execution of the Master Plan would increase the employee population from the current population of 199 to 212 by 2030.

The plan consolidates the research, animal care and support facilities on the northern section of the campus, retaining buildings in good condition and fully utilizing the central utility plant and infrastructure in place. Aging, deteriorating and inappropriate buildings are phased out. On the southern campus, existing resources in good condition are retained and upgraded to current standards.

The Master Plan defines the real property assets that would support the execution of the programs housed at NIHAC and guides new development within the campus in support of the NIH mission. Realization of the Master Plan at any given time will depend on HHS and NIH priorities, governmental policy decisions, as well as budgetary considerations. The Master Plan represents neither the pre-approval of any individual project nor the pre-approval of the particular needs of specific programs to be accommodated on the campus. The Master Plan is, therefore, designed as a flexible framework and a guide for the orderly future development of the campus, if and as it occurs.

2.1.1 *Components of NIHAC Master Plan*

Below is a summary of the new construction, demolition, and other improvements that NIH would execute under the Master Plan. Figure 2-1 presents the vision for the NIHAC campus following completion of all components of the Master Plan. Refer to the 2012 Draft NIHAC Master Plan for additional details.

New Construction, Additions, Renovation, and Demolition

- Shared Imaging and Diagnostic Facility. This facility would provide 43,400 gross square feet (GSF) of clinical support space for researchers, with imaging and procedure rooms, and laboratories. This facility would provide key personnel support spaces, including a data center and shelter-in-place.

- Behavioral Research Facility. This facility would provide 80,800 GSF of flexible animal housing and research space with procedure rooms, cage-wash, personnel support and related services. NIH would use the facility for behavioral research and it would serve to replace aging facilities and accommodate the serious space shortfall expected as a result of the projected increase in research.

- Multi-Species Animal Holding Facility. This facility would provide 103,100 GSF of flexible animal housing with personnel offices and support facilities that would accommodate a projected increase in animal population and replace inappropriate facilities. This facility would include procedure rooms, cage-wash, personnel support, and related services.

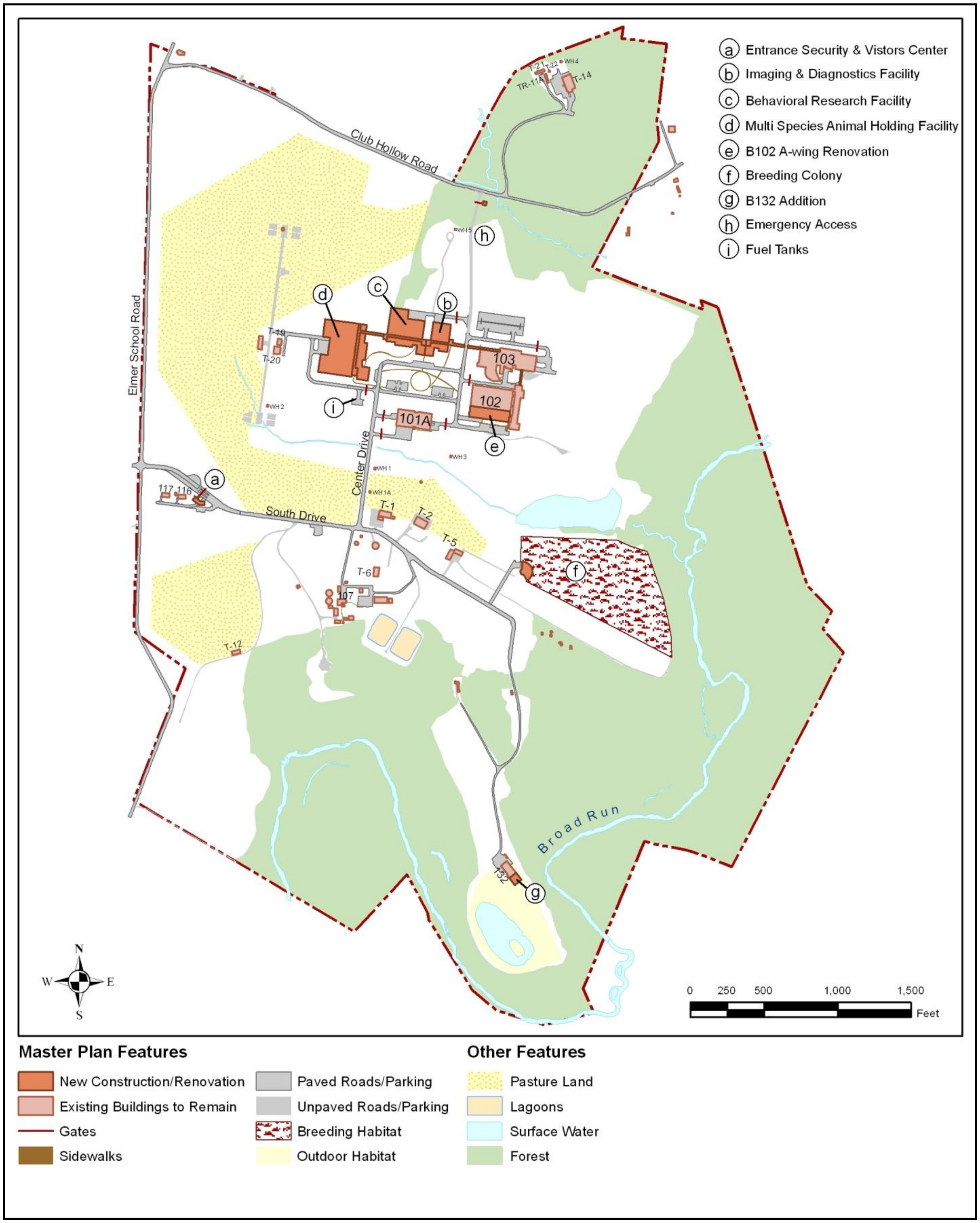


Figure 2-1. Proposed Action – NIHAC Master Plan

- Building 102 A Wing Renovation. NIH would renovate the A Wing of Building 102 to provide animal holding facilities appropriate for NHPs.

- Breeding Colony. This facility would provide 4,200 GSF of shelter, an observation post and open acreage for non-human primate breeding.

- Addition to Building 132. This addition would provide an observation area for non-human primates. The Master Plan would not otherwise modify the existing outdoor habitat.

- Entrance Security and Visitors' Center. This 1,400-GSF facility would allow for reception and screening of visitors and support space for the NIH security personnel.

- Miscellaneous additions and improvements. Interior improvements to Buildings 102 and 103 would upgrade outmoded animal procedure space. NIH would upgrade facilities throughout the campus to meet modern energy and water efficiency standards and would continue to provide ongoing maintenance.

- Demolition. NIH would demolish 29 aging and inefficient buildings, trailers, and temporary facilities throughout the campus for a total of 131,564 GSF of demolition. Figure 2-2 illustrates the proposed scope of demolition. Table 2-1 indicates those existing facilities that would be demolished under the Master Plan versus those that would be retained.

Land Use Plan

The land use plan establishes functional zones within the campus to organize the program. These zones include a campus center, outdoor NHP zones, utility and service zone, entrance and primary circulation, perimeter buffer, residential zone, north parcel support, and open space. The land use plan directs future development while responding to existing building adjacencies, natural features, neighboring influences and the anticipated nature of future facilities. NIH developed the land use plan based on the following principles:

- Consolidation of research and animal care facilities.
- Provision of outdoor areas for NHPs that have privacy and minimal disturbance.
- Reuse and maintenance of viable utilities and services.
- Preservation of open space and natural features.
- Good neighbor policy.

Refer to the 2012 Draft NIHAC Master Plan for additional details.

Landscape Plan

Figure 2-3 depicts the proposed elements associated with the landscape plan, including vegetation restoration, preservation areas and associated water features, and pasture reduction. The goal of the landscape plan is to increase local biodiversity by means such as reducing carbon-based maintenance activities within the campus and ensuring that stormwater is managed in accordance with state and federal requirements. The plan also introduces new landscape elements that harmonize with existing historical landscape patterns, protect agricultural views, restore wildlife habitats and create visually rich, and seasonally appealing, landscape. Refer to the 2012 Draft NIHAC Master Plan for additional details.

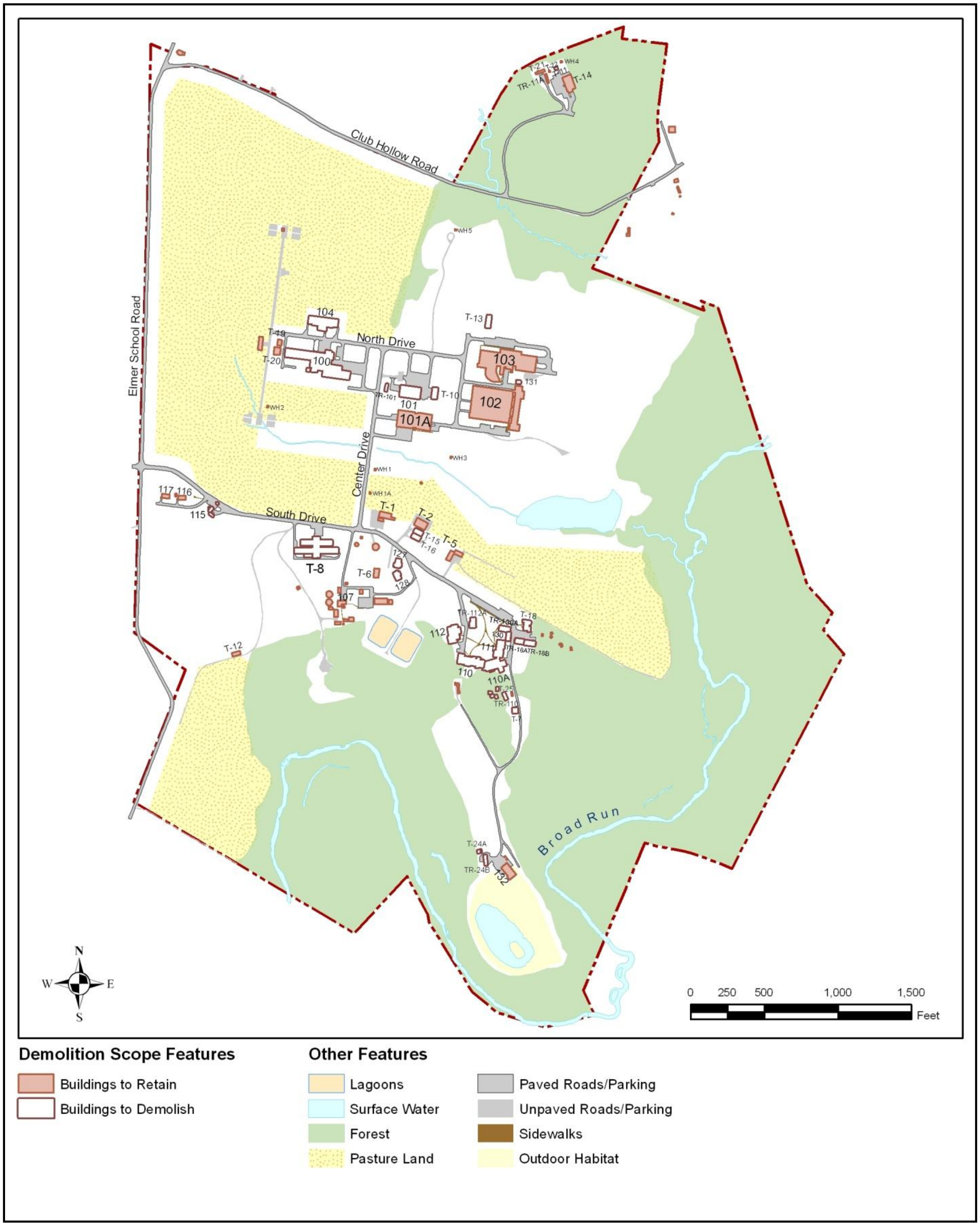


Figure 2-2. Facility Demolition under the NIHAC Master Plan

Table 2-1. Summary of Existing Buildings and Associated Action under the NIHAC Master Plan

Building	Managed By	Primary Use	Construction Year [a]	GSF	Semi-Outdoor	GSF with Semi-Outdoor	Master Plan Action
B100	DVR	Animal Facility	1967	35,055	31,352	66,407	Demolish
B101	ORF	Old CUP; Storage	1967	9,822	--	9,822	Demolish
B101A	ORF	CUP	2003 [b]	44,315	--	44,315	Retain
B102	DVR	Animal Facility	1967	63,244	14,575	77,819	Retain/Renovate
B103	DVR	Animal Facility	1972	90,543	1,880	92,423	Retain
B104	DVR	Animal Facility	1995 [b]	12,081	--	12,081	Demolish
B107	ORF	Treatment Plant	1972	1,870	--	1,870	Retain
B107.x [c]	ORF	Treatment Plant	Unknown	784	--	3,699	Retain
B110	NICHD	Office/Animal Lab	1972	7,758	--	7,758	Demolish
B110A	NICHD	Animal Facility	1988	8,104	--	8,104	Demolish
B111	NICHD	Office/Animal Lab	1972	4,627	--	4,627	Demolish
B112	NICHD	Office/Animal Lab	1972	9,458	3,162	12,620	Demolish
B115	Other	Security	1968	387	--	387	Demolish
B115.1 [d]	Other	Security	Unknown	219	--	219	Demolish
B116	Other	Residential	1974	1,478	--	1,478	Retain
B117	Other	Residential	1974	1,497	--	1,497	Retain
B127	DVR	Animal Facility	1967	1,650	--	1,650	Demolish
B128	DVR	Animal Facility	1967	1,848	--	1,848	Demolish
B130	NICHD	Storage Building	2010 [e]	1,128	--	1,128	Demolish
B131	DVR	Storage Building	1977	351	--	351	Demolish
B132	NICHD	Animal Facility	1989 [b]	5,035	--	5,035	Retain
T1	DVR	Animal Barn	Pre-1960	4,760	--	4,760	Retain
T2	DVR	Animal Barn	Pre-1960	4,346	--	4,346	Retain
T5	DVR	Storage Shed	Pre-1960 [g]	--	3,325	3,325	Retain
T6	Other	Residential	Pre-1960	1,519	--	1,519	Retain
T7	Other	Storage Shed	Pre-1960	--	822	822	Demolish
T8	DVR	Abandoned-Office	1961	19,294	--	19,294	Demolish
T10	ORF	Garage	1968	2,116	--	2,116	Demolish
T11	DVR	Storage Shed	1967	89	--	89	Demolish
T11A	Other	Residential	Unknown	719	--	719	Retain

Table 2-1. Summary of Existing Buildings and Associated Action under the NIHAC Master Plan

Building	Managed By	Primary Use	Construction Year [a]	GSF	Semi-Outdoor	GSF with Semi-Outdoor	Master Plan Action
T12	DVR	Loafing Shed	1975	--	1,512	1,512	Retain
T13	DVR	Equipment Shed	1975	2,151	--	2,151	Demolish
T14	ORF	Warehouse	1979	6,162	--	6,162	Retain
T15	DVR	Storage Building	1978	1,355	--	1,355	Demolish
T16	DVR	Storage Building	1978	1,355	--	1,355	Demolish
T18	NICHD	Abandoned	1983	2,334	--	2,334	Demolish
T19	ORF	Storage Shed	1980	--	1,157	1,157	Retain
T20	DVR	Storage Shed	1980	--	2,199	2,199	Retain
T21	Other	Residential	Unknown	1,033	--	1,033	Retain
T22	DVR	Storage Building	Unknown	97	--	97	Retain
T24A	NICHD	Storage	Unknown	278	--	278	Demolish
T25, 25A-C	NICHD	Storage	Unknown	680	--	680	Demolish
TR18A	NICHD	Office	Unknown	1,666	--	1,666	Demolish
TR18B	NICHD	Office	Unknown	1,829	--	1,829	Demolish
TR24B	NICHD	Office	Unknown	938	--	938	Demolish
TR101	ORF	Office	Unknown	545	--	545	Demolish
TR110	NICHD	Abandoned-Office	Unknown	545	--	545	Demolish
TR112A	NIAAA	Office	Unknown	1,943	--	1,943	Demolish
TR130A	NICHD	Office/Storage	Unknown	1,958	--	1,958	Demolish
W107-ST8 [f]	DVR	Storage Building	Unknown	271	--	271	Retain
WT19-WT20 [f]	DVR	Storage Shed	Unknown	--	2,479	2,479	Retain
TOTAL	--	--	--	**361,607**	**62,463**	**424,070**	--

Notes:

General – Where conflicts exist on the construction year, it is assumed that the 2009 Asset Detail Report year supersedes the information reported by the facility managers, and the 1996 Master Plan supersedes all other information, unless otherwise noted. The square footages indicated are based on measurements from computer-aided design (CAD) files obtained from NIH. Where CAD files do not exist, outlines were prepared from aerial photographs and matched with other sources to obtain the best estimate.

a – Construction year has been noted as per the 1996 Master Plan document, unless otherwise noted.

b – Construction year noted from the 2009 Asset Detail Report prepared by VFA, Inc.

c – The B107.x represents the five ancillary buildings in the treatment plant complex. This is not an official NIH designation. It has been used to serve as a reference within this document. The square footages shown are the totals for all five buildings.

d – This building is a temporary structure intended to serve as a swing space for the security building (115). The 115.1 designation is not assigned by NIH. It has been used to serve as a reference within this document.

e – This building was originally constructed in 1968 as a greenhouse. In 2010, the building was reconstructed on the same foundation and converted into an unconditioned storage building. This information was provided by NICHD Facilities Manager.

f – This is not an official NIH designation. It has been used to serve as a reference within this document.

g – This building appears to have undergone extensive renovation in recent years.

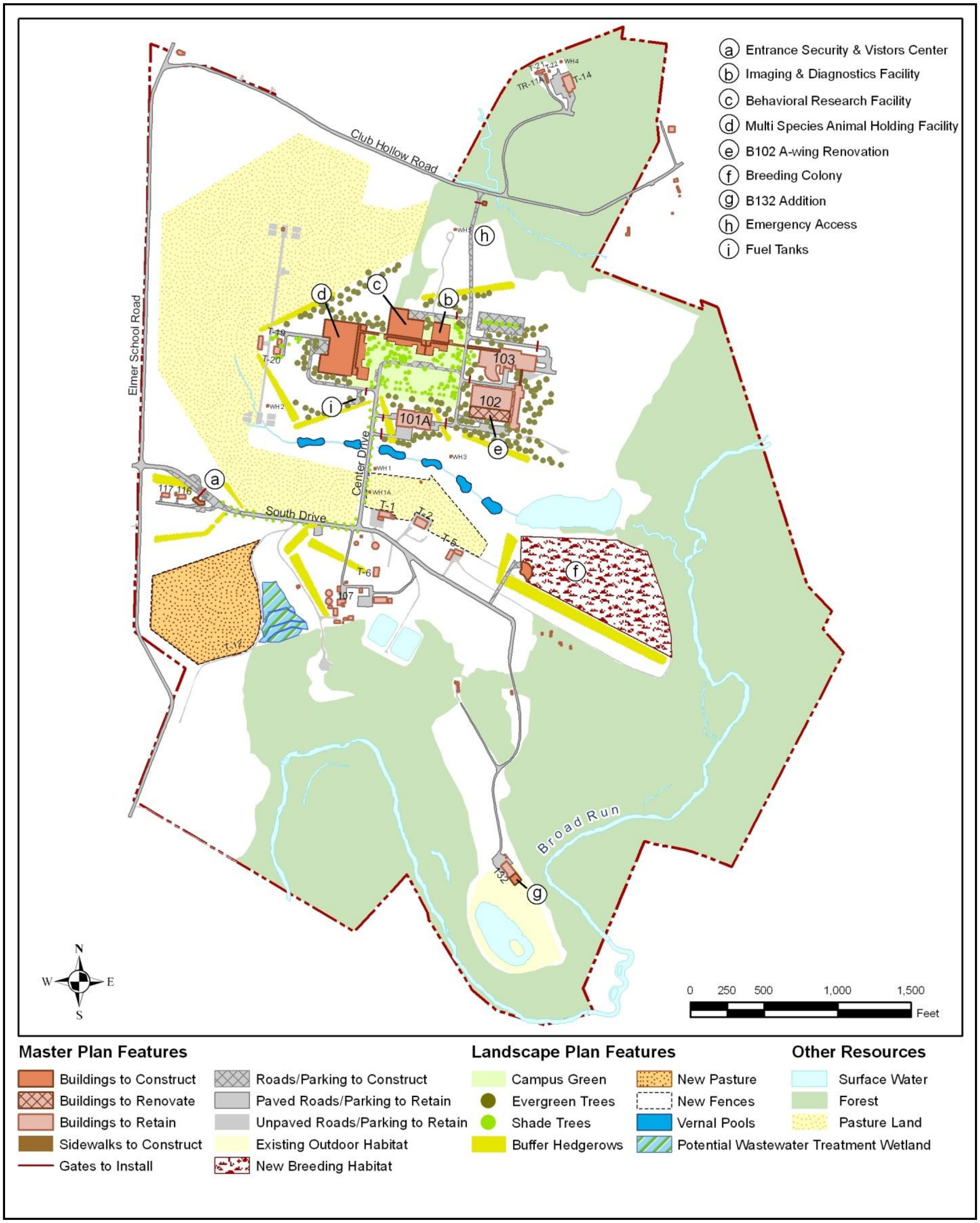


Figure 2-3. Landscape Plan under the NIHAC Master Plan

Parking and Circulation Plan

The planned improvements at the NIH campus that consolidate activities and facilities on the north campus also would incorporate various modifications to the parking layout, security entrance, and access points, as well as make various other transportation improvements to the network. NIH would implement the parking and circulation plan in phases that would parallel related facility construction. Refer to the 2012 Draft NIHAC Master Plan for additional details.

Engineering and Site Utilities

The planned improvements to the site utilities would improve performance while accommodating the anticipated growth at NIHAC by replacing aging and energy-inefficient buildings and fully utilizing the capacity of the recently-constructed Central Utility Plant (CUP), Building 101A. The Master Plan encompasses the following improvements to the site utility systems.

- Heating and Cooling Systems. Under the Master Plan, chilled water and steam from the CUP would supply all major facilities on the north campus. The two proposed facilities located on the south campus (entrance security and the shelter for the NHP breeding colony) would have energy efficient dedicated mechanical systems and would use alternative energy sources to generate both heat and electricity, where feasible. The Master Plan would install two additional below-grade, vaulted fuel tanks to support the CUP. Per guidance from the U.S. Environmental Protection Agency (USEPA), these vaulted tanks would be considered aboveground storage tanks (ASTs).

- Electrical System. The existing electrical infrastructure and emergency generators have sufficient capacity to support the growth associated with the Master Plan. Construction of new facilities in the north campus likely would require rerouting of the incoming electrical service from Club Hollow Road.

- Potable Water System. NIH expects the Master Plan to generate an overall increase in potable water demand due to increased campus populations of both humans and NHPs as well as the increased steam demand. To stay within the permitted allowance of 90,000 gallons per day (gpd), NIH would implement the following measures to reduce the peak flow demand: take measures to conserve water and reduce projected future potable water use by 15 percent; reduce future steam loads through energy conservation and heat recovery by 20 percent; repair additional system leaks and maintain a leak monitoring system; and expand the use of non-potable water to reduce potable water use for certain applications.

- Non-Potable Water System. With the planned development on the north campus under the Master Plan, the make-up water rate for the cooling tower system would increase by approximately 42 percent. The Master Plan would improve the treatment of non-potable water (i.e., gray water) to reduce this water demand. The Master Plan would reduce the total dissolved solids (TDS) content of gray water used in the cooling towers by installing a scale inhibiting system to mitigate the build-up of scale on the condenser water piping system. As illustrated in Figure 2-3, the Master Plan also could include construction of a wetland adjacent to the wastewater treatment plant (WTP) to further reduce the TDS content of gray water. This approach, however, requires further evaluation by NIH to determine whether it is a technically feasible and practical solution for improving the quality of gray water at NIHAC.

- Sanitary System. The campus WTP is at, or beyond, its capacity with the current development on the site. The Master Plan recommends installation of an additional filter at the WTP to increase the treatment capacity. The Master Plan also would construct a shed over the drying bed for sanitary sludge to protect it from the elements. Installation of the new filter, combined with implementation of the potable water conservation measures described earlier for existing and proposed facilities, should provide sufficient capacity to accommodate wastewater generated at NIHAC. However, if these measures are not implemented or the actual building designs result in greater than anticipated flows, the WTP would likely require replacement or a major component upgrade. Such an upgrade would require additional planning to define the scope of necessary improvements and cannot be defined with precision within this Master Plan.

- Stormwater System. There appears to be adequate capacity in the stormwater system to support the Master Plan. The Master Plan would implement a rain capture and re-use system for new buildings to minimize the potable water usage of the site.

Refer to the 2012 Draft NIHAC Master Plan for additional details.

Security Plan

The Master Plan would provide an entrance security and screening center, 100-foot vehicle separation from buildings, access control at loading docks, perimeter fence repair, and an emergency access for the campus to meet recently enacted safety requirements for government facilities. Refer to the 2012 Draft NIHAC Master Plan for additional details.

Sustainable Design Plan

The Master Plan incorporates sustainable design and energy efficiency as core principles. Daylighting, energy efficiency, water efficiency, stormwater management, vehicle-trip reduction, adaptive reuse, heat gain and wind moderation, landscape stewardship, appropriate planting, and renewable energy are key site-specific strategies that would be implemented under the sustainable design plan. Refer to the 2012 Draft NIHAC Master Plan for additional details.

2.1.2 *Phasing of NIHAC Master Plan*

Twenty years is the projected timeframe for implementation of the Master Plan. NIH has prioritized components of the Master Plan and structured it into four development phases. The first phase consolidates a number of projects and initiatives that have already been in planning stages, including the demolition of unused and underutilized buildings and renovation for which there is a preliminary design in place. The second phase addresses a priority need for an on-campus Shared Imaging and Diagnostics Facility with the construction of common services and connection to the existing Building 103. The third phase establishes the consolidated campus by building a Behavioral Research Facility. The fourth and final phase encloses the fourth side of the campus green by adding animal holding facilities to accommodate growth in the animal programs currently administered by DVR. Figure 2-4 through Figure 2-7 depict the phasing of the Master Plan. Refer to the 2012 Draft NIHAC Master Plan for additional details.

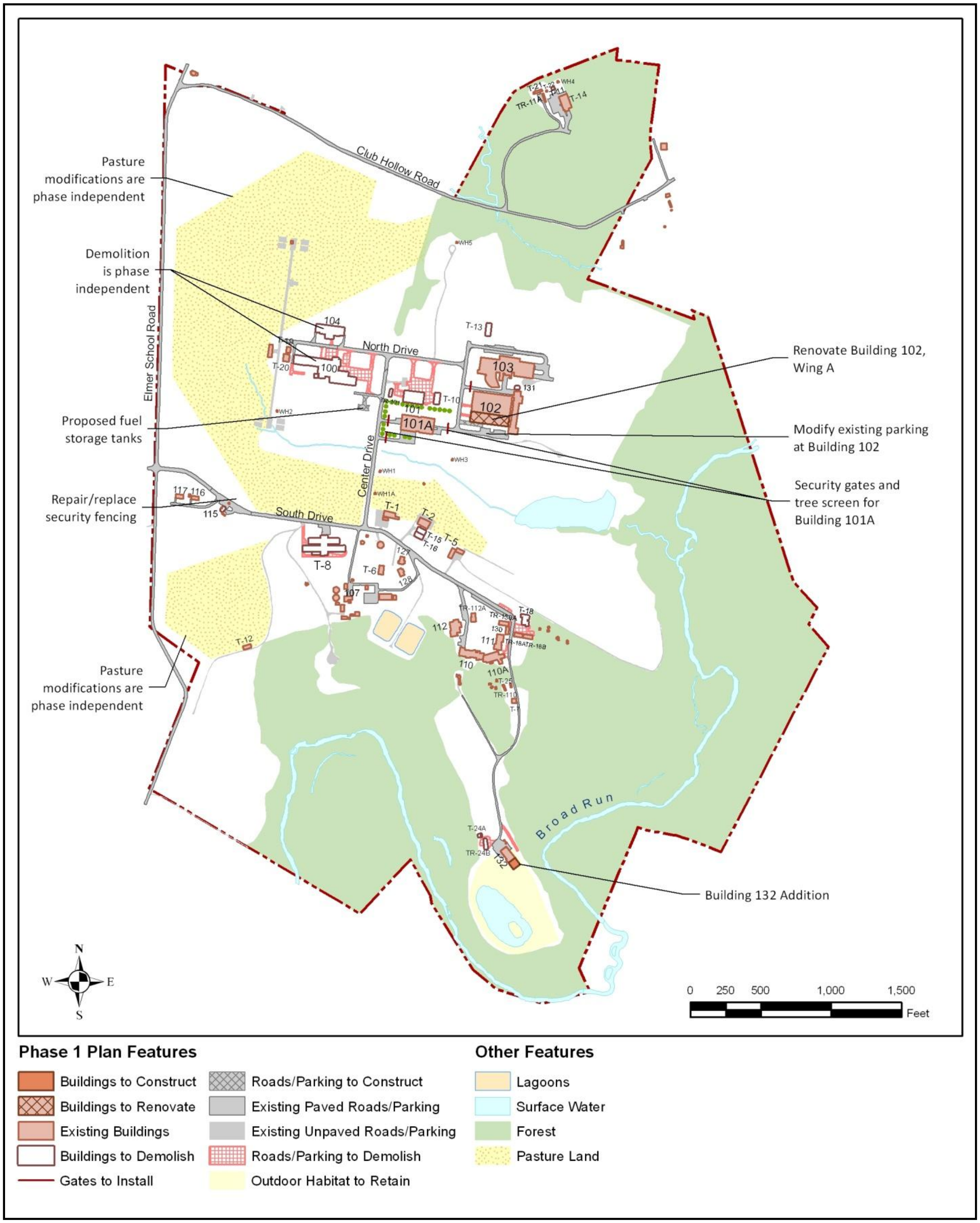


Figure 2-4. Phase 1 of the NIHAC Master Plan

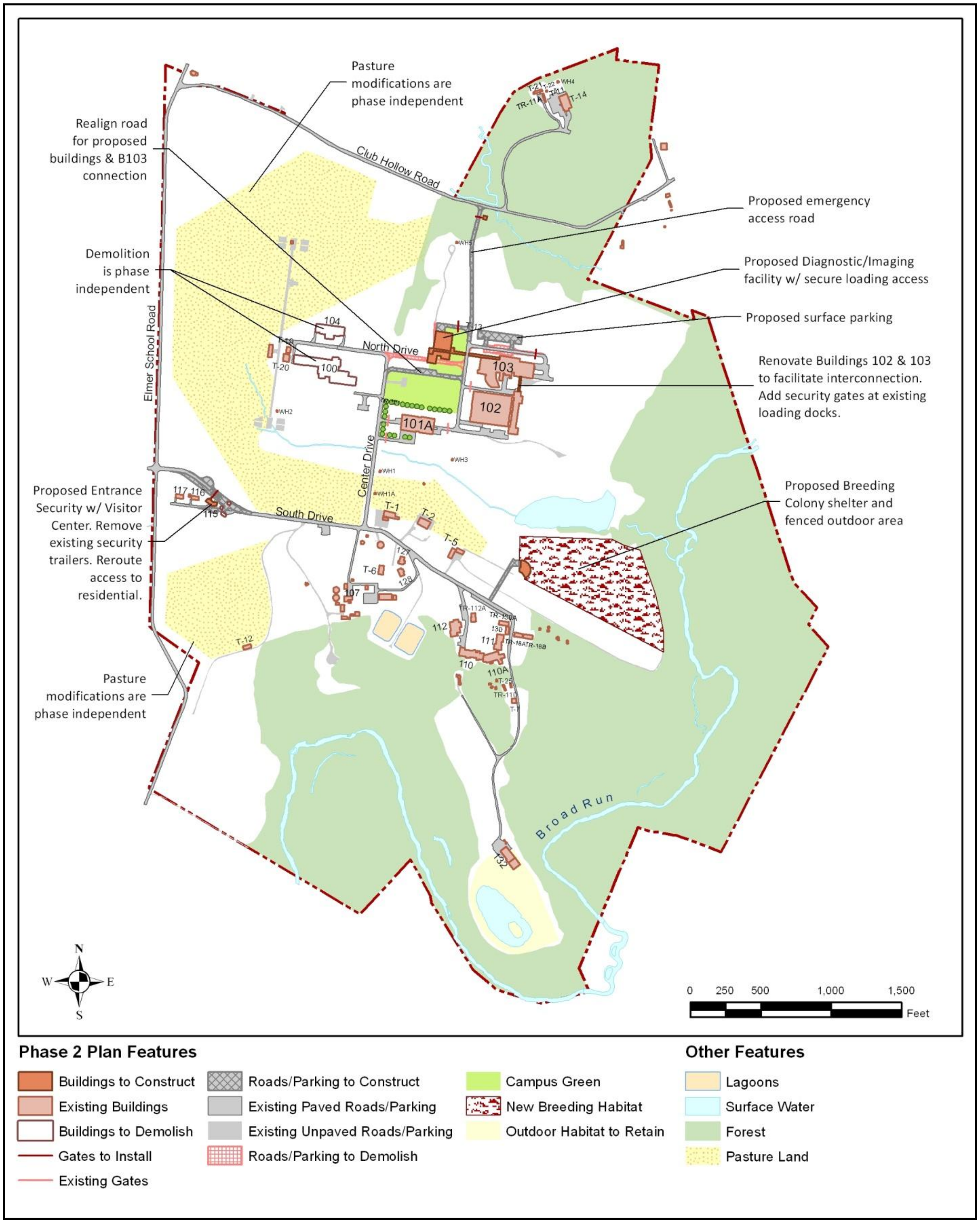


Figure 2-5. Phase 2 of the NIHAC Master Plan

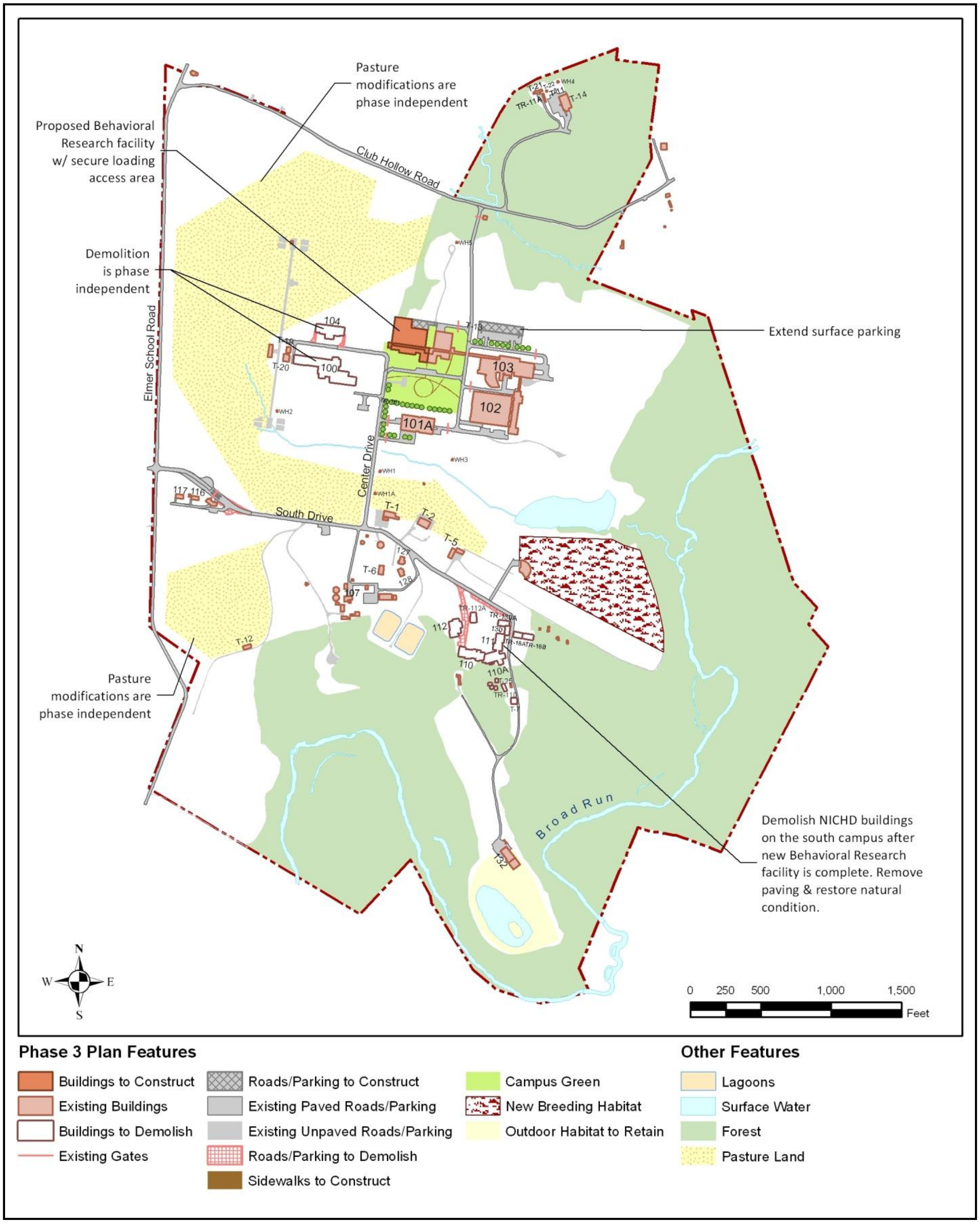


Figure 2-6. Phase 3 of the NIHAC Master Plan

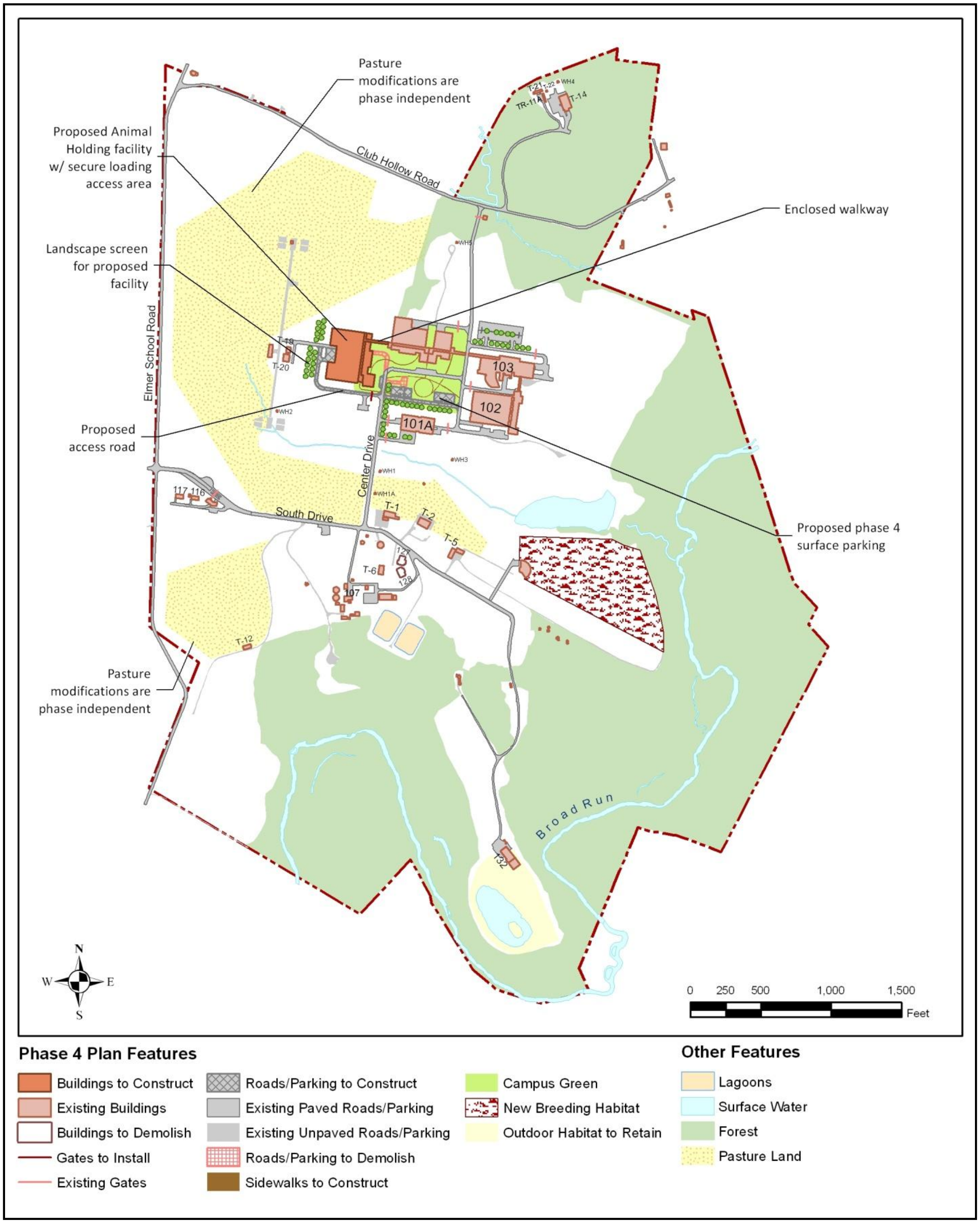


Figure 2-7. Phase 4 of the NIHAC Master Plan

2.1.3 *Selection of NIHAC Master Plan as the Proposed Action*

NIH chose the NIHAC Master Plan as the Proposed Action because it would meet the purpose and need described in Section 1.2 in the following ways:

- New development would optimize the value of the NIHAC campus as an animal research support resource by providing state-of-the-art animal facilities that would afford flexibility and provide multi-species animal housing. The new animal laboratory facilities would support a wide range of animal species and research protocols and allow for expanded diagnostic procedure space and imaging capabilities.

- New development would proceed in a manner that results in an appropriate scale, density, and character for the site by ensuring the protection of the charming rural character and views associated with the campus. The Master Plan would consolidate the built elements and restore natural landscaping to areas of pastureland that are no longer needed and to areas where demolition occurs.

- New development would ensure appropriate campus and facility utilization by incorporating a building location convenient for shared access by researchers and would increase the connectivity between old and new buildings, thereby encouraging personnel interaction and improving the efficiency of animal movement.

- The guiding principles of the plan, which designate clustering of buildings surrounded by green space and increasing connectivity and shared services, can be maintained while allowing for flexible growth that would conform to the evolving needs of NIH.

- New development would tie into the existing utility services, utilize the CUP and increase overall energy efficiency by linking the branched utility lines into a complete utility loop, which would eventually provide for redundancy in service delivery. New development would incorporate sustainable design techniques to promote energy and water efficiency.

2.2 <u>No-Action Alternative</u>

The No-Action Alternative would not implement the NIHAC Master Plan. The No-Action Alternative would maintain the present course of action at NIHAC by continuing ongoing research, management, and maintenance activities. The No-Action Alternative would not affect the number of employees at NIHAC.

The No-Action Alternative would include the execution of certain projects that are expected to receive funding (or have already been funded) prior to finalization of the Master Plan. These include the following, as illustrated in Figure 2-8:

- Installation of two 50,000-gal, below-grade vaulted ASTs at the CUP, which would double the capacity of fuel supply for the boilers and emergency generators.

- Continued detection and repair of leaks in the potable water system.

- Consolidation and elimination of one building (T18) and six trailers (TR18A, TR18B, TR101, TR110, TR112A, and TR130A).

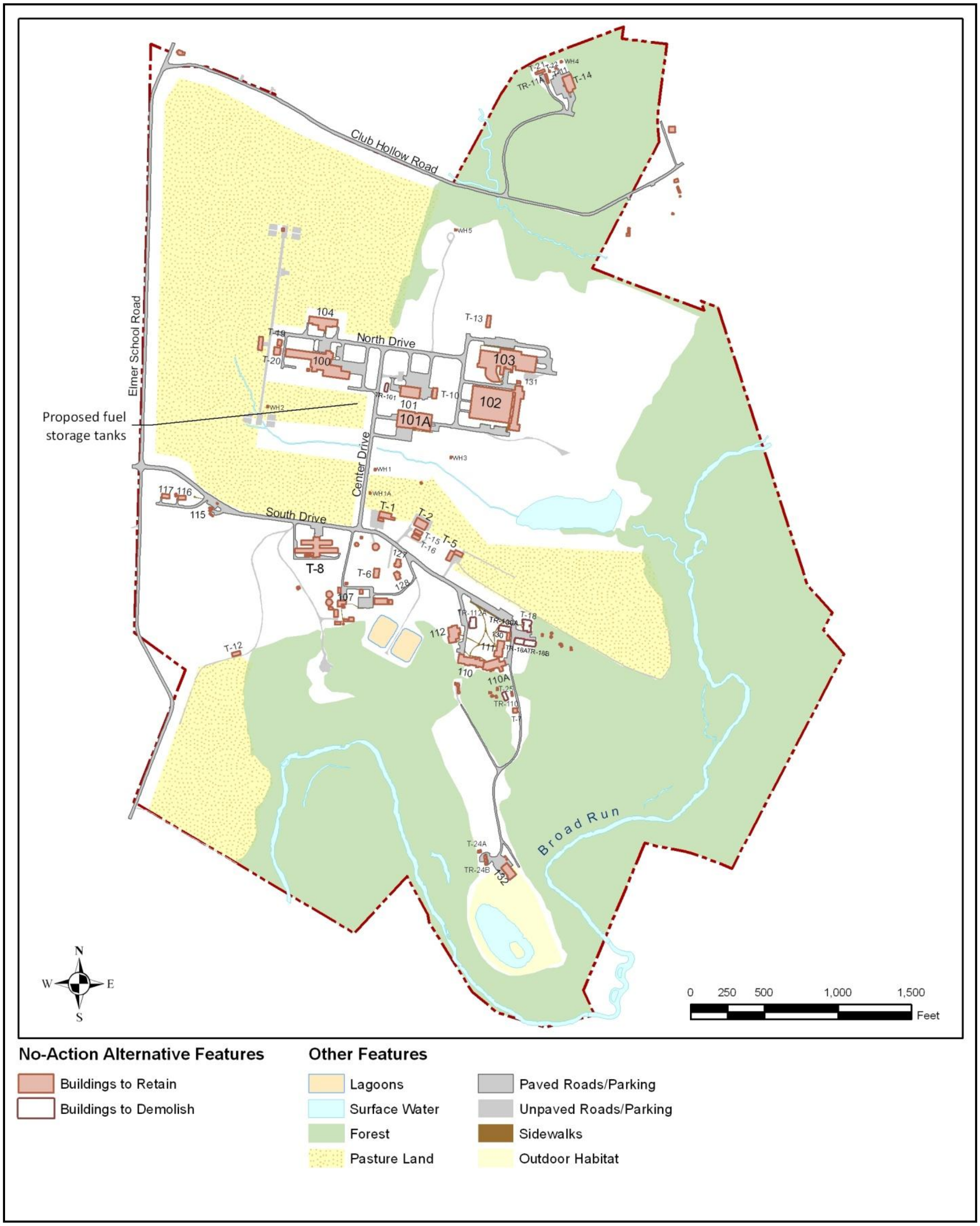


Figure 2-8. No-Action Alternative

Section 3 (Affected Environment and Environmental Consequences) discusses the potential environmental impacts and consequences of the Proposed Action and the No-Action Alternative. The No-Action Alternative would not meet the purpose and need criteria defined in Section 1.2 (Purpose and Need). As a result, NIH considered the No-Action Alternative to be less desirable than the Proposed Action.

2.3 Alternatives Considered but Not Carried Forward

NIH considered two additional Master Plan alternatives but rejected them from further consideration based on conflicts with the purpose and need described in Section 1.2. These other alternatives are illustrated in Figure 2-9 and Figure 2-10 and are described below.

Independent Concept

NIH considered organizing the campus in such a way that the clusters of buildings remain the same as current, with NICHD in the south and DVR primarily in the north. This alternative would retain most of the existing buildings, but modernize and expand them to accommodate shortfall and functional issues. This alternative would add new buildings for offices, animal holding, and employee amenities to each cluster to meet future needs. This alternative would renovate several of the inefficient buildings, notably Buildings 100 and 104, and adapt them to serve as housing for NHPs. There would be little change in the rural, farm-like atmosphere of the campus, even with the introduction of new structures. This concept would reuse campus architectural resources, minimizing demolition. This approach retains the distinct identities of DVR and NICHD and allows each to expand and renovate at its own pace.

Despite the modernization of retained buildings, however, the Independent Concept would not resolve existing issues associated with inefficient facilities, less flexible configuration, and distribution of animal holding and support space. Improvements to energy use and infrastructure would be difficult to accomplish under this concept. With this concept there is an estimated 30 percent premium in energy use as compared to that of the Proposed Action, which would conflict with NIH's energy efficiency and sustainability goals in accordance with EISA 2007, HHS directives, and the Guiding Principles. This concept may involve the gradual implementation of smaller projects, which would require careful phased planning to minimize disruption to operations and stress on animals and could conflict with NIH's research and animal care provisions goals. Therefore, NIH dismissed this alternative from further consideration.

Independent and Shared Nucleus Concept

NIH also considered retaining the north and south clusters, similar to the Independent Concept, and creating a shared amenity and diagnostic facility equidistant between them. This alternative would replace inefficient and deteriorating NICHD buildings along South Drive, together with buildings for offices and animal holding. This alternative would add new DVR buildings to the north campus to accommodate growth, and modernize and expand Buildings 102 and 103 to meet current needs. This alternative would retain the distinct identities for DVR and NICHD, but would draw them together physically and symbolically with the new shared services building. Upon entry to the campus, the shared services building would be the first visual image of modern, improved research support, before the road branches to DVR or to NICHD. Much of the animal housing and support would be in new facilities, creating more flexibility. Although the facilities in the South cluster are far from the CUP, their new construction would have energy efficient systems.

The separate clusters of facilities provided under the Independent and Shared Nucleus Concept, however, would require walking or transportation for personnel to reach amenities as well as for animal diagnostics and imaging. Therefore, this concept would not be consistent with the purpose of establishing an efficiently organized campus that minimizes disruptions to mission and activities. Careful planning would be necessary to minimize potential for disturbance to NICHD operations during construction, which could conflict with NIH's research and animal care provisions goals. Even with new facilities, there would be an estimated 10 percent premium in energy use in comparison with the Proposed Action, which would not align as well as the Proposed Action with NIH's energy efficiency and sustainability goals in accordance with EISA 2007, HHS directives, and the Guiding Principles. Therefore, NIH dismissed this alternative from further consideration.

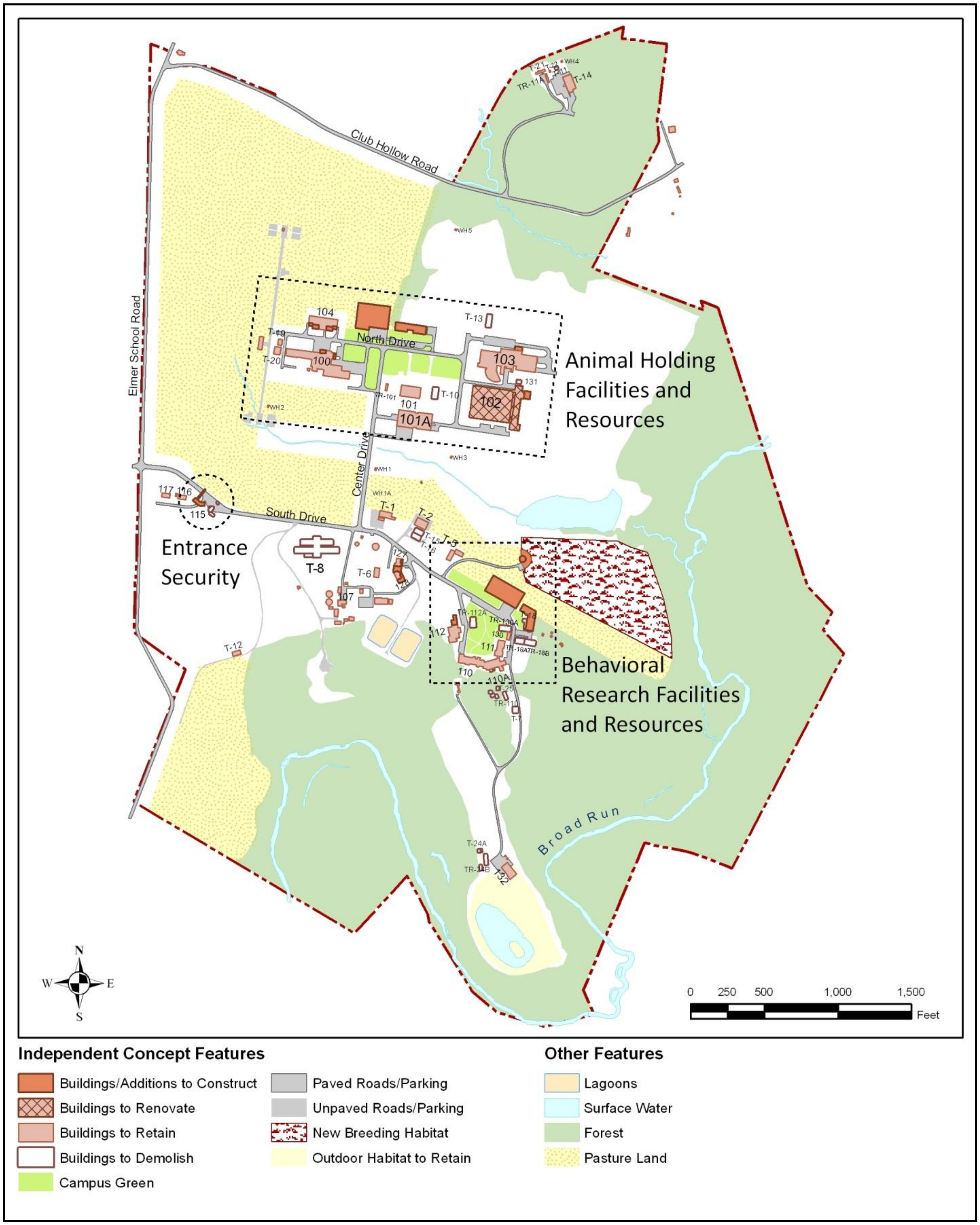


Figure 2-9. Other Alternative Considered – Independent Concept Master Plan

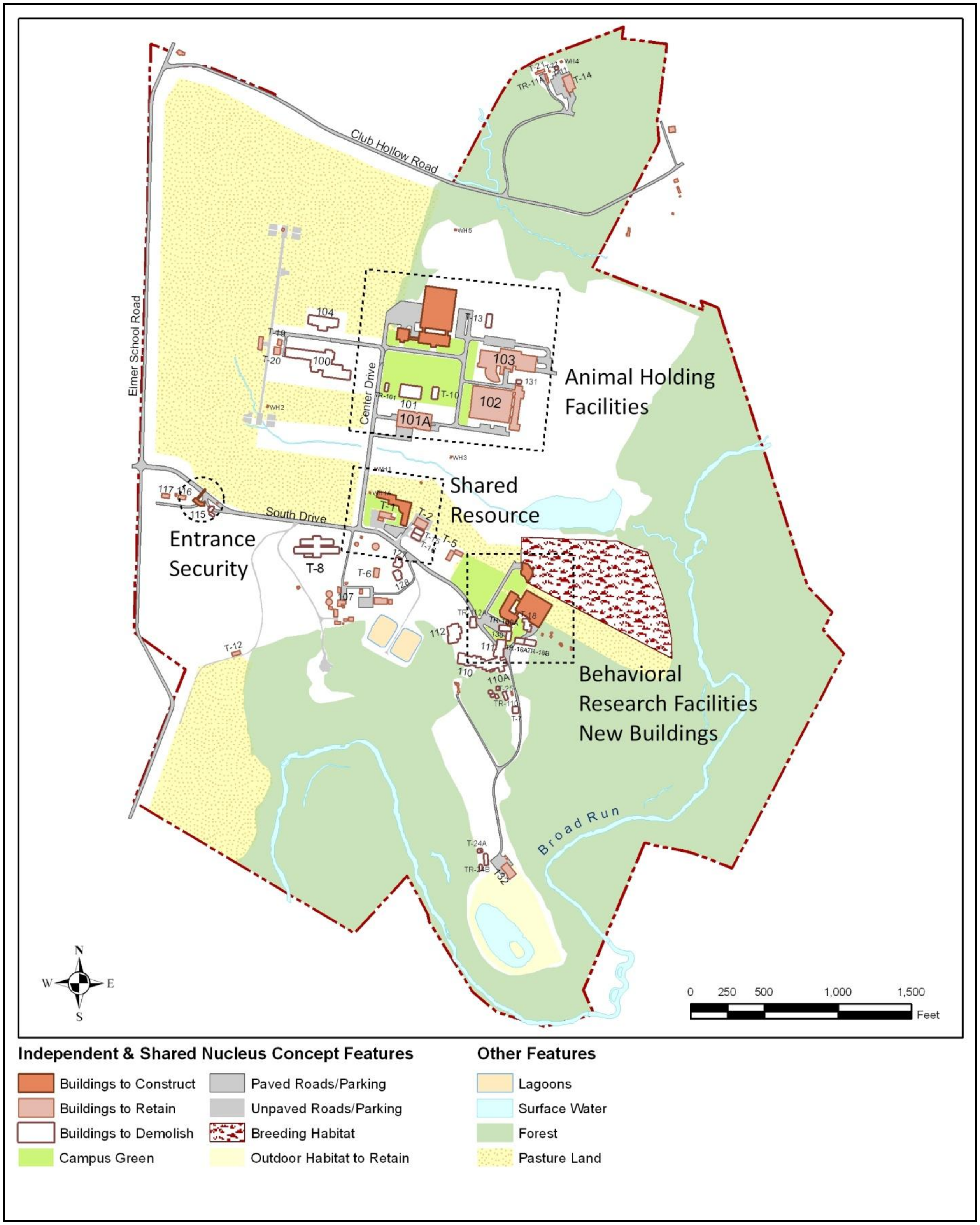


Figure 2-10. Other Alternative Considered – Independent and Shared Nucleus Concept Master Plan

3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 Land Use and Socioeconomics

3.1.1 *Land Use and Regional Planning*

Background

Land use planning helps determine the best use for each parcel of land in an area. Zoning regulations or other means can then be used to control how the land is used. Zoning designates various parcels of land for certain uses. Land use planning may take into account geological, ecological, economic, health, and sociological factors. Proper land use can decrease development and sustainment costs, traffic congestion and commute times, air pollution, energy consumption, the loss of open space and habitat, inequitable distribution of economic resources, and the loss of a sense of community. Community sustainability requires proper land use planning to create and maintain livable environments.

A number of local government entities operate in the region providing planning and development guidance, promoting economic development, administering transportation and infrastructure development, and facilitating intergovernmental cooperation. These include the following:

- The Metropolitan Washington Council of Governments (MWCOG) is an independent, non-profit association that helps address and solve regional issues, such as the environment, affordable housing, and transportation, through the development of policy and programs. MWCOG comprises 22 units of local government (including Montgomery County), members of the Maryland and Virginia legislatures, and members of the U.S. Congress.

- The National Capital Planning Commission (NCPC) serves as the central planning agency for the federal government in the National Capital Region (NCR), which includes the District of Columbia and parts of Maryland, Virginia, and West Virginia. NCPC focuses on preserving the region's natural and historic features by developing and updating the *Comprehensive Plan for the National Capital Region* and creating, reviewing, and providing advice on long-range plans, planning policies, and projects that impact the Capital and surrounding areas. NCPC also coordinates the planning efforts of federal agencies within the NCR and provides recommendations for federal public works through the Federal Capital Improvements Program.

- M-NCPPC acquires, develops, maintains, and administers a regional system of parks within Montgomery and Prince George's Counties and provides land use planning for the physical development of the two counties. Within the M-NCPPC, there is a five-member Montgomery County Planning Board, which is responsible for setting land use and protecting parkland resources throughout the county.

- The Town of Poolesville has no formal jurisdiction over the NIHAC campus; however, it is the nearest "place" as defined by the U.S. Census Bureau with respect to the campus. The Town's Master Plan, adopted in February 2005, focuses on a strong desire to maintain a small town feel and preserve, protect, and enhance historic qualities.

Affected Environment

The NIHAC campus, owing to its federal ownership, is generally exempt from local regulations and plans. The federal government, however, has instituted the "Good Neighbor Program" through the General Services Administration (GSA) to ensure quality work environments for the employees of Federal agencies by helping to revitalize the nation's communities. To comply with this GSA initiative, NIH should consider local plans and requirements to ensure that future campus development is not in conflict with recent regional planning initiatives.

Montgomery County has had considerable success in preserving open space and agricultural land despite economic pressure to develop in the Washington Region. The county's long-standing policies in favor of land acquisition for parkland and conservation and its support for maintaining agriculture as a viable and productive industry have prevented aggressive development of open land. The *Montgomery County General Plan*, developed by M-NCPPC in 1964 and updated in 1993, identifies four development areas, each with a specific planning directive regarding development. The NIHAC campus is located within the Agricultural Wedge. This central feature of Montgomery County's General Plan has successfully implemented Transfer of Development Rights (TDR) to designate 93,000 acres, including the NIHAC campus, as an Agricultural Reserve to ensure the preservation of land and farming activity in perpetuity.

To implement the TDR program, the Montgomery County Planning Board established the Rural Density Transfer (RDT) Zone in the Martinsburg Planning Area. The purpose of the RDT Zone is to promote agriculture as the primary land use and protect farmland and open space in rural areas of Montgomery County. The NIHAC campus is located within the RDT Zone, which promotes agriculture as its primary land use. While the mix of animals kept at the campus has changed over time, the facility retains a rural character with low profile buildings and large swaths of pastures typical of the surrounding agricultural area.

Land use in the immediate vicinity of the NIHAC campus includes the Broad Run Stream Park to the south and east and the Chesapeake and Ohio (C&O) Canal National Historical Park to the south. These areas are primarily wooded or open space and are used for recreation or agriculture. The Montgomery County Police Department uses the property immediately west of the NIHAC site as a firing range.

The nearest concentration of residential neighborhoods and commercial retail is in and immediately surrounding the Town of Poolesville. The Town has experienced considerable residential growth and its growth is expected to continue as its single-family neighborhoods expand. There are eight subdivision projects approved by the Montgomery County Planning Board within three miles of the NIHAC campus. In total, these subdivisions include development of over 1,125 acres. Additional details regarding the size, location, and development type may be found in the NIHAC Master Plan. While residential density in the area is increasing, commercial development within the Town is restricted to a few small shopping centers.

Direct and Indirect Effects

<u>Proposed Action</u>

The Master Plan's land use plan provides a framework to help organize future development at NIHAC so that similar land use types are consolidated while open space and natural features are preserved. NIHAC would exhibit the same basic types of land use as it does currently, but in a slightly different configuration. The Master Plan does not propose any land use changes outside NIHAC. Therefore, the NIHAC campus is anticipated to remain consistent with the county plan and zoning regulations.

Prior to finalization, the NIHAC Master Plan will be reviewed by NCPC for conformity with the *Comprehensive Plan for the National Capital Region*. Additionally, the Master Plan will be subject to review and approval by the Montgomery County Planning Board.

No-Action Alternative

The No-Action Alternative would not impact land use. NIHAC would remain consistent with county plans and zoning regulations.

Cumulative Effects

Land use in the vicinity of NIHAC is changing slightly from agricultural to residential due to the expected construction of eight subdivisions, as described above. The Master Plan is not expected to encourage or conflict with any such changes in land use in the vicinity of NIHAC and will have no effect on land use or land use planning.

3.1.2 *Social Resources*

Background

Social resources consist of elements of the environment integral to personal and community dynamics, including population, housing, and education. Access to these resources is essential to maintaining sustainable communities.

A subset of social resources is environmental justice. Environmental justice considers sensitive populations, such as children, minorities, and low-income communities. Executive Order (EO) 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, serves to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations. EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*, states that federal agencies shall identify and address environmental health and safety risks from their activities, policies, or programs that may disproportionately affect children. EO 13045 is commonly referred to as "Environmental Justice for Children."

Affected Environment

According to the 2010 U.S. Census, Montgomery County has a population of 971,777. Overall population trends and demographic characteristics in Montgomery County show that the local population is increasing, but the rate of increase is slowing based on census data and M-NCPPC projections. Record-high level births to county residents and high immigration from other countries may contribute to population growth observed within the county (Montgomery County DEP, 2010). Sensitive populations, such as low-income, minority, foreign-born, children or Native American populations, are present within Montgomery County. However, prevalence is lower in the area surrounding NIHAC (i.e., ZIP Code 20842) than in Montgomery County as a whole. Population distribution and trends in Montgomery County are shown in Table 3-1.

Table 3-1. Demographic and Housing Characteristics for NIHAC, Montgomery County, and Maryland (2000-2010)

	NIHAC/ Surrounding Area [a]		Montgomery County				Maryland			
	2000		2000		2010		2000		2010	
	Number	%	Number	%	Number	%	Number	%	Number	%
Population Characteristics										
Total Population	1,848	--	873,341	--	971,777	--	5,296,486	--	5,773,552	--
Under 5 years	107	5.8	60,173	6.9	63,732	6.5	353,393	6.7	364,488	6.3
18 years and over	1,426	77.2	681,583	74.6	738,247	75.9	3,940,314	74.4	4,420,588	76.6
65 years and older	256	13.9	91,157	11.2	119,769	12.3	599,307	11.3	707,642	12.3
White	1,595	86.3	565,719	64.8	558,358	57.5	3,391,308	64.0	3,359,284	58.2
Minority	253	13.7	337,682	38.7	413,419	42.5	1,905,178	36.0	2,414,268	41.8
Housing Characteristics										
Total housing	747	--	334,632	--	375,905	--	2,145,283	--	2,378,814	--
Occupied units	701	93.8	324,565	97.0	357,086	95.0	1,980,859	92.3	2,156,411	90.7
Vacant units	46	6.2	10,067	3.0	18,819	5.0	164,424	7.7	222,403	9.3
Median value ($)	257,100	--	221,800	--	--	--	146,000	--	--	--

Source: U.S. Census Bureau, 2012.

a – Only limited data are available on the 2010 Census at this time. For the purposes of this comparison, "Surrounding Area" consists of the area within ZIP Code 20842.

Residential housing within Montgomery County includes single-family homes, apartments, condominiums, and townhouses. The 2010 Census reported a total of 375,905 housing units within Montgomery County with only a 5 percent vacancy rate, which is lower than the state vacancy rate of 9.3 percent. Reflecting current population trends, housing in Montgomery County is increasing, but the rate of increase is slowing. According to the 2000 Census, median housing values are considerably higher in the area surrounding NIHAC than in Montgomery County (13.7 percent higher) and Maryland as a whole (43.2 percent higher). Housing occupancy and trends in Montgomery County are shown in Table 3-1. Please refer to Section 3 (Regional Analysis) of the NIHAC Master Plan for additional data, tables, and graphs.

Educational resources in the area surrounding NIHAC include public schools. Schools within a 15-minute driving radius of the NIHAC campus include Poolesville Elementary School, Monocacy Elementary School, John Poole Middle School, and Poolesville High School. While county projections show that enrollment at the middle school and high school may moderately decrease through 2018, enrollment at the elementary schools is anticipated to increase slightly. Currently, student enrollment at Poolesville High School is exceeding the existing capacity. However, county projections forecast a decreasing student enrollment at the high school to a level matching the school's capacity by the 2015/2016 school year. Capacity at the elementary and middle schools is adequate to support projected changes in student enrollment (Montgomery County Public Schools, 2011).

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to have a minimal effect on the population, housing, and education trends in the surrounding area due to the minimal increase in number of staff from 199 personnel to 212 personnel over the projected 20-year timeframe. Some of these new staff members are likely to move to Montgomery County, and possibly the Poolesville area, from outside of the region. Housing and educational resources in the area are expected to have more than sufficient capacity to accommodate the minimal increase in demand associated with the Master Plan with no associated disruptions to school enrollment projections.

The area surrounding NIHAC does not include any identifiable communities or neighborhoods disproportionately composed of children, minority, or low income populations. As a result, the Master Plan would not result in disproportional impacts to these communities.

No-Action Alternative

The No-Action Alternative would have no effect on the population (including sensitive populations), housing, or educational resources in the surrounding area.

Cumulative Effects

As discussed above, population and housing levels in Montgomery County and the NIHAC vicinity are increasing and this trend is expected to continue. However, existing social resources, such as schools and housing, have adequate capacity to support the community.

The Master Plan would only minimally influence these trends and would have minimal effect on social resources.

3.1.3 *Economic Resources*

Background

Economics analyzes the production, distribution, and consumption of goods and services. Economic drivers are industries, such as manufacturing and agriculture, which direct and push the economy by providing jobs, goods and services. Economic indicators allow analysis of economic performance and predictions for future performance. Common economic indicators include income, poverty rate, and employment rate.

Affected Environment

Several major economic drivers in Montgomery County support a viable economy. Due to the county's proximity to Washington, DC, the federal government provides a number of employment and economic opportunities to the area through a variety of governmental agencies, such as NIH, the Food and Drug Administration, and the National Institute of Standards and Technology. The county is also home to numerous government contracting companies, providing employment opportunities in the biotechnology and defense industries (Montgomery County Department of Economic Development, 2009). The number of jobs at retail and commercial centers in Montgomery County is expected to increase by approximately 33 percent by 2030 (Montgomery County Planning Department, 2011). In addition, as described in Section 3.1.1 (Land Use and Regional Planning), Montgomery County has placed a priority on maintaining its historic agricultural industry through the establishment of its Agricultural Reserve. Employment by industry in Montgomery County is shown in Table 3-2.

Table 3-2. Montgomery County Employment by Industry (2006-2010)

Industry	Civilian Employed Population	
	Number	Percent (%)
Professional, scientific, and management, and administrative and waste management services	113,092	22.1
Educational services, and health care and social assistance	107,082	20.9
Public administration	54,519	10.7
Arts, entertainment, and recreation, and accommodation and food services	40,783	8.0
Retail trade	38,795	7.6
Finance and insurance, and real estate and rental leasing	37,311	7.3
Other services, except public administration	36,102	7.1
Construction	29,992	5.9
Information	19,603	3.8
Manufacturing	15,661	3.1
Transportation and warehousing, and utilities	11,264	2.2
Wholesale trade	6,475	1.3
Agriculture, forestry, fishing and hunting, and mining	803	0.2

Source: U.S. Census Bureau, 2012.

As shown in Table 3-2, the leading industries in Montgomery County are professional, scientific, and management services and educational services, health care and social assistance. This is in large part due to the presence of NIH and more than 500 biotechnology and science companies, which has allowed Maryland to emerge as one of the "core biotechnology" development centers in the nation (Maryland Biotechnology Center, 2012). NIH employs approximately 20,000 personnel at the Bethesda campus and NIHAC, providing direct economic benefits to the surrounding community. NIH has provided more than $1.7 billion in research grants and contract awards to Maryland universities. The biotechnology sector, including NIH, directly supports six percent of jobs in Maryland and generates six percent of the state's gross domestic product. Indirectly, the bioscience sector supports other local businesses when employees working in the biotechnology sector (including NIH staff), visitors, and local residents patronize area hotels, restaurants and retailers during biotechnology-related conferences in their free time.

Economic indicators suggest an overall healthy economy in Montgomery County and in the area surrounding NIHAC. According to 2010 Census data, the median income of $89,155 in Montgomery County is higher than the national average. Further, income in the area around NIHAC is higher than in Montgomery County as a whole. While the poverty rate is relatively stable in Montgomery County at a rate of six percent, it remains among the lowest in the nation. The poverty rate in the area surrounding NIHAC is slightly lower than in Montgomery County as a whole. The unemployment rate in Montgomery County averaged 7.1 percent in 2010, which is lower than the state unemployment rate of 8.8 percent. Employment trends for NIHAC and the surrounding area, Montgomery County, Maryland and the nation are shown in Table 3-3.

The Montgomery County Department of Finance projects increases in fiscal resources. Total tax revenues, including investment income, totaled $2 billion in the third quarter of fiscal year (FY) 2012, increasing by 7.5 percent from the same period in 2011. This increase is due primarily to revenues from the income tax and the fuel and energy tax (Montgomery County Department of Finance, 2012).

Table 3-3. Economic Characteristics for NIHAC, Montgomery County, Maryland, and U.S. (2010)

Economic Characteristic	NIHAC/ Surrounding Area [a]		Montgomery County		Maryland		US	
	2000		2010		2010		2010	
	Number	%	Number	%	Number	%	Number	%
Total labor force (civilian)	1,115	--	563,935	--	3,164,140	--	155,917,013	--
Employed in labor force	1,090	97.8	523,864	92.9	2,886,015	91.2	139,033,928	89.2
Unemployed in labor force	25	2.2	40,071	7.1	278,125	8.8	16,883,085	10.8
Median household income ($)	89,120	--	89,155	--	68,854	--	50,046	--
Families below poverty level	--	3.5	--	4.9	--	6.6	--	11.3
Individuals below poverty level	--	6.5	--	7.7	--	9.9	--	21.6

Source: U.S. Census, 2000 and 2010.
a – Only limited data are available on the 2010 Census at this time. For the purposes of this comparison, "Surrounding Area" consists of the area within ZIP Code 20842.

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to result in a minimal permanent effect on the local economy, including the Town of Poolesville, due to the minimal change in the number of staff at NIHAC. The increase in number of personnel employed at the NIHAC campus (from 199 to 212 over the projected 20-year period) would slightly improve employment levels and would not displace existing jobs in Montgomery County. More significantly, implementation of the Master Plan would further NIH's mission to conduct and support innovative biomedical research, a key driver of Montgomery County's economy. Most economic impacts on the local community would be limited to the duration of demolition and construction (e.g., meals and incidentals for construction workers).

No-Action Alternative

The No-Action Alternative would not improve employment or income in Montgomery County and the vicinity of the NIHAC campus. The No-Action Alternative would not adequately support NIH's mission, which is a key driver of Montgomery County's economy.

Cumulative Effects

Commercial development in the Town of Poolesville is relatively stable, but may be affected by the expected increase in residential development described earlier. The Master Plan would result in a minor contribution to this positive impact on economic resources in the vicinity of NIHAC.

3.1.4 *Parks and Recreation*

Background

As stated in Section 3.1.1 (Land Use and Regional Planning), Montgomery County has been successful in preserving open space to provide an enjoyable, accessible, and safe park system to promote a strong sense of community through shared spaces. There are more than 400 parks covering 34,000 acres in the Montgomery County park system. Park amenities include playgrounds, basketball courts, trails, picnic areas, athletic fields, campsites, and lakes and streams. The majority of parks within the county are devoted to recreation, open space, natural resource protection, agricultural land preservation, and cultural resources conservation.

Affected Environment

Parks in close vicinity to the NIHAC campus include the Broad Run Stream Park (south and east of the site) and C&O Canal National Historical Park (south of the site). The Broad Run Stream Park is a 103-acre property listed under the county's Legacy Open Spaces, which is a program that expands on the existing park system to protect exceptional open spaces and heritage resources. Broad Run Stream Park is one of several stream valley parks in the Montgomery County parks system. Stream valley parks form the foundation of the park system, extending as greenways throughout the urban areas and into the countryside. The C&O Canal National Historical Park extends 184.5 miles along the Potomac River from Washington, DC, to Cumberland, MD and covers a total of 19,587 acres. Approximately 4,034 acres of the C&O Canal National Historical Park fall within the boundaries of Montgomery County. These Montgomery County parks provide space for a number of recreational activities for the community, including hiking, jogging, biking, picnicking, and wildlife observation.

Also, the M-NCPPC has proposed an additional park, Limestone CP (or the Limestone Ecological Corridor), within three miles of NIHAC. This proposed park would protect approximately 100 acres of diverse vegetation supported by limestone bedrock and resulting soils in the area (M-NCPPC, 2005). However, additional information on the proposed park could not be identified at this time.

Direct and Indirect Effects

Proposed Action

The Master Plan is not expected to have an adverse effect on recreational activities and the use of nearby parks. Temporary construction-related noise levels would be minor and would not affect the recreational use of nearby parks (see Section 3.6). Air emissions from operations and construction activities would not be expected to affect ambient air quality within nearby parks (see Section 3.7).

No-Action Alternative

The No-Action Alternative would not affect parks or recreation in the vicinity of the NIHAC campus. As with the Proposed Action, noise and air emissions associated with demolition and AST installation would be temporary and minor.

Cumulative Effects

M-NCPPC plans to acquire lands in close proximity to NIHAC, known as the Beverly Property, to establish the future Broad Run Stream Valley Park (Figure 3-1). This acquisition would be the first in a long-term series of acquisitions to complete a stream valley park stretching from the C&O Canal National Historical Park near Edwards Ferry to Woodstock Special Park. The 535-acre property is adjacent to the existing Broad Run Stream Park and meets several of the Legacy Open Space criteria as an exceptional open space that should be included in the county's park system (Montgomery County Department of Parks, 2007).

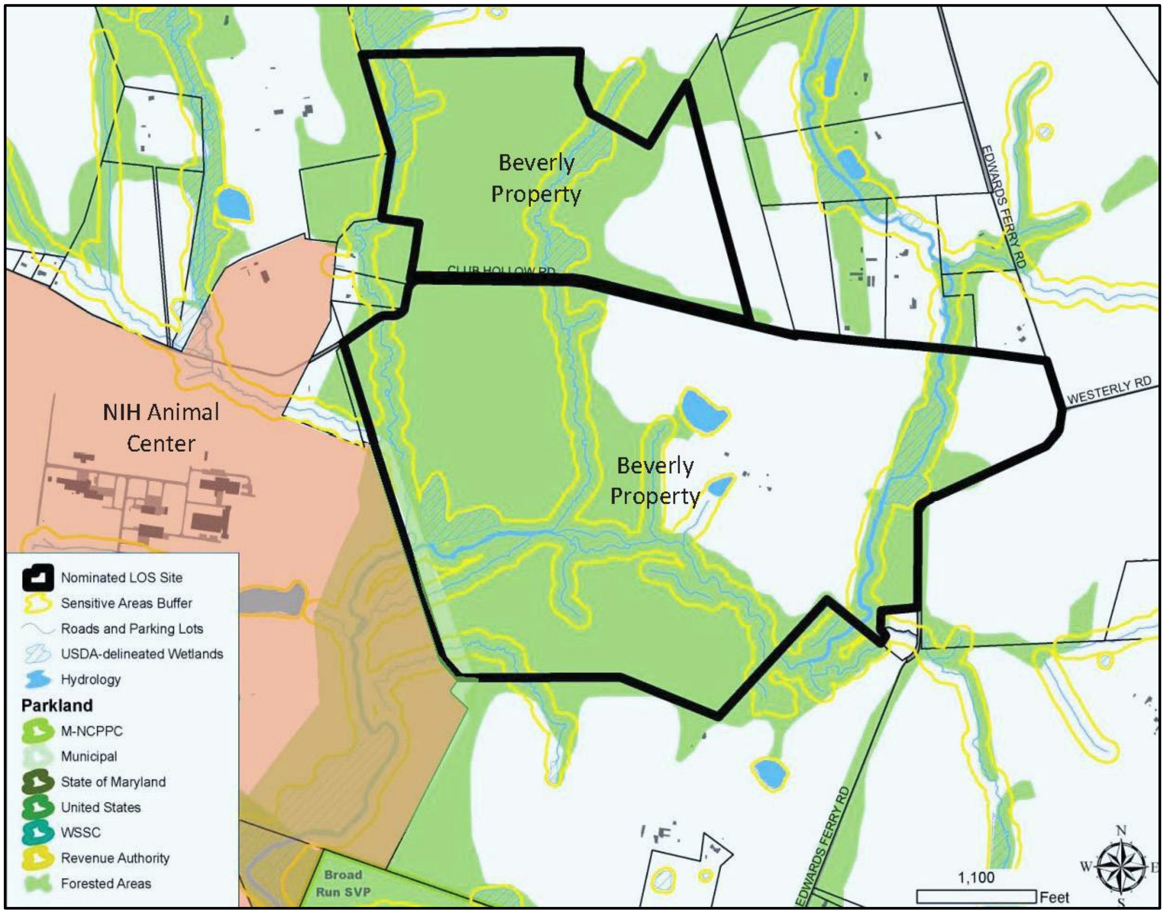
The Master Plan proposes no new development or activities that would affect parks or recreation, and would therefore not conflict with plans to improve and expand the park system.

3.2 Transportation

Background

Transportation systems include the vehicles and infrastructure necessary to convey passengers and goods from location to another. Transportation vehicles, including airplanes, cars, trucks, and boats, emit a variety of air pollutants, including carbon monoxide (CO), nitrogen oxides (NOx), and volatile organic compounds (VOCs). Traffic congestion and queuing on roads and highways cause increased pollution from cars and trucks. In addition, traffic congestion on local roads and highways can affect the quality of life of employees and neighboring residents.

Major regional airports include Washington Dulles International Airport (IAD), Baltimore Washington International Airport (BWI), and the Ronald Reagan National Airport (DCA). In addition, regional rail service includes Amtrak, the Maryland Regional Commuter Train Service (MARC), and Metrorail, which is operated by the Washington Metropolitan Area Transit Authority (WMATA). Local bus services are operated by WMATA, the Maryland Transit Authority (MTA), and the Montgomery County Department of Public Works (i.e., Ride On). Additional information on regional transportation options may be referenced in Section 7.1 (Regional Transportation Infrastructure) of the Master Plan.



Source: Montgomery County Department of Parks, 2007.

Figure 3-1. Location of Proposed Park Acquisition (Beverly Property) Adjacent to NIHAC

The major ground transportation artery for the entire Washington, DC region is the Capital Beltway (Interstate 495, or I-495), which regularly exceeds its planned daily volume. Annual Average Daily Traffic (AADT) on the Beltway varies from a low of 138,025 to 250,325 vehicles per day. The Dwight D. Eisenhower Memorial Highway (I-270), also known as the Washington National Pike, is a 35-mile auxiliary interstate highway connecting Frederick, MD to the Beltway. AADT on various segments of this Interstate ranges from a low of 71,675 to 258,975 vehicles per day.

The White's Ferry cable ferry operates as an alternative for private vehicles to cross the Potomac River between Poolesville, MD and Leesburg, VA. The ferry can transport approximately 20-24 vehicles per trip and takes slightly under 10 minutes to load, cross the river and unload vehicles.

Affected Environment

Transportation issues within Montgomery County include traffic patterns, volume, and emissions. In general, the number of vehicles is increasing in Montgomery County, but vehicle capacity constraints are rare in the Town of Poolesville and in the vicinity of NIHAC (Maryland State Highway Administration, 2012).

Maryland Governor Martin O'Malley, the Maryland Department of Transportation (MDOT), and MTA have committed to a plan to double transit ridership in Maryland by 2020. Transit initiatives in Montgomery County include promotion of Transit-Oriented Development and construction of fixed guideway transit. There is no regional rail or local bus service, however, that connects to the campus. Due to this lack of access to regional mass transit, access to the campus is primarily limited to privately owned vehicles (POVs) and larger commercial vehicles required for trash and recycling services or other facility operations.

Types of roads within the vicinity of NIHAC include arterial, collector, and local roads, as defined by the U.S. Department of Transportation (USDOT) Federal Highway Administration (FHA). The only principal arterial road in proximity to NIHAC is I-270. Minor arterial roads in the vicinity, which link cities and towns providing interstate and inter-county service, include White's Ferry Road, Darnestown Road, Beallsville Road, and River Road. Elmer School Road, a rural, two-lane local road, runs along the west side of the campus. Club Hollow Road, another local road, runs along the north side of the campus and splits the North Parcel from the rest of the campus.

The single access point for employees and visitors to the NIHAC campus is located off of Elmer School Road. Each individual entering the campus must undergo a security screening, which takes place at the secured entrance checkpoint. The existing security procedures and configuration of the access point occasionally result in lengthy queues, resulting in minor delays to enter the facility during peak periods. This single access point is not an ideal site planning practice, as it does not easily allow egress or ingress to the site by an emergency vehicle in the event that the main entrance becomes inoperable.

NIHAC employees typically commute to the campus using I-270 and arterial and local roads (e.g., White's Ferry Road, Darnestown Road, Beallsville Road, and Elmer School Road). NIHAC employees commuting from Northern Virginia may take White's Ferry across the Potomac River. In addition to daily commuting to and from the campus, activities at NIHAC occasionally require the transport of animals to the Bethesda campus (62 miles round-trip) to make use of the available imaging and diagnostic support facilities.

The capacity of state and local roads and intersections in proximity to NIHAC is categorized as level-of-service A, where traffic flows at or above the posted speed limit and all motorists have complete mobility between lanes (Transportation Research Board, 2011). Traffic congestion issues in the NIHAC vicinity are rare due to the extremely low number of trips entering and exiting the site. Based on a traffic study conducted in 2011 as part of the NIHAC Transportation Analysis, there were only 51 morning and 18 evening peak hour vehicle trips in and out of the main access point to the campus. The total number of trips during both the morning and evening peaks through the main access point is significantly lower than the total staff of approximately 200 people due to the staggered eight-hour work cycles that require a portion of the staff to be on site 24 hours per day.

The internal roadways within the campus include South Drive, the main east-west connector; Center Drive, a north-south roadway; and minor connector roads. Approximately 120 striped parking spaces are distributed throughout parking lots within the NIHAC campus. The existing parking supply for NIHAC employees and visitors is not optimally distributed to maximize usage of available spaces. While certain lots are not used to their full capacity, a number of other parking lots currently exceed capacity, resulting in employees parking POVs in non-striped or unpaved areas.

There is very little pedestrian activity within the NIHAC campus. There are very few sidewalks at the site other than immediately adjacent to existing buildings and the existing topography and layout of facilities does not facilitate pedestrian activities. Montgomery County released a Pedestrian Safety Initiative with a focus on locations with high pedestrian activity to improve pedestrian network and connectivity needs and increase awareness through enforcement and education. Due to the limited pedestrian activity within NIHAC, however, this initiative appears to be of limited relevance to the campus.

The number of bicyclists in the Washington, DC metropolitan area continues to rise. While there are currently no designated bicycle lanes in Montgomery County, the county's Master Plan identifies three Signed Shared Roadway routes that connect to the C&O Canal National Historical Park Towpath in the vicinity of the NIHAC campus (River Road between Edwards Ferry Road and White's Ferry Road, White's Ferry Road between River Road and West Willard Road, and Westerly Road between Edwards Ferry Road and West Willard Road) (M-NCPPC and MCDPP, 2005). While these narrow, hilly Signed Shared Roadway routes do not exhibit ideal conditions for cycling, they appear to be frequently used for recreational purposes. There are no designated bicycle lanes or routes within the NIHAC campus and very little accessibility for bicycling at the campus. However, cyclists share the road with cars within the campus.

Direct and Indirect Effects

<u>Proposed Action</u>

The Master Plan is expected to have a minor impact to the existing transportation network, both outside and within the NIHAC campus. Due to an increase of approximately 13 NIHAC personnel over the course of the Master Plan, there would be a slight increase in POVs entering and exiting the campus during peak hours. However, this increase would be partially offset by a reduction in trips between NIHAC and the NIH Bethesda campus due to improved imaging and diagnostic capabilities at NIHAC. Similarly, while the Master Plan anticipates a slight increase in personnel, there would be a reduction in intra-campus POV use due to consolidation of facilities within the campus and improved pedestrian connectivity. While the circulation plan maintains existing roads within the campus, consolidation of research and animal facilities would shift traffic to the north campus. As a result, traffic would diminish in the south campus. The Master Plan would also result in temporary increases in traffic during construction and demolition activities. However, the existing road network within and outside the NIHAC campus has capacity to adequately handle these potential changes in traffic volume. Each of the intersections studied in the NIHAC Transportation Analysis is anticipated to operate at acceptable levels of service during both the morning and evening peak periods.

Improvements to the secured entrance and construction of an emergency access point would provide a minor improvement in access to the NIHAC campus. The Master Plan would modify the secured entrance area to create separate lanes for employees and for screening of commercial and visitor vehicles, reducing delays and improving access for employees. Construction activities during improvements to the secured entrance may result in temporary effects to campus access. Due to the low volume of vehicles accessing the campus, however, these activities are not expected to result in considerable delays. In addition, construction of an emergency access point would facilitate ingress and egress to and from the site in the event that the main entrance becomes inoperable.

The construction and reconfiguration of parking lots is expected to result in a minor improvement to parking availability and distribution. Based on the site's future parking demand, an anticipated parking supply of 217 spaces is needed to ensure proper utilization and flow within the parking areas. The Master Plan would increase the number of parking spaces by 50 percent, from 141 to

217 spaces, allowing for better flow within parking lots. These new parking spaces would be distributed throughout the campus in four new parking lots located near consolidated building clusters and existing lots associated with campus buildings would remain in place.

No-Action Alternative

The No-Action Alternative would not impact the external transportation network or traffic levels and would not change POV use within the campus. There would be no improvement, however, to campus ingress or egress or parking availability throughout the campus.

Cumulative Effects

Regional changes in population growth and residential and commercial development, as discussed in Section 3.1 (Land Use and Socioeconomics), may have an effect on the existing road infrastructure and traffic levels in Montgomery County and in the vicinity of NIHAC. The projected increase in residential developments and number of jobs at retail and commercial centers in Montgomery County will further contribute to increased traffic volumes. The increase in traffic volume due to population growth and development would likely contribute to a slight decrease in the level of service on roadways in the vicinity of NIHAC. However, the county's intent to maintain its rural character (including existing roads surrounding the campus) limits residential and commercial development, minimizing changes to existing land use and traffic patterns.

Moreover, the potential increase in vehicular traffic generated by the Master Plan would only minimally contribute to the slight decrease in the level of service on roadways in the vicinity of the campus. Existing arterial, connector, and local roads surrounding NIHAC are underutilized and have the capacity to support projected traffic increases associated with the Master Plan and population growth. In addition, NIHAC is relatively isolated from existing and projected local centers of employment, residence, or retail, limiting potential effects on road infrastructure or traffic levels. Therefore, the minor increase in traffic volume associated with the Master Plan is not expected to contribute to significant traffic concerns in the vicinity of NIHAC.

3.3 Utilities and Infrastructure

Utilities and infrastructure are the basic facilities, services, and installations needed for a building or campus to function. NIHAC utilities and infrastructure include potable and gray water supply systems, a sanitary sewer system with a centralized WTP, a stormwater management system, steam and chilled water production within the CUP, and a power supply system.

3.3.1 *Potable Water Supply*

Affected Environment

Potable water is supplied to the entire NIHAC campus by five well pumps. Four of the wells are located on the main campus and supply the onsite water tower. The water tower distributes potable water to all of the buildings on the main campus. The fifth well is located on the north parcel and services the buildings located there. An earlier well, identified as Well No. 1, was replaced by Well No. 1A in early 2006 and subsequently closed.

NIHAC has a Maryland State Water Appropriation Permit (M01960G011) that allows well water extraction up to a daily average of 90,000 gpd on a yearly basis and up to a daily average of 120,000 gpd for the month of maximum use. Water extraction levels historically exceeded this permit limit until the recent implementation of a comprehensive metering, leak detection, and repair program. Current daily water consumption at NIHAC is less than 60,000 gpd. The following are the primary drivers of potable water consumption at NIHAC:

- Wash down of existing animal facilities (27,970 gpd).
- Make-up water for the campus steam system (12,790 gpd).
- Transmission losses (10,000 gpd).
- Use by occupants, including humans and NHPs (7,420 gpd).

EO 13514 mandates federal agencies to reduce potable water use intensity by at least 26 percent by FY 2020 as compared to the FY 2007 baseline year. Accordingly, NIH has established goals to reduce potable water use intensity 16 percent by 2015 and 26 percent by 2020.

For additional background on the aquifers supplying the potable water system, see Section 3.9.3 (Geology and Groundwater).

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to generate an overall increase in potable water demand due to increased campus population for both humans and NHPs and increased steam load. Construction of new facilities and the corresponding increase in human and NHP populations would increase water consumption gradually during the four phases of the Master Plan over the next 10 to 20 years. Construction of the Behavioral Research Facility and Multi-Species Animal Holding Facility during Phase 3 and Phase 4, respectively, would generate the largest increase in water consumption (due to wash down of additional animal facilities). Gradual steam load increases during Phases 2, 3, and 4 would generate corresponding increases in make-up water consumption for the steam system.

Based on current practices and consumption rates, wash down of additional animal facilities would constitute the majority of the increase in potable water consumption (an increase of 20,000 gpd), followed by water for use by additional humans and NHPs (7,400 gpd) and additional make-up water for the increased steam load (4,700 gpd). Based on current system operation with no new conservation measures or system upgrades to expand gray water use, this would increase NIHAC daily well water extraction to a rate of approximately 90,000 gpd with little margin of safety to ensure compliance with the MDE withdrawal permit.

To ensure that NIHAC water extraction remains within permitted levels and to reduce water consumption in accordance with NIH and federal goals, NIH would implement multiple water conservation and reuse strategies. The recommended approach of the Master Plan includes the following strategies:

- Further reduce onsite potable water system leaks and maintain a monitoring system.

- Decrease water use intensity through water efficiency improvements and conservation measures, such as the use of automatic animal watering devices, high-efficiency cage washing systems, and autoclaves.

- Reduce steam make-up water requirements by reducing steam loads through energy conservation and heat recovery measures.

Other strategies include expanding allowable gray water uses through additional filtration and capture of rainwater (see Section 3.3.2 for additional gray water discussion).

Table 3-4 presents a summary of the existing and projected potable water, gray water, and sanitary system use associated with the recommended system upgrades and conservation measures. The projected potable water extraction would remain within permitted levels while accommodating a 20 percent factor of safety.

No-Action Alternative

The No-Action Alternative would not increase potable water consumption or supply. Thus, well water extraction would not exceed the 90,000 gpd permit limitation. It is NIH's philosophy that there is no acceptable long term leakage rate for potable water; accordingly, the leak detection and repair program would continue to further reduce potable water consumption.

Cumulative Effects

The Master Plan encompasses all expected impacts to the NIHAC potable water system. Regional development would not impact NIHAC infrastructure; therefore, no cumulative effects are expected. See Section 3.9.3 (Geology and Groundwater) regarding competing demands for groundwater.

3.3.2 *Wastewater and Gray Water*

Affected Environment

Wastewater Treatment Plant

The onsite WTP at NIHAC receives and treats wastewater that has been discharged to the sanitary sewer system. The primary sources of sanitary wastewater at NIHAC include the following:

- Cooling tower blowdown (56,000 gpd during summer months).
- Wash down of existing animal facilities (27,970 gpd).
- Gray water used to transport animal feces from Building 104 to the WTP (16,000 gpd).
- Steam condensate (12,790 gpd).
- Stormwater infiltration from roof leaders connected to sanitary system (12,000 gpd).
- Sanitary wastewater from occupants, including humans and NHPs (7,420 gpd).

The WTP consists of denitrification units, clarifiers, and filters, and is capable of collecting and treating approximately 120,000 gpd. The collection rate occasionally exceeds the capacity of the plant when the cooling towers are operating near peak and/or rain events occur. When the collection rate exceeds the available capacity, the WTP diverts wastewater to one of two 1,400,000-gallon lagoons for temporary storage.

The NIHAC National Pollutant Discharge Elimination System (NPDES) permit (MD0020931) allows the WTP to discharge an average of 100,000 gpd to Broad Run Creek. The NPDES permit limits the allowable discharge of the following: biochemical oxygen demand (BOD), total suspended solids (TSS), ammonia nitrogen, fecal coliform, *E. coli*, total residual chlorine, pH, and dissolved oxygen. Refer to Section 3.9.5 (Surface Waters) for additional surface water quality information.

Table 3-4. Summary of Potable, Gray Water, and Sanitary System Operation – Existing and Projected With System Upgrades

Category	Existing (gpd)			Projected (gpd) With System Upgrades			System Upgrades
	Potable	Gray Water	To WTP	Potable	Gray Water	To WTP	
Water Use							
Occupant Use	7,420	—	7,420	12,580	—	12,580	Water conservation and improved water use efficiency: 15% flow reduction
Wash Down	27,970	—	27,970	48,000	—	48,000	
CUP Steam Make-up	12,790	—	12,790	14,000	—	14,000	Heat recovery and energy efficiency: 20 % steam make-up water reduction
Transmission Loss (estimated)	10,000	—	—	—	—	—	Complete leakage repair program
Factor of Safety (20%)	—	—	—	14,900	—	14,900	
Infiltration	—	—	12,000	—	—	—	Remove/redirect stormwater connections
Cooling Tower Blowdown [a]	—	56,000	56,000	—	27,200	27,200	Scale inhibiting system to reduce blowdown
Cooling Tower Evaporation [a]	—	24,000	—	—	27,200	—	Energy efficiency: 20% cooling load reduction
Miscellaneous Gray Water Use	—	16,000	16,000	12,580	—	12,580	
Totals – Summer							
Potable/Ground Water Use	58,180	—	—	89,480	—	—	
Sanitary Water Treated at WTP	—	—	132,180	—	—	132,680	Additional filter to increase plant capacity
Effluent Discharge to Broad Run	—	—	36,180	—	—	62,280	
Gray Water Use	—	96,000	—	—	70,400	—	
Totals – Winter							
Potable/Ground Water Use	58,180	—	—	89,480	—	—	
Sanitary Water Treated at WTP	—	—	76,180	—	—	105,480	
Effluent Discharge to Broad Run	—	—	60,180	—	—	89,480	
Gray Water Use	—	16,000	—	—	16,000	—	

Source: NIH, 2012.
Notes:
a – Cooling tower blowdown and evaporation values represent cooling tower water use during summer months. Cooling towers are not used during winter months.

The NIHAC WTP is approximately 40 years old and is nearing the end of its useful life. The WTP will need either a major component upgrade or complete replacement within the next 10 to 20 years.

Gray Water

Gray water, also known as non-potable water, is water that has been treated at the NIHAC WTP and circulated for reuse instead of being discharged to Broad Run. NIH stores gray water in two 250,000-gallon tanks at the WTP, which then supply Buildings 101A (the CUP), 103, and 104 through a separate system of pipes. The primary use of gray water at NIHAC is at the CUP for condenser make-up water in the cooling towers (56,000 gpd during summer months). The cooling towers require make-up water to replace water that is lost to evaporation and blow down. Evaporation is part of the cooling process; as water evaporates, the concentration of dissolved solids in the remaining cooling tower water increases. To reduce the concentration of dissolved solids, CUP operators discharge some cooling tower water (as "blow down") and replace it with fresh gray water. The high TDS content of the gray water at NIHAC leads to excessive blow down rates in the cooling towers, requiring more make-up water than typical cooling towers. NIH also uses gray water at Building 104 to transport animal feces to the WTP (16,000 gpd). Several animal holding facilities in Building 104 contain grated floors with large pools of water beneath the floors to collect the animal feces. The water drains each night to the WTP. Gray water is not currently useable for wash down of animal facilities, but its use could be expanded if NIH installs additional treatment systems.

Interdependence of Potable, Gray Water, and Wastewater Treatment Systems

The potable, gray water, and wastewater treatment systems function interdependently. For example, expanding gray water treatment and applications at NIHAC would reduce the demand for potable water. Depending on the filtration system used, increased gray water use could also greatly increase the amount of water treated at the WTP while reducing the total effluent discharge to Broad Run. On other hand, reducing the applications of gray water at NIHAC would increase the demand for potable water and increase the amount of effluent discharged to Broad Run. The potable, gray water, and wastewater treatment systems currently have the following restrictions or limitations:

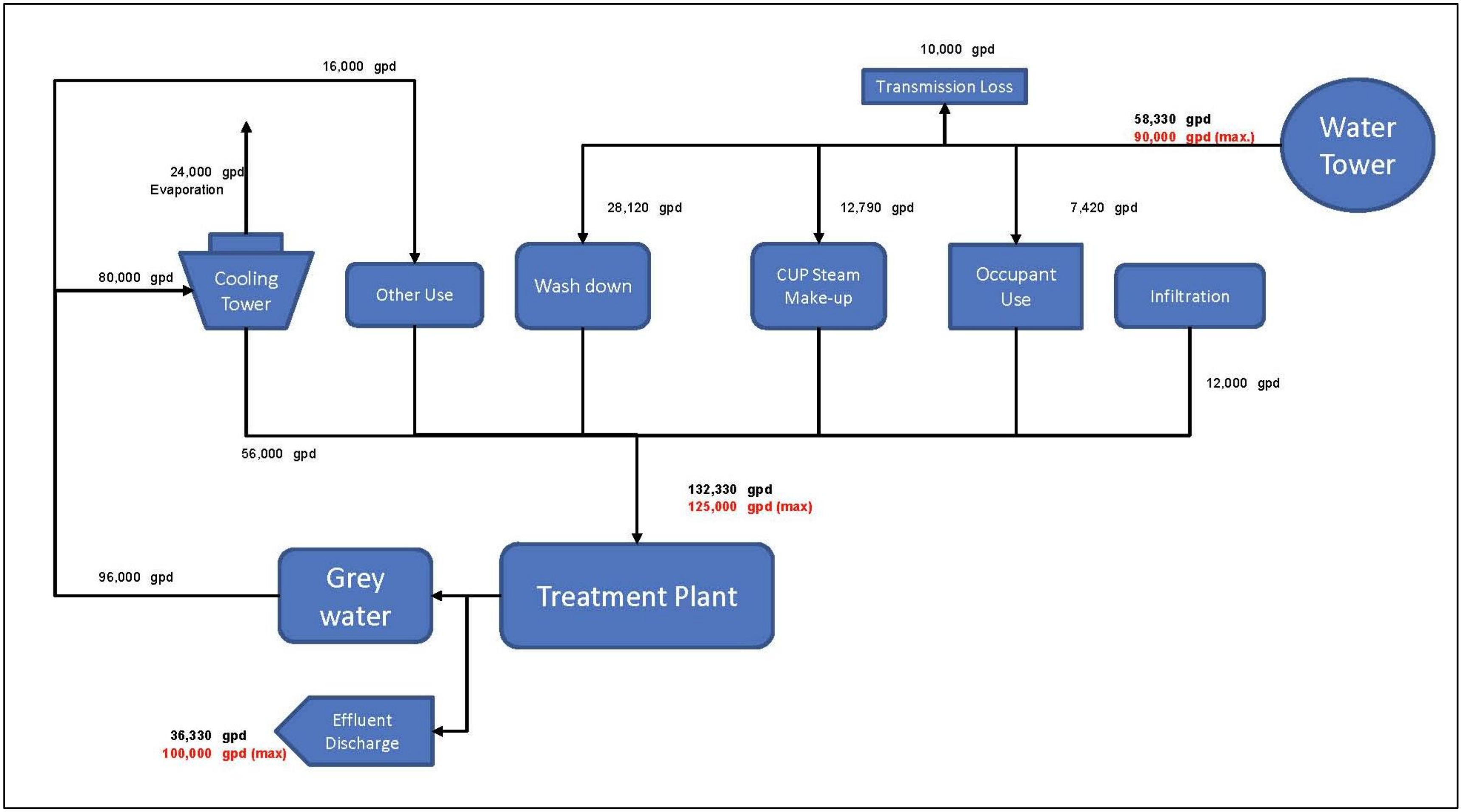
- Permitted daily potable water well extraction limit: 90,000 gpd.
- WTP collection capacity: ~120,000 gpd.
- Permitted daily effluent discharge limit: 100,000 gpd.

Figure 3-2 presents a schematic of the potable, gray water, and wastewater treatment systems at NIHAC.

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to result in an overall increase in wastewater generation due to increased cooling load and increased campus population for both humans and NHPs. The generation of wastewater would increase in conjunction with the increases in potable water use described in Section 3.3.1 (Potable Water Supply).



Source: NIH, 2012.

Note: This schematic represents operations during summer months, when the cooling towers are operational and the total water demand is higher than in the winter. Effluent discharges would be higher in the winter due to less demand for gray water.

Figure 3-2. NIHAC Water System Schematic (Summer Operations)

Based on current practices and consumption rates with no implementation of system upgrades and water conservation measures, this increase in wastewater generation would greatly exceed the existing WTP collection capacity of 120,000 gpd. Wastewater from wash down of animal facilities would increase by 71 percent; cooling tower blow down would increase by 41 percent due to increased cooling load during summer months; steam condensate would increase by 37 percent due to the increased steam load; and sanitary wastewater from occupant use would increase by 100 percent due to additional humans and NHPs.

The Master Plan recommends system upgrades and water conservation measures to address the WTP capacity concern. The Master Plan would install an additional filter at the WTP to increase the treatment capacity. Installation of the new filter, combined with implementation of the potable water conservation measures presented in Section 3.3.1 (Potable Water Supply) and Table 3-4, should provide sufficient capacity to accommodate wastewater generated under the Master Plan and would accommodate a 20 percent factor of safety. NIH would evaluate the water demands and potential implementation of system upgrades and water conservation measures as they proceed through planning and design for each new facility.

If potable water conservation measures are not fully implemented, or the actual building designs result in greater than anticipated flows, the WTP would likely require replacement or a major component upgrade. NIH would conduct a detailed study during Phase 1 of the Master Plan to evaluate the need for upgrades to the WTP. Following the Phase 1 study, NIH would implement WTP upgrades during Phases 2 and/or 3 of the Master Plan.

To ensure that the NIHAC wastewater discharge remains within the NPDES permit limit, multiple wastewater reduction and reuse strategies may be implemented. In addition to the water conservation strategies discussed in Section 3.3.1 (Potable Water Supply), the recommended approach of the Master Plan includes the following wastewater reduction strategies:

- Eliminate stormwater infiltration by removing roof leaders directly connected to the sanitary sewer system and redirect them to stormwater management features.

- Implement a scale inhibitor system at the CUP to inhibit scale build-up on the cooling tower piping, which would reduce the amount of cooling tower blow down and the associated gray water use for make-up water.

By implementing the recommended water conservation and wastewater reduction and reuse strategies, daily effluent discharges from the WTP to Broad Run would increase by approximately 72 percent during the summer and 49 percent during the winter as compared to current discharge levels (see Table 3-4). These discharges, however, would remain below the current daily effluent discharge limit of 100,000 gpd. NIH would evaluate the water demands and potential expansion of gray water use as they proceed through planning and design for each new facility.

Upgrades to wastewater treatment methods and gray water collection methods under the Master Plan may allow gray water to be used for additional applications such as cage washing in the proposed Behavioral Research Facility and Multi-Species Animal Holding Facility, which would be constructed during Phases 3 and 4, respectively. The Master Plan may install cisterns to collect stormwater from the roof leaders at the new buildings. This would allow stormwater from these buildings to be treated at the source in dedicated gray water treatment units and used for applications such as cage washing within those buildings. In addition to the scale inhibitor system described earlier, the Master Plan may include biological filtration to reduce the TDS of gray water.

This could be accomplished through construction of a wetland near the WTP, as illustrated in the Landscaping Plan (Figure 2-3). Treated effluent from the WTP would flow through the constructed wetland to achieve further TDS reduction prior to being routed to the gray water system. This approach, however, requires further evaluation by NIH to determine whether it is a technically feasible and practical solution for improving the quality of gray water at NIHAC.

NIH also considered tertiary filtration, such as reverse osmosis (RO), to reduce the TDS of gray water. RO filtration, however, typically exhibits a 50 percent rejection rate of the system flow (i.e., for every 10,000 gallons treated via RO filtration, 5,000 gallons is useable and 5,000 gallons is rejected back to the treatment plant). This would greatly increase the burden on the WTP and is not part of the recommended approach under the Master Plan.

Expansion of the WTP treatment capacity under the Master Plan, as described earlier, may require a revised NPDES permit from MDE with updated effluent limitations. NIH would continue to operate the WTP in accordance with the applicable NPDES permit limitations.

No-Action Alternative

The No-Action Alternative would not increase wastewater discharge and would not increase gray water consumption or supply at NIHAC. Thus, effluent discharge from the WTP would continue to comply with the daily average 100,000 gpd permit limitation. The existing WTP, however, would continue to exceed capacity during rain events, when cooling towers are operating near peak, and during significant cleaning events or excessive water use.

Cumulative Effects

The Master Plan encompasses all expected impacts to the NIHAC wastewater and gray water infrastructure. Regional development would not impact NIHAC infrastructure; therefore, no cumulative effects are expected. See Section 3.9.5 (Surface Waters) regarding cumulative effects to water quality.

3.3.3 *Stormwater and Stormwater Management*

Background

Stormwater is generated when precipitation runs off from land and impervious areas such as paved streets, parking lots, and building rooftops. Stormwater runoff can collect and transport pollutants such as oil and grease, chemicals, nutrients, metals, and bacteria as it travels across these surfaces. Soil erosion occurs when stormwater travels at velocities sufficient to transport sediment particles. Excessive stormwater runoff may also lead to flooding and infrastructure damage. Stormwater is typically managed on site by using conventional practices such as infiltration devices, ponds, filters and constructed wetlands, or sustainable practices such as Low Impact Development (LID) techniques (USEPA, 2004). LID practices aim to maintain and restore the hydrologic and ecological functions of watersheds by managing stormwater as close to its source as possible.

Impervious surfaces collect and accumulate pollutants and during high storm events, these pollutants are quickly washed off and rapidly delivered to aquatic systems. Monitoring and modeling studies have consistently indicated that urban pollutant loads are directly related to watershed imperviousness, and that it is difficult to maintain predevelopment stream quality when the percent of Total Impervious Area (TIA) within a given watershed exceeds 10 to 15 percent (Schueler, 1994).

The Chesapeake Bay watershed encompasses more than 64,000 square miles, including almost the entire State of Maryland (CBP, 2012). Water quality in the Chesapeake Bay is impaired due to excessive pollutant and nutrient loading. Maryland has implemented stormwater regulations with the goal of reducing pollutant and nutrient loading from stormwater runoff and improving water quality in the Chesapeake Bay. Maryland stormwater regulations stipulate that development disturbing over 5,000 SF of land area must adhere to a state-approved stormwater management plan. In Montgomery County, Federal agencies developing stormwater plans must demonstrate that the system can manage the 24-hour, 10-year frequency storm event (MDE, 2010).

The State of Maryland Stormwater Management Act of 2007 requires that environmental site design (ESD) be implemented in stormwater management plans to the maximum extent practicable (MDE, 2007). ESD includes the use of nonstructural BMPs and other better site design techniques that reduce the amount of stormwater leaving the site. As a result, the Maryland Department of the Environment (MDE) revised Chapter 5 of the 2000 Maryland Stormwater Design Manual focusing on the use of decentralized stormwater management techniques, including LID practices such as green roofs, permeable pavers, bioretention, and grassed swales (MDE, 2009).

The Maryland Stormwater Management Guidelines (MSMG), published April 2010, also supplemented the 2000 Maryland Stormwater Design Manual. Stormwater management for redevelopment projects (i.e., projects at sites exceeding 40 percent impervious area) must comply with MSMG requirements, including implementation of ESD to provide water quality treatment for a minimum of 50 percent of the existing affected impervious area within the project limit of disturbance (LOD) and reduction of existing impervious areas by a minimum of 50 percent within the project LOD. If a project is unable to reduce the existing impervious area by 50 percent, the project must implement ESD to the maximum extent practicable and submit a Stormwater Management Waiver Application (MDE, 2010).

Stormwater management requirements are also driven by the HHS 2011 *Sustainable Buildings Plan* (SBP) and Section 438 of EISA 2007. EISA 2007 requires that any development or redevelopment project involving a federal facility with a footprint that exceeds 5,000 SF shall use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow. The HHS 2011 SBP requires that site development and planning for construction projects and major renovations projects be performed in accordance with *Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (EPA document 841-B-09-001, December 2009).

Affected Environment

The entire NIHAC campus is located within the Broad Run watershed. All stormwater from the NIHAC campus eventually drains to Broad Run, which feeds the Potomac River, a Chesapeake Bay tributary. The NIHAC campus consists of approximately 1,012,000 SF of existing TIA (buildings, sidewalks, and paved or gravel roads and parking lots), which contributes to stormwater runoff potential and is equivalent to 4.5 percent of the entire campus. The NIHAC stormwater system consists primarily of a network of reinforced underground concrete pipes, as well as some plastic pipes and natural and concrete stormwater ditches.

Stormwater runoff from the north campus buildings (Buildings 101A, 102, and 103) is treated in stormwater management facilities before being discharged to the vegetated drainage swale that runs west to east through the center of the campus. The drainage swale leads to a reservoir near the eastern boundary of the campus that drains to Broad Run. In addition, some of the roof leaders from several north campus buildings (Buildings 101, 104, and portions of Buildings 100, 102, and 103) may connect directly to the sanitary system, contributing to WTP capacity issues. Runoff from Buildings 101 and 104 that does not discharge directly to the sanitary system also drains to the central, vegetated swale through a series of culverts and drainage ditches. Site and roof runoff from Building 107 and ancillary WTP buildings drain into a swale located to the south that drains into the stream network that feeds into Broad Run. Most of the south campus buildings also drain into this stream network.

Direct and Indirect Effects

Proposed Action

Construction and demolition activities associated with the Master Plan are expected to increase the TIA at the NIHAC campus by approximately 101,000 SF. There would be a large overall reduction in TIA during Phase 1 (-173,000 SF) due to extensive demolition, followed by moderate TIA increases during Phase 2 (+90,000 SF) and Phase 3 (+28,000 SF), and a large increase during Phase 4 (+157,000 SF). The percentage of TIA at NIHAC would increase to 5.0 percent after completion of the Master Plan, which is well below the 10 to 15 percent TIA threshold described earlier as a potential indicator of impaired water quality. TIA changes during each phase are summarized in Table 3-5.

The Master Plan may install cisterns to collect and reuse stormwater from the roof leaders at the proposed Behavioral Research Facility and Multi-Species Animal Holding Facility, which would be constructed during Phases 3 and 4, respectively. If this is implemented, a large portion of these impervious surfaces would not involve runoff of stormwater to surface waters. This may reduce the effective TIA (i.e., TIA that discharges stormwater to surface waters) at the NIHAC campus to approximately 4.3 percent and result in a net decrease in the overall quantity of stormwater discharged into surface waters. In addition, the demolition of buildings with roof leaders that may connect directly to the sanitary sewer system (Buildings 100 and 104) would reduce the quantity of effluent discharged to Broad Run from the WTP during precipitation events. Furthermore, the quality of stormwater runoff from developed portions of the campus is expected to be improved through the implementation of additional LID/ESD measures.

Although some construction on the north campus would be redevelopment of existing impervious surface, most of the construction would occur on existing green space. Thus, the TIA in the north campus would increase. However, this would be partially offset by a decrease in TIA in the south campus associated with extensive demolition and restoration of green space. The decrease in TIA in the south campus would increase stormwater infiltration and reduce runoff in this area. The hydrology of the demolition sites would be restored to predevelopment conditions.

Table 3-5. Total Impervious Area Changes under the Master Plan

	Phase 1	Phase 2	Phase 3	Phase 4	Complete Master Plan
TIA Construction					
Buildings	5,058	36,587	50,033[a]	98,752[a]	190,429
Pavement	9,256	67,470	50,805	49,796	177,327
Sidewalks	—	—	11,858	—	11,858
Connection Walkway	—	8,857	5,723	12,355	26,936
Subtotal	14,314	112,914	118,419	160,904	406,550
TIA Demolition					
Buildings	(91,673)	(325)	(41,011)	(3,658)	(136,667)
Pavement	(92,738)	(22,839)	(37,664)	—	(153,241)
Sidewalks	(3,368)	—	(12,073)	—	(15,441)
Other	—	—	—	—	—
Subtotal	(187,779)	(23,164)	(90,748)	(3,658)	(305,349)
Net Change	**(173,466)**	**89,750**	**27,670**	**157,246**	**101,201**
Existing Campus TIA					1,012,182 (4.5%)
Projected Campus TIA					1,113,383 (5.0%)[a]

Notes:
All numbers (except percentages) are in units of SF.
a – The Master Plan may include collection of rain water from buildings constructed under Phases 3 and 4 for reuse as gray water. This may reduce the effective TIA under the complete Master Plan to 4.3 percent.

New construction and redevelopment would follow stormwater and sediment and erosion control (SEC) plans to address stormwater runoff and prevent sediment transport during construction and demolition activities. NIH would implement ESD/LID measures to comply with local, state, and federal rules and regulations. The ESD/LID measures may result in an improvement to the stormwater quality. For any redevelopment project that is unable to meet the requirement to reduce the existing affected impervious area within the project LOD by 50 percent, NIH would submit a Stormwater Management Waiver Application. MDE approval is needed for all project elements with an LOD greater than 5,000 SF. Smaller project elements that may fall below this threshold, such as the emergency access point and the security gate reconfiguration, would not require MDE approval; however, NIH would still implement SECs and other appropriate measures to minimize impacts to stormwater quantity and quality.

NIH would incorporate appropriate and feasible LID practices into the stormwater management plan and the project designs to restore the predevelopment hydrology to the maximum extent technically feasible. The LID/ESD measures to be incorporated into the project designs may include the following:

- Vegetated swales with check dams.
- Vernal pools.
- Permeable paving.
- Curbless parking lots or curbs with cut-ins.

Overall, these LID measures would reduce runoff volume and rate, disperse flow, remove pollutants, and provide for groundwater recharge by facilitating infiltration into the soil. Stormwater runoff is not expected to negatively impact the wetlands near the north campus construction activities. See Section 3.9.6 (Wetlands) for additional information regarding impacts to wetlands and Section 3.9.5 (Surface Waters) for additional information regarding stormwater quality associated with the proposed breeding colony.

No-Action Alternative

The No-Action Alternative would slightly reduce stormwater runoff volume at NIHAC through the removal of approximately 10,864 SF of impervious surfaces. The No-Action Alternative would not improve existing stormwater management practices to meet the intent of local, state, and federal rules and regulations.

Cumulative Effects

The Master Plan encompasses all expected impacts to NIHAC stormwater infrastructure. Regional development would not impact NIHAC infrastructure; therefore, no cumulative effects are expected. See Section 3.9.5 (Surface Waters) regarding cumulative effects to water quality.

3.3.4 *Energy Systems*

The electrical infrastructure at NIHAC provides the energy needed to operate the facilities on campus, while heating and cooling systems consume energy sources in the form of electricity and fossil fuels. NIH has established a goal of reducing energy-use intensity by 30 percent by FY 2015.

3.3.4.1 Electricity

Affected Environment

The primary uses of electricity at NIHAC are to operate the lighting systems, laboratory equipment, heating, ventilation, and air conditioning (HVAC) systems, and cooling towers and chillers at the CUP. The CUP houses the electrical switchgears for the incoming feed from Allegheny Power Company, which provides electricity service to the entire campus. The existing onsite infrastructure, including the utility feeder and switchgears, is sized to support a peak load significantly larger than the current peak load of 2,791 kilowatts (kW). Based on a study performed by Allegheny Power Company, the existing onsite infrastructure has available capacity to support a 50-percent increase in peak load.

Backup power at NIHAC is provided by four 1,450-kW emergency generators, located at the CUP. Assuming one generator is kept on standby, the output of three generators would be approximately 4,350 kW. Thus, the existing emergency generator capacity is approximately 50 percent greater than the current peak load of 2,791 kW. Individual buildings throughout the campus are supported by a total of 16 other emergency generators ranging in size from 55 kW to 230 kW.

Many of the existing NIHAC buildings, particularly those in the south campus, are aging and deteriorating and do not feature the latest energy efficient technologies. For example, many of these facilities are poorly insulated and do not effectively utilize daylighting.

Direct and Indirect Effects

Proposed Action

Under the Master Plan, NIHAC peak electrical demand would increase by 38 percent (to 3,840 kW) due to the operation of lighting systems, laboratory equipment, and HVAC systems associated with the new buildings. The existing electrical infrastructure and emergency generators have sufficient capacity to support this growth. Installation of two additional fuel tanks under the Master Plan would improve the emergency supply of electricity by extending the potential generator run time. Construction of new facilities in the north campus likely would require rerouting of the incoming electrical service from Club Hollow Road. NIH would plan accordingly to avoid interruption to electrical service.

Despite the increase in peak electrical demand, the proposed buildings would feature improved energy efficiency compared to the existing facilities. This would help NIH meet its agency-wide goal of reducing energy intensity at facilities. Furthermore, the Master Plan recommends onsite renewable energy generation (specifically, solar technology) for the proposed NHP breeding colony and the Entrance Security & Visitors Center, which would reduce the quantity of electricity consumed from the grid. In particular, solar technology would be appropriate for the NHP breeding colony due to its distance from existing utility services and its relatively light energy demands. The Master Plan also recommends further investigation into the feasibility of installing a solar panel field to the east of Building 103 to provide renewable energy for the north campus buildings. Refer to Section 3.4 (Sustainable Development) for additional discussion of sustainable design strategies.

No-Action Alternative

The No-Action Alternative would not impact electrical infrastructure or demand. Under the No-Action Alternative NIH would continue to operate energy inefficient facilities and would, therefore, not improve energy efficiency throughout the campus. As with the Proposed Action, the No-Action Alternative would improve the NIHAC's emergency supply of electricity by installing two additional fuel tanks at the CUP.

Cumulative Effects

The electrical grid is expected to accommodate increased regional electrical demand, including increased demand due to the Master Plan. No significant increases in regional electrical demand are expected in the near future. If Allegheny Power receives a request for additional electricity from another source, Allegheny Power would perform the necessary upgrades to the electrical grid without impacting NIHAC service (Roxby, 2012).

3.3.4.2 Heating and Cooling

Affected Environment

Activities at NIHAC use steam and chilled water to support the HVAC systems in the north campus facilities. NIH constructed the CUP and associated utility tunnels in 2003 to provide steam and chilled water to approximately 250,000 SF of facility space in Buildings 100, 102, 103, and 104. Buildings on the south campus have dedicated HVAC systems, including boilers with heat input capacities ranging from 350,000 British thermal units (Btu) per hour to 650,000 Btu per hour.

The CUP contains three chillers and four boilers with available space for an additional chiller and boiler. The CUP and utility tunnels are consistent with current technology and have significant remaining life.

The current peak heating and cooling loads are approximately 34,640 pounds of steam per hour (pph) and 1,130 tons of refrigeration (tons), respectively. (One ton of refrigeration is equivalent to the energy removal rate that will freeze one ton of water at 32 degrees Fahrenheit in one day, or approximately 12,000 Btu/hr.) The existing steam and chilled water production and distribution systems have significant additional capacity, as indicated by their firm capacities of 67,300 pph and 2,400 tons, respectively. The firm capacity represents the system output without the availability of the largest single generation unit (e.g., with two of the three chillers in operation).

As discussed in Section 3.3.1 (Potable Water Supply) and Section 3.3.2 (Wastewater and Gray Water), steam production currently uses potable water for make-up water and the cooling towers currently use gray water for make-up water.

Many of the existing NIHAC buildings in the south campus are aging and deteriorating and were not designed for their current uses. Most of these buildings contain inadequate HVAC systems and do not feature the latest energy efficient technologies.

Direct and Indirect Effects

<u>Proposed Action</u>

Under the Master Plan, the existing CUP would supply all new facilities in the north campus with chilled water and steam. The new facilities would increase the heating demand by up to 37 percent (to 47,320 pph) and would increase the cooling demand by up to 42 percent (to 1,600 tons). No upgrades to CUP infrastructure are needed to support the planned heating and cooling loads.

Despite the increases in heating demand and cooling demand, the proposed buildings would feature improved insulation and HVAC efficiency compared to the existing facilities. NIH would use ventilated cage racks, heat recovery systems, and proper zoning of air movement, where feasible, to improve HVAC energy efficiency. This would help NIH meet its agency-wide goal of reducing energy intensity at facilities.

Impacts to potable and gray water demands due to increased heating and cooling loads are discussed in Section 3.3.1 (Potable Water Supply) and Section 3.3.2 (Wastewater and Gray Water), respectively.

The existing buildings to be retained in the south campus would continue to have dedicated HVAC systems. The two new facilities in the south campus (the shelter at the NHP breeding colony and the Entrance Security & Visitors Center) would have energy efficient dedicated mechanical systems and the habitat shelter may utilize alternative energy sources for heat and electricity.

The installation of additional fuel storage tanks at the CUP would ensure availability of steam for up to 30 days during emergencies.

<u>No-Action Alternative</u>

The No-Action Alternative would not implement the facility space expansion associated with the Proposed Action and therefore would not impact heating and cooling demand. As with the

Proposed Action, the No-Action Alternative would improve NIHAC's ability to provide steam during emergencies by installing two additional fuel tanks at the CUP. However, NIH would continue to operate facilities with energy inefficient HVAC systems.

Cumulative Effects

The Master Plan encompasses all expected impacts to the NIHAC heating and cooling infrastructure. Regional development would not impact NIHAC infrastructure; therefore, no cumulative effects are expected.

3.4 Sustainable Development

Background

Sustainable development can be defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (IISD, 2012). The federal government is required to implement sustainable building and operations practices through federal mandates such as EO 13423, EO 13514, and EISA 2007. These federal mandates promote sustainable practices by establishing operational targets for federal agencies, including energy reduction, water reduction, and greenhouse gas (GHG) reduction goals. Based on these mandates, HHS and NIH have incorporated sustainability policies and goals into the HHS SBP, HHS SSPP, NIH Environmental Management System (EMS), and the NIH *Design Requirements Manual* (DRM). NIH has developed several energy-use and water-use goals, including the following:

- Reduce energy-use intensity by 30 percent by FY 2015.
- Reduce Scope 1 and Scope 2 GHG emissions by 10.4 percent by FY 2020.
- Reduce potable water-use intensity by 26 percent by FY 2020.
- Reduce industrial, landscaping, and agricultural water use by 20 percent by FY 2020.

HHS is committed to implementing the *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings* (Guiding Principles), which promote the design, construction, maintenance, and operation of facilities in an energy-efficient and sustainable manner. NIH also designs and locates facilities in accordance with EO 13514 (*Federal Leadership in Environmental, Energy, and Economic Performance*) and the associated implementing instructions developed by the Council on Environmental Quality (CEQ) (e.g., *Sustainable Locations for Federal Facilities*).

Furthermore, it is NIH policy to obtain certification from the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) or the Green Building Initiative's Green Globes™ System for all new construction projects that have a total project cost equal to or greater than $3 million and for all renovation projects that have a total project cost equal to or greater than $10 million and/or that impact 40 percent or more of the overall floor area.

Affected Environment

NIH has implemented sustainable practices to support the existing water conservation, energy conservation, and stormwater management programs at NIHAC. To reduce water consumption at NIHAC, NIH is implementing a comprehensive metering, leak detection, and repair program. This program has reduced water consumption by 40 percent. To minimize landscaping water consumption, NIH uses native and appropriate plantings at NIHAC that do not require watering. In addition, the CUP uses gray water from the WTP to supply cooling tower make-up water, thus reducing demand on the groundwater supply. NIHAC facilities use automatic lighting controls to turn off lights at night, reducing energy consumption associated with unnecessary interior lighting.

Many of the existing facilities proposed for demolition contain inadequate HVAC systems and do not feature current energy- and water-efficient technologies. Thus, these facilities exhibit reduced occupant comfort and a higher energy- and water-use intensity per square foot compared to newer facilities that use energy- and water-efficient technologies.

Direct and Indirect Effects

Proposed Action

The Master Plan would result in an overall moderate improvement to campus sustainability. Existing inefficient and inadequate facilities would be replaced by more efficient and comfortable facilities. To ensure the sustainability of these facilities, NIH would obtain LEED or Green Globes certification for all new construction projects that have a total project cost equal to or greater than $3 million, such as the three main buildings to be constructed under the Master Plan.

NIH would design the new facilities to meet federal and NIH sustainability goals and policies, including those associated with the Guiding Principles, HHS SSPP, HHS SBP, and NIH EMS. NIH would select sustainable design strategies when individual projects are being programmed and designed. Numerous sustainable design strategies may be appropriate for the proposed facilities to help them achieve federal and NIH sustainability goals and LEED or Green Globes certification. These strategies can produce a wide range of benefits, including improved energy efficiency, water efficiency, stormwater management, and transportation efficiency.

The energy-efficiency strategies that NIH employs in the execution of the Master Plan could include upgrading existing HVAC and lighting systems and installing high-performance lighting, HVAC, and building envelope systems for new facilities. In addition, NIH would improve energy efficiency by expanding CUP heating and cooling services to new facilities and using daylighting throughout new and renovated facilities. Furthermore, NIH could install geothermal and renewable energy systems to meet the heating, cooling, and electrical demands associated with some of the proposed facilities. The NHP breeding colony, in particular, would be an appropriate location for geothermal and solar technology due to its distance from existing utility services and its relatively low energy demands.

The water-efficiency strategies that NIH employs could include advanced gray water filtration and WTP capacity upgrades to increase the quality and reuse of gray water. In addition, NIH could reduce water demand by installing high performance water fixtures, continuing the leak repair program, and continuing to use native and appropriate plants that do not require watering. Additional water conservation and reuse strategies are discussed in Sections 3.3.1 (Potable Water Supply) and 3.3.2 (Wastewater and Gray Water).

NIH would implement multiple stormwater management strategies that include LID/ESD features to increase filtration and reduce runoff. These strategies might include vegetated swales, appropriate plantings, vernal pools, curbless parking lots, and permeable paving. In addition, NIH would follow SEC plans to address stormwater runoff and prevent sediment transport during construction and demolition activities and would restore the topography of demolition sites to the predevelopment hydrology.

Consolidation of the facilities in the north campus and the provision of additional services would improve transportation efficiency at NIHAC by reducing the need to transport animals to Bethesda and reducing vehicle trips within the campus. Both the consolidation of the facilities in the north campus and the reuse of existing facilities support the intentions of the implementing instructions for *Sustainable Locations for Federal Facilities*.

NIH would enhance indoor environmental quality by constructing facilities that are designed in accordance with the Guiding Principles and feature improved ventilation and thermal comfort, moisture control, and daylighting compared to existing facilities. NIH could also use construction materials with low pollutant emissions and would protect indoor air quality during construction.

Construction of the proposed facilities would require the commitment of a wide range of raw materials, including wood, metal, glass, and fossil fuels. The fabrication and manufacture of construction materials requires large quantities of energy and natural resources. In general, construction materials are readily available, and the construction of new facilities would not have an adverse effect on continued availability of these resources. Construction and demolition debris would be recycled to the maximum extent feasible. Operation of the proposed facilities and transportation of additional employees to the campus would also require committing fossil fuels to operate boilers, generators, vehicles, and other fuel-burning equipment. Overall, the long-term improvements in the sustainability of NIH facilities under the Master Plan, combined with the public benefits gained from the medical research that these facilities would support, are expected to greatly outweigh these short-term and continuing commitments of readily available resources.

No-Action Alternative

The No-Action Alternative would not improve existing facilities, infrastructure, or stormwater management practices to meet the intent of local, state, and federal rules and regulations related to sustainable development. Numerous activities at NIHAC would continue to occur in water- and energy-inefficient facilities with inadequate ventilation systems. The No-Action Alternative, however, would continue the leak detection and repair program to further reduce potable water consumption. In addition, the No-Action Alternative would not require construction materials and, thus, would avoid the consumption of energy and natural resources associated with fabrication and manufacture of those materials.

Cumulative Effects

Although the Master Plan would increase overall water and energy use at NIHAC, it would contribute to overall NIH sustainability goals by improving water and energy efficiency and stormwater quality.

3.5 Light Pollution

Background

Exterior lighting of parking lots, roads, buildings, and pathways is often used to enhance the safety and security of persons and property. Exterior lighting may also be used to emphasize features of architectural and historic significance, enhance the enjoyment of outdoor areas, advertise or promote products or services, or call attention to commercial premises.

Excessive and inappropriate exterior lighting, however, can generate light pollution. The International Dark Sky Association (IDA) identifies four main elements of light pollution (IDA, 2012):

- Urban Sky Glow: the brightening of night sky over inhabited areas, reducing the visibility of stars.
- Light Trespass: light falling where it is not intended, wanted, or needed, such as light from a streetlight entering a residential window.
- Glare: excessive brightness that can cause visual discomfort and decreased visibility.
- Clutter: bright, confusing, and excessive groupings of light sources. Clutter contributes to urban sky glow, light trespass, and glare.

Furthermore, light pollution associated with over-illumination or inefficient fixtures can contribute to excess energy consumption.

Several standards and guidelines exist for designing effective and appropriate exterior lighting systems, as follows:

- The IDA *Outdoor Lighting Code Handbook* (version 1.14, December 2000/September 2002), provides recommendations for improving the night sky conditions. The Handbook identifies five different lighting zones based upon the development and natural conditions of these different areas and provides lighting standards appropriate to each zone.
- The Illuminating Engineering Society (IES) *Lighting Handbook* (tenth edition, 2011), provides safety and security lighting level recommendations for various uses, including guard booths, walkways, parking lots, and streets.
- The United States Green Building Council (USGBC), *LEED Reference Guide for Green Building Design and Construction* (2009), provides exterior lighting recommendations for improving both energy efficiency and night sky conditions.
- The *NIH DRM for Biomedical Laboratories and Animal Research Facilities* provides guidance for landscape lighting design considerations and exterior lighting design.

Affected Environment

Rural residential areas, such as the area surrounding NIHAC, are classified by the IDA *Outdoor Lighting Code Handbook* as Lighting Zone E2: Low Ambient Brightness. These rural residential areas are subject to more stringent lighting guidance than urban areas.

In general, there is minimal perceptible light trespass outside the NIHAC campus boundary from safety and security lighting. The two light sources closest to the campus boundary are security lights at the guard station and approximately eight to 10 streetlights located at the first gate when entering the campus. There are no residences near these locations, however, that would be affected by light trespass.

There are approximately 160 overhead streetlights installed at the NIHAC campus along streets and parking lots for safety and security purposes. Photocell sensors control the streetlights and security lights. These lights turn on during sunset and turn off during sunrise. The streetlights feature rectangular, fully shielded fixtures with flat, horizontally oriented lenses. These fixtures direct light toward the street and greatly reduce potential light trespass from campus lighting. There are not any known issues associated with exterior light trespass into animal facilities at night. If necessary, night shades can be used at the animal holding facilities to further reduce any light trespass from ambient outdoor lighting (Shaw, 2012).

The largest source of light trespass at NIHAC is the strobe light on top of the water tower. This strobe light is required by the Federal Aviation Administration and is used to mark the flight path for planes approaching Dulles Airport. After receiving a complaint from a neighboring resident on Club Hollow Road, NIH recently installed shielding on the strobe light to direct the strobe light upward. NIH has not received any other complaints regarding light pollution from NIHAC (Shaw, 2012).

Interior lighting near windows or skylights does not cause any noticeable exterior light pollution. In Buildings 102, 103, and 104, the Building Automation System (BAS) controls the interior lighting. In the animal rooms, the BAS turns on the lights at 6 a.m. and turns off the lights at 6 p.m. Interior lights not connected to the BAS are on torque timers and follow a similar schedule. Emergency lighting in these buildings is not noticeable at night from the outside.

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to generate a negligible change in light trespass outside the campus boundary from new exterior lighting. The new screening facility and visitor's center reconfiguration is expected to require only a minor reconfiguration of the lighting system and should not impact light trespass.

The construction of new roadways, facilities, and parking areas under the Master Plan would require the installation of additional lighting systems for these areas to ensure that the safety and security of the campus is maintained. In addition, exterior lighting is planned for the campus green to improve enjoyment of this area at night. To minimize light pollution impacts, new exterior lighting systems would be directed and sized appropriately and streetlights would utilize full cut-off luminaires consistent with the existing streetlights. The new lighting systems would be designed in accordance with IES and IDA guidance and the NIH DRM.

While additional lighting systems would be installed on the north campus, demolition of south campus facilities may allow some exterior lighting to be removed from these areas.

Some new buildings constructed under the Master Plan would feature high vertical windows and the circulation path between buildings would feature skylights and windows, thus increasing the potential for light trespass from interior lighting. This potential for light trespass would be mitigated through the continued use of automatic lighting controls. Similar to existing operations, interior lighting would be controlled by the BAS and would be automatically turned off at night.

No-Action Alternative

The No-Action Alternative would not impact light pollution at NIHAC. There would be no change to existing interior or exterior campus lighting.

Cumulative Effects

There are no identified plans for development of new light sources in the area immediately surrounding NIHAC. Therefore, no cumulative effects are expected.

3.6 Noise

Background

High noise levels that occur over a long duration can impact the health of exposed populations and be a nuisance to the surrounding community. The A-weighted decibel scale (dBA) is a logarithmic scale generally used to measure noise levels because it can account for the sensitivity of the human ear across the frequency spectrum. Table 3-6 compares decibel noise levels, common noise sources, and the relative perception of these noise levels.

Table 3-6. Perception of Noise

Noise Level (dBA)	Common Noise Source	Subjective Evaluation
70	Outdoors in a commercial area	Loud
60	Average of normal speech three feet away	Moderate
50	Open office background noise	
40	Quiet suburban environment at night	Faint
30	Quiet rural environment at night	
20	Concert hall background noise	Very Faint
10	Human breathing	
0	Threshold of hearing or audibility	Inaudible

Source: NIH, 2009.

Ambient noise levels are typically evaluated using the 90th percentile-exceeded noise level, L_{90}, which indicates the single noise level that is exceeded during 90 percent of a measurement period. The L_{90} noise level typically does not include the influence of discrete noises of short duration, such as car horns.

OSHA regulates workplace noise with standards for two different types of noise: constant and impulse. The OSHA limit for constant noise is 90 dBA for eight hours; however, the National Institute for Occupational Safety and Health (NIOSH) recommends a constant noise limit of 85 dBA for eight hours to minimize occupational noise induced hearing loss. The Occupational Safety and Health Administration (OSHA) maximum sound level for impulse noise is 140 dBA. In areas where workplace noise exceeds these sound levels, employers must provide workers with personal protective equipment to reduce noise exposure.

State and local government agencies regulate noise within the community. The Montgomery County Noise Control Ordinance (Chapter 31B of the County Code) established maximum allowable noise levels in the county. The Montgomery County noise exposure limits for residential and non-residential properties are summarized in Table 3-7.

Table 3-7. Montgomery County Maximum Allowable Noise Levels for Receiving Noise Areas

Land Use of Receiving Property	Daytime 7 a.m. – 10 p.m. (dBA)	Nighttime 10 p.m. – 7 a.m. (dBA)
Residential	65	55
Non-residential	67	62

In addition, noise levels from construction activities must not exceed 85 dBA at the source between 7 a.m. and 5 p.m. if the County Department of Environmental Protection has approved a noise suppression plan, and must not exceed 75 dBA if it has not. Similarly, the noise standards set by the state under Code of Maryland Regulations (COMAR) 26.02.03 limit the 24-hour average sound levels for residential, commercial, and industrial zones to 55, 64, and 70 dBA, respectively.

Affected Environment

The NIHAC campus is located in a rural area with relatively low ambient noise levels. The site is located within Montgomery County's Agricultural Reserve and is surrounded by farms to the north and east, parkland to the south, and a Montgomery County Police Department firing range to the west. To maintain the site's rural character, it is important that on-campus noise levels be minimized and that noise levels do not exceed state and county limits at the on-campus residences (Buildings 116 and 117), and those along Club Hollow Road. NIHAC does not have any campus-specific noise policies.

Ambient noise levels at NIHAC are affected by noise generated both onsite and offsite. The main sources of noise generated onsite include the following (in decreasing order of noise level):

- CUP operations (i.e., generators, boilers, cooling towers, and chillers).
- HVAC equipment and emergency generators at individual buildings.
- Grounds maintenance activities (i.e., lawn mowers and leaf blowers).
- NHPs housed indoors and outdoors.
- Cars and other vehicles.

Ambient noise levels at the NIHAC campus were measured in May 2012 during daytime operations. Noise level measurements were conducted at the CUP, NIHAC property boundary, at central points in the north and south campuses, and near emergency generators. Ambient noise levels at the property boundaries ranged from L_{90} 36 dBA to 41 dBA. On-campus ambient noise level measurements ranged from L_{90} 40 dBA to 54 dBA and were greatest at the south campus near TR-112A due to noise from the Building 112 HVAC exhaust system. During noise events (e.g., emergency generator testing and grounds maintenance), on-campus noise level measurements near the sources ranged from L_{90} 61 dBA to 88 dBA. These noise levels were greatest near the Building 103 generator and the west side of the CUP near the emergency generator exhausts and the emergency generator load bank, which provides an electrical load or demand to dissipate power output from the emergency generators. The emergency generators are tested weekly for a period of one hour and also operate during power outages. The CUP cooling towers, located exterior to the facility, generate moderate levels (less than 83 dBA at the source) of continuous perceptible noise during summer months. The CUP boilers generate approximately 88 to 90 dBA within the building and the chillers are slightly louder (Mayberry, 2012). NIH personnel wear hearing protection while working in CUP areas with noise-generating equipment. There is minimal perceptible noise from the boilers and chillers exterior to the CUP. The other sources of noise at NIHAC are not significant and do not exceed OSHA or Montgomery County noise exposure limits.

Additional sources of noise generated offsite include the following:

- Montgomery County Police Department firing range.
- Planes taking off and landing at Dulles International Airport.
- Vehicles traveling along nearby roads.
- Wildlife, such as singing birds.

These sources of noise are intermittent and, in general, are an insignificant source of noise at NIHAC. The firing range can be heard faintly from campus. Furthermore, minimal noise can be heard on campus from vehicles traveling along nearby roads due to the trees along Club Hollow Road, topography, and physical distance from the campus center.

To minimize noise impacts to animal holding and research activities, NIH follows general guidance from the *Guide for the Care and Use of Laboratory Animals, 8th edition*. The guide recommends that noise-generating activities, such as cage washing, be conducted in rooms or areas separate from those used for animal housing or research. The guide also recommends the separation of human and animal areas and designing environments "to accommodate animals that make noise rather than resorting to methods of noise reduction" (NRC, 2011). For example, hallways and ceilings within Building 103 feature noise attenuation panels for the purpose of reducing noise levels to improve worker safety and comfort.

Direct and Indirect Effects

<u>Proposed Action</u>

Under the Master Plan, the overall change to routine noise levels is expected to be negligible. The upgrade and expansion of facilities would introduce new minor noise sources on campus, including new air-handling units, exhaust fans, and emergency generators. Increased steam, chilled water, and emergency power output at the CUP and corresponding increases in the number of operating boiler, chiller, and generator units is not expected to generate a noticeable increase in noise inside or outside the facility (Mayberry, 2012). Workers within the CUP would continue to wear appropriate hearing protection in areas with noise-producing equipment. A minor decrease in noise is expected in the south campus due to the removal of emergency generator, HVAC, and boiler units associated with facilities to be demolished.

To limit impacts to nearby residences, NIH would limit construction activities to normal daytime working hours. Under the Master Plan, the ambient noise levels at NIHAC would remain within Maryland and Montgomery County noise thresholds. Furthermore, any minor change in noise levels is not expected to affect the rural character of the site.

Interior noise levels could increase during construction activities and could impact animals inside buildings adjacent to construction. NIH would phase construction activities, however, to minimize disturbance to animal holding and research activities, breeding colonies, and pastures. If necessary, NIH would temporarily relocate animals to avoid undue stress and research disruptions that could result from construction-related noise.

NIH would design all new facilities in accordance with noise guidelines in the NIH DRM and the *Guide for the Care and Use of Laboratory Animals*.

No-Action Alternative

The No-Action Alternative would not affect ambient or interior noise levels associated with routine activities. Demolition and installation of the two fuel tanks at the CUP, however, would involve temporary, minor noise impacts that would be limited to normal daytime working hours and would remain within Maryland and Montgomery County noise thresholds.

Cumulative Effects

No other recent, ongoing, or foreseeable actions were identified that would affect noise levels in the NIHAC vicinity. The continued presence of the Broad Run Stream Park and the C&O Canal National Historical Park adjacent to NIHAC should help to ensure that ambient noise levels in the vicinity remain low. Therefore, there are no anticipated cumulative effects associated with the Master Plan.

3.7 Air Quality

Air quality can be defined as the concentrations of airborne pollutants determined by USEPA to be of concern to the health and welfare of the general public and the environment. Both ambient (outdoor) and indoor air quality are a concern to human health and well-being. Releases of air pollutants and the resulting changes in air quality can cause damage to human health, property, aesthetics, vegetation, fish, wildlife, and other natural resources. Poor ambient air quality typically results from emissions of fossil fuel combustion, usually from vehicles (mobile sources) or production facilities (stationary sources). Emissions from fossil fuel combustion also contain GHGs, which are very likely to be a contributor to global climate change (IPCC, 2007). Poor indoor air quality often results from poor ventilation in a building and source pollutants such as mold, dirt, or emissions from chemicals used or stored inside.

3.7.1 *Ambient Air Quality*

Background

The following sections discuss several of the federal and state air quality standards and permit programs that have been established with the goal of protecting ambient air quality.

National Ambient Air Quality Standards

The Clean Air Act (CAA) designated USEPA the authority to set National Ambient Air Quality Standards (NAAQS) for air pollutants considered to be harmful to public health and the environment (40 Code of Federal Regulations [CFR] Part 50). The NAAQS are benchmark levels for ambient air pollutant concentrations above which human health and public welfare may be adversely affected. The air pollutants regulated under the NAAQS, commonly referred to as “criteria pollutants”, include ozone (O_3), particulate matter (PM), CO, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb) (USEPA, 2010). PM is further divided into coarse (PM_{10}) and fine ($PM_{2.5}$) particulate matter. The NAAQS limits for these criteria pollutants are presented in Table 3-8 below.

USEPA designated the Metropolitan Washington region, which includes Montgomery County, as a “moderate” nonattainment area for the 8-hour ozone standard in 2004 and a nonattainment area for the $PM_{2.5}$ standard in 2005. As shown in Table 3-9, Montgomery County is an attainment area for CO, SO_2, NO_2, and lead (40 CFR 81.321).

Table 3-8. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Level [a]
Ozone (O_3)	8-hour	0.075 ppm [b]
Particulate Matter ($PM_{2.5}$)	24-hour	35.0 ug/m^3
	Annual Mean	15.0 ug/m^3
Particulate Matter (PM_{10})	24-hour	150 ug/m^3
Carbon Monoxide (CO)	1-hour	35.0 ppm
	8-hour	9.0 ppm
Lead (Pb)	3-month	0.15 ug/m^3
Nitrogen Dioxide (NO_2)	1-hour	100 ppb
	Annual Mean	53 ppb
Sulfur Dioxide (SO_2)	1-hour	75 ppb
	3-hour	0.5 ppm

Notes:
a – All of the standards are primary standards, which provide public health protection, except for the 3-hour SO_2 limit, which is a secondary standard and provides public welfare protection. Units of measure are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (ug/m^3).
b – Based on a court ruling and consent decree, USEPA issued a new 8-hour ozone rule on March 12, 2008, which strengthens the NAAQS for ozone from 0.08 ppm to 0.075 ppm. In September 2011, the White House announced that the ozone standard will be reconsidered in 2013 (OPS, 2011).

Table 3-9. Montgomery County Attainment Status and General Conformity Rule *De Minimis* Thresholds

Criteria Pollutant	Classification of Charles County	Pollutant or Precursor of Concern	*De Minimis* Emission Rate (tons/yr) [a, b]
Ozone (O_3)	Nonattainment (moderate) since 2004	NOx	100
		VOCs	50
Particulate Matter ($PM_{2.5}$)	Nonattainment since 2005	$PM_{2.5}$	100
		NO_x	100
		SO_2	100
Carbon Monoxide (CO)	Attainment	CO	N/A
Lead (Pb)	Attainment	Pb	N/A
Nitrogen Dioxide (NO_2)	Attainment	NO_2	N/A
Particulate Matter (PM_{10})	Attainment	PM_{10}	N/A
Sulfur Dioxide (SO_2)	Attainment	SO_2	N/A

Notes:
a – *De minimis* levels are emission rates specified in 40 CFR 93.153(b), which may not be exceeded by federal actions taking place in nonattainment and maintenance areas. Federal actions in nonattainment areas for $PM_{2.5}$ must also consider the *de minimis* levels for $PM_{2.5}$ precursors, including NOx and SO_2.
b – N/A designates that Montgomery County is an attainment area for that pollutant and *de minimis* levels are therefore not applicable for that pollutant.

The CAA General Conformity Rule (GCR) requires that federal actions taking place in nonattainment areas must conform to the region's State Implementation Plan (SIP) for reducing airborne concentrations of the nonattainment pollutant(s). Because Montgomery County is located in a nonattainment area for $PM_{2.5}$ and ozone, actions at NIHAC must be reviewed to determine whether the associated emissions of these pollutants or their precursors would exceed *de minimis* levels and trigger a SIP conformity determination. The *de minimis* levels for each of Montgomery County's nonattainment criteria pollutants are listed in Table 3-9.

The Maryland Ambient Air Monitoring Network consists of 25 air monitoring stations throughout the state that measure ground-level concentrations of criteria and other pollutants (MDE, 2012a). In addition, Virginia monitors ambient air quality at 46 stations throughout the state (VADEQ, 2011). Table 3-10 presents ambient air quality data for the four stations located closest to NIHAC. Exceedances of the NAAQS for $PM_{2.5}$ and ozone are highlighted in red text.

Table 3-10. $PM_{2.5}$ and Ozone Ambient Air Monitoring Data from Stations Located Near NIHAC

Monitoring Site	Year	$PM_{2.5}$		Ozone	
		24-hour Max (ug/m^3)	Annual (ug/m^3)	8-hour Max (ppm)	8-hour Exceedances
USEPA NAAQS		35	15	0.075	N/A
Broad Run High School 21670 Ashburn Rd Ashburn, VA (7 miles S of NIHAC)	2011	23.7	9.1	0.086	3
	2010	36.9	10.3	0.092	5
	2009	28.4	9.2	0.069	0
	2008	30.5	11.1	0.1	8
	2007	38.3	12.8	0.091	14
SR 669 - Butler Manufacturing Co. Stonewall, VA (34 miles W of NIHAC)	2011	28.3	10.0	0.071	0
	2010	34.8	10.8	0.095	13
	2009	24.1	10.4	0.08	1
	2008	30.6	12.0	0.095	6
	2007	46.4	12.5	0.082	1
18530 Roxbury Road Hagerstown, MD 21740 (33 miles N of NIHAC)	2011	—	—	0.084	3
	2010	30.2	10.5	0.09	5
	2009	24.6	9.7	0.07	0
	2008	35.7	11.8	0.084	3
	2007	38.5	12.9	0.085	9
Lathrop E. Smith Env. Education Center, 5110 Meadowside Lane Rockville, MD (20 miles E of NIHAC)	2011	—	—	0.088	5
	2010	18.6	9.1	0.081	5
	2009	29.2	9.4	0.074	0
	2008	34.3	10.9	0.094	5
	2007	35.6	11.7	0.103	17

Source: USEPA, 2012a.

Operating Permit Programs

Title V of the CAA requires all major sources of air pollution to obtain an operating permit known as a Title V permit. For Title V applicability, the major source threshold for emissions of NOx and VOC is 25 tons per year (COMAR 26.11.02.01.C). This permit consolidates all State and federal air quality requirements that apply to the source, including emissions limits and monitoring, record keeping, and reporting requirements.

Maryland Air Quality Programs

In Maryland, a permit to construct (PTC) from MDE is required before construction or modification of an emission source (COMAR 26.11.02.09), including emergency generators and boilers, unless that source is listed under COMAR 26.11.02.10 as being exempt from PTC requirements. Maryland's air quality program also incorporates federal emissions standards that apply to stationary sources such as National Emission Standards for Hazardous Air Pollutants (NESHAPs), which require the application of technology-based emissions standards known as Maximum Achievable Control Technology (MACT) to control hazardous air pollutants (HAPs), and New Source Performance Standards (NSPS), which apply to specific categories of stationary sources. In addition, Maryland's air quality program includes requirements for sources that emit toxic air pollutants (TAPs), as defined in COMAR 26.11.15. These requirements specify that new sources of TAPs must obtain a PTC and that the owner or operator of all new sources and certain existing sources of TAPs must apply the best available control technology for toxics (T-BACT).

Affected Environment

Emission Sources

Operations at NIHAC generate air emissions from multiple sources, including onsite stationary sources (boilers, generators, fume hoods), offsite stationary sources (incineration of MPW), and mobile sources (vehicles).

The largest onsite stationary emission sources include four No. 2 fuel oil boilers at the CUP for steam generation. Two boilers have heat input ratings of 46.53 million Btu (MMBtu) per hour and the other two boilers have heat input ratings of 18.57 MMBtu per hour. These boilers are subject to the proposed Boiler Area Source Rule (40 CFR Part 63 Subpart JJJJJJ). The proposed rule would require a one-time energy assessment for all boilers with heat input ratings greater than 10 MMBtu per hour and biennial tune-ups for all boilers. However, no emission limits would apply to existing oil boilers (NHDES, 2011). In FY 2010, the CUP boilers consumed a total of 822,323 gal of fuel oil. The boilers produce emissions of NOx, CO, VOCs, SO_2, and PM during regular operation.

Multiple smaller boilers are located at individual facilities throughout the south campus, including Buildings 110A, 110, 111, 112, 127, 128, and 132. The heat input capacity of these boilers ranges from 0.35 MMBtu per hour to 0.65 MMBtu per hour. Forced hot air units are also used to heat the onsite residences, Buildings 116 and 117. In FY 2010, the boilers in the south campus consumed 164,553 gal of fuel oil.

Propane is used at the CUP as igniter fuel for the CUP boilers and is stored in a 100-lb cylinder in Building 101A. Propane is also used in the winter to heat the semi-enclosed NHP area of Building 112. In 2010, NIHAC operations consumed 21,086 gal of propane.

The CUP also houses four 1,450-kW emergency generators with 2,088-brake horsepower engines that supply emergency power to the entire campus. The emergency generators are subject to "Tier 1" USEPA emission standards for nonroad engines at or above 37 kW. The Tier 1 emission standards establish emission limits for multiple pollutants, including CO, PM, and NOx. In the event that the emergency generators at the CUP were to fail, each individual building also has its own emergency generator. Building 103 (Primate Unit) is supported by an 800-kW emergency generator and Building 107 (WTP office/lab) is supported by a 515-kW generator. A total of 16 other emergency generators ranging from 55 kW to 230 kW support individual buildings throughout the rest of the campus. In FY 2010, the generators consumed 10,270 gal of fuel oil. The generators produce emissions of NOx, CO, VOCs, SO_2, and PM during regular testing and emergency operation. The emergency generators operate approximately one hour per week for regular testing to ensure system functionality. Table 3-11 presents criteria pollutant emissions in FY 2010 from NIHAC stationary on-site sources.

Table 3-11. FY 2010 NIHAC Criteria Pollutant Emissions from Stationary On-site Sources

Source	Fuel Consumption (gal.)	Criteria Pollutant Emissions (tons)						
		CO	Lead	NOx	$PM_{2.5}$	PM_{10}	SO_2	VOC
Boilers	986,800	2.5	0.001	10.4	0.8	1.1	0.1	0.2
Emergency Generators	10,300	0.6	—	2.4	0.1	0.1	0.03	0.08
Propane Use	21,000	0.1	—	0.1	0.01	0.01	0.001	0.01
	Total:	3.2	0.001	12.9	0.9	1.2	0.1	0.3

Other minor stationary emissions sources include fuel storage tanks and fume hoods. The emergency generator systems are supported by 24 aboveground fuel oil tanks, ranging in size from 25 gal to 5,000 gal. Two 50,000-gal underground storage tanks (USTs) at the CUP store enough fuel to operate the emergency generators and boilers for 15 days in the event of a prolonged power outage. Fume hoods provide ventilation for laboratory spaces in Buildings 102, 103, and 111.

Medical and pathological waste (MPW) from NIHAC is sent to NIH Bethesda for consolidation before disposal at a contracted incineration facility located in Baltimore, MD. The incineration facility generates mercury, dioxin, and criteria pollutant emissions. Mercury and dioxin emissions are controlled using a Powder Activated Carbon Injection System, which has a mercury control efficiency greater than 90 percent, and a Remedia catalytic filtration system technology that destroys dioxin to well below regulatory thresholds (CBE, 2012).

Mobile emission sources associated with NIHAC activities include POVs for ongoing employee commuting to and from work, as well as intra-campus travel. NIHAC vehicles also make periodic trips to Bethesda for animal testing and imaging.

Operating Permit

As defined by MDE, "a synthetic minor source is an air pollution source that has the potential to emit (PTE) air pollutants in quantities at or above major source threshold levels but has accepted federally enforceable limitations to keep the emissions below such levels" (MDE, 2012b). PTCs for individual emission units may be used to establish federally enforceable emission limits. MDE has issued NIHAC three PTCs for the four boilers at the CUP, the four emergency generators at the CUP, and the 800-kW generator located at Building 103, respectively. Collectively, these PTCs serve as a synthetic minor operating permit that ensures emissions remain below major source thresholds and avoids the need for a Title V permit. NIHAC staff are required to record and report monthly NOx emissions and verify that NOx emissions do not exceed the 50-ton rolling 12-month limitation.

Direct and Indirect Effects

Proposed Action

The Master Plan would have the potential to directly and indirectly affect air quality at NIHAC as a result of the following activities:

- Onsite stationary sources:
  - Operation of CUP boilers
  - Discontinued operation of boilers and emergency generators from demolished buildings
  - Operation of emergency generators

- Offsite stationary sources:
  - Incineration of MPW

- Mobile sources:
  - Changes in employee commuting
  - Changes in NIHAC vehicle travel

- Temporary activities:
  - Construction, demolition, and renovation activities

The following subsections describe these air quality impacts in more detail.

Onsite Stationary Sources

Under the Master Plan, a moderate increase in air emissions of NOx, CO, VOCs, SO_2, and PM from onsite stationary sources is expected due to increased heating demand during normal operations and increased electrical demand during power outages.

The construction of new facilities that would be serviced by the CUP is expected to increase the steam load by approximately 36 percent. The existing boilers have adequate capacity to provide this increased steam load. The CUP boiler output and fuel consumption are expected to increase proportionally with the increased steam load. Operation of the boilers would comply with the proposed Boiler Area Source Rule. Increased air emissions from the CUP boilers would be partially offset by removal of multiple boilers from facilities that would be demolished.

The Master Plan would install new generators at each proposed facility to provide redundant back-up power during emergencies. Emissions associated with these new generators would be offset by the removal of emergency generators associated with demolished buildings. Thus, for this analysis it is assumed that emergency generator fuel consumption will remain constant. The emergency generators would continue to comply with USEPA Tier 1 emission standards.

The cooling towers and chillers associated with chilled water production are electric powered, and thus increased cooling demand will not increase onsite air emissions.

Minor increases in VOC emissions are expected due to the installation of two 50,000-gal below-grade, vaulted ASTs and additional fume hoods in various labs. Minor increases in TAP emissions from laboratory fume hoods are also expected. NIH would evaluate potential TAP emissions and, if necessary, obtain a PTC and apply T-BACT to ensure that emissions do not present a concern to public health.

NIHAC emissions are not expected to exceed the synthetic minor operating permit threshold of 50 tons NOx per year. Table 3-12 presents a summary of projected criteria pollutant emissions from stationary on-site sources under the Master Plan.

Table 3-12. Projected NIHAC Criteria Pollutant Emissions from Stationary On-site Sources

Source	Projected Fuel Consumption (gal.)	Criteria Pollutant Emissions (tons)						
		CO	Lead	NOx	$PM_{2.5}$	PM_{10}	SO_2	VOC
Boilers	1,288,000	3.2	0.001	13.5	1.0	1.5	0.14	0.2
Emergency Generators	10,300	0.6	—	2.4	0.1	0.1	0.03	0.08
Propane Use	21,000	0.1	—	0.1	0.01	0.01	0.001	0.01
	Total:	3.9	0.001	16.0	1.1	1.6	0.2	0.3

Offsite Stationary Sources

As discussed in Section 3.8 (Waste), the Master Plan would increase the expected generation of MPW, with most of this increase occurring during Phases 3 and 4. MPW would continue to be incinerated at a contracted waste disposal facility, resulting in a potential increase in offsite emissions of criteria pollutants, mercury, and dioxin. The MPW incineration facility would continue to comply with all operating permits and applicable standards.

Mobile Sources

The Master Plan would not be expected to significantly impact vehicle-related air emissions. The Master Plan would increase the number of personnel commuting to and working at NIHAC from 199 to 212. However, within NIHAC, POV trips between facilities would decrease due to facility consolidation. Furthermore, a slight decrease in NIH vehicle travel to Bethesda for imaging and testing is expected due to the provision of these capabilities at NIHAC. Section 3.2 (Transportation) provides details regarding the changes in vehicular traffic at NIHAC. Overall, vehicle-related air emissions are not expected to be impacted significantly under the Master Plan.

Temporary Activities

Construction, demolition, and renovation (CDR) activities required for the Master Plan would result in temporary minor emissions of NOx, VOC, CO, PM, and SO_2 from the use of on-road vehicles, such as delivery vehicles, tractor trailers, and dump trucks, as well as nonroad construction vehicles, such as excavators, cranes, track loaders, backhoes, and bulldozers over the course of an approximately 20-year period. Emissions from construction equipment and POVs associated with the proposed CDR activities were estimated using USEPA’s National Mobile Inventory Model (NMIM), a consolidated emissions modeling system for USEPA’s MOBILE6 and NONROAD models. The maximum annual projected NOx, VOC, CO, PM, and SO_2 emissions from construction activities and the methodology used to calculate these emissions can be found in Appendix B.

CDR activities often cause fugitive dust (PM) emissions that might have a temporary impact on local air quality. Dust emissions during building construction are associated with land clearing, ground excavation, grading, and the construction of the building itself. Emissions may vary substantially from day to day, depending upon the level of activity, specific type of activity, and weather conditions. The quantity of dust emissions from construction operations is proportional to the area of land where the activity is taking place, as well as the level of construction activity.

NIH is required to take reasonable precautions to prevent PM from becoming airborne, per COMAR 26.11.06.03D. These precautions may include a number of air quality best management practices, which would limit fugitive dust impacts to temporary, minimal health or environmental effects. These practices would include, but would not be limited to, the following:

- Watering down active construction areas to reduce fugitive dust emissions.
- Stabilizing exposed or graded areas (e.g., by paving roads and hydroseeding open areas) as soon as possible upon completion of grading.
- Properly covering trucks hauling fill material or maintaining at least two feet of free-board.
- Limiting truck speeds on unpaved areas of the site to 15 miles per hour or less.
- Grading sites in phases, thereby limiting the time that disturbed soil is exposed.
- Temporarily halting construction activities when winds exceed 25 miles per hour.

If any buildings are found to have asbestos-containing materials, all asbestos air quality hazards in these buildings would be removed prior to demolition. All construction and demolition activities affecting asbestos-containing materials would be performed in accordance with 40 CFR Part 61 Subpart M, the National Emission Standards for Asbestos.

If any buildings to be demolished are found to have HVAC or refrigeration equipment that contains ozone-depleting substances (ODS), the removal and disposal of equipment containing ODS would be performed in accordance with 40 CFR Parts 261 to 268. Applicable record keeping requirements would also be performed in accordance with 40 CFR Part 62 and CAA Section 114(a).

GCR Analysis and Emissions Summary

NIH has prepared a GCR Applicability Analysis for the Master Plan (Appendix B).This analysis assumes worst-case emission rates of nonattainment criteria pollutants during construction and operation of the affected facilities for each calendar year affected by the Master Plan. This analysis demonstrates that the Master Plan would result in emissions well below the *de minimis* thresholds each calendar year for nonattainment criteria pollutants and their precursors (NOx, VOC, $PM_{2.5}$, and SO_2). The Master Plan is therefore not subject to GCR requirements and a conformity determination is not required. The air quality effects of criteria pollutants at NIHAC and beyond the campus boundary would be insignificant under the Master Plan and would not interfere with regional efforts to meet the NAAQS. The minor increase in emissions associated with the Master Plan would not affect population centers or sensitive receptors.

<u>No-Action Alternative</u>

The No-Action Alternative would result in temporary air emissions from construction equipment during demolition activities and during installation of the two new ASTs. The ASTs also would have minor recurring VOC emissions. Demolition activities under the No-Action Alternative would follow the same procedures for fugitive dust minimization, asbestos-containing materials, and ODS as described for the Proposed Action. The emissions-producing operations described under Affected Environment would continue at their existing locations in accordance with the installation's synthetic minor operating permit and applicable standards.

Cumulative Impacts

Air monitoring data at the stations closest to NIHAC demonstrate that ozone and PM ambient air quality pollutant concentrations have been steadily declining over the past 10 to 20 years (USEPA, 2012a). Therefore, the moderate increase in air emissions under the Master Plan is not expected to result in cumulative negative impacts to regional air quality. Additionally, and as stated above, the findings of the GCR Applicability Analysis indicate that the Master Plan would not interfere with regional efforts to meet the NAAQS for these pollutants.

3.7.2 *Indoor Air Quality*

Background

Indoor air quality (IAQ), as defined by the USEPA, refers "to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants" (USEPA, 2012b). Common pollutants that negatively impact IAQ include asbestos, mold, lead, VOCs, and particulate matter. The three basic strategies for improving IAQ are source control, ventilation, and filtration.

Facilities that contain laboratories and animal research facilities often have greater IAQ concerns than traditional office buildings and thus have more stringent HVAC requirements. The NIHDRM and the *Guide for the Care and Use of Laboratory Animals* provide HVAC design requirements and guidance for NIH laboratories and animal facilities.

The *Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings Memorandum of Understanding* (Guiding Principles) provides the following IAQ guidelines:

- Meet the current ASHRAE Standard 55-2004, Thermal Environmental Conditions for Human Occupancy, and ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality.

- Implement a moisture control strategy to prevent building damage and mold contamination.

- Specify low-emitting materials and products, including adhesives, sealants, paints, carpet systems, and furnishings.

- Protect IAQ during construction by following the recommended approach of the Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) *IAQ Guidelines for Occupied Buildings under Construction.* After construction and prior to occupancy, conduct a minimum 72-hour flush-out to minimize occupant exposure to contaminants from new building materials.

Affected Environment

Many of the existing NIHAC laboratory and animal research facilities are aging and the HVAC systems are in need of upgrade or renovation. In many facilities, the building uses have changed and the existing HVAC systems are no longer adequate for the current uses. The HVAC systems in Buildings 102, 110A, and 132 were recently renovated and Buildings 110, 111, and 112 are in need of improved HVAC systems. The animal holding space in Building 103 can only be used on a seasonal basis due to HVAC limitations.

Dedicated HVAC systems are required for some NIHAC animal holding and testing activities to contain biological contaminants as well as nuisance odors, ensuring the safety and comfort of other buildings occupants.

Direct and Indirect Effects

Proposed Action

Under the Master Plan, the HVAC systems in new and renovated facilities would improve occupant comfort, health, and safety compared to existing facilities. Multiple facilities with aging and inadequate HVAC systems would be demolished. The functions from these facilities would be moved to new and renovated animal holding and laboratory facilities that feature HVAC systems designed in accordance with the NIH DRM.

Renovation projects in Building 102 would implement construction measures to protect IAQ in occupied areas in accordance with the NIH DRM, the Guiding Principles, and SMACNA *IAQ Guidelines for Occupied Buildings under Construction*.

In accordance with the Guiding Principles and in support of LEED certification efforts, low-emitting products and materials, such as low-VOC paints and adhesives, may be used to minimize VOC emissions during construction and initial occupancy.

No-Action Alternative

Under the No-Action Alternative, existing facilities with inadequate HVAC systems would continue to be used. Therefore, occupant comfort, health, and safety in these facilities would not be improved.

Cumulative Impacts

No cumulative impacts are expected. IAQ impacts are confined to the interior of buildings; therefore, no impacts should occur beyond those discussed in the Master Plan.

3.7.3 *Greenhouse Gas Emissions*

Background

GHGs are gases in the lower atmosphere that absorb infrared radiation emitted from the earth's surface and then radiate most of this energy back to the earth's surface, allowing average global temperatures to be about 60°F warmer than they would otherwise be (USEPA, 2011). According to the Intergovernmental Panel on Climate Change (IPCC), anthropogenic (human-generated) GHG emissions include the following: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

EO 13514 requires federal agencies to compile annual GHG emission inventories and set GHG emission reduction targets for FY 2020, relative to FY 2008. EO 13423 requires each federal agency to reduce GHG emissions through the reduction of energy intensity by three percent annually or 30 percent by the end of FY 2015, relative to the agency's energy use in FY 2003.

GHG emissions and reduction targets are classified as Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), and Scope 3 (other indirect emissions). Scope 1 emissions include emissions from direct fossil fuel combustion such as in the operation of boilers, generators, incinerators, and vehicles operated by the organization, as well as fugitive emissions of refrigerants and other GHG gases (e.g., fire suppressants). Scope 2 emissions include upstream emissions from purchased electricity, steam, heating, and cooling. Scope 3 emissions include all other indirect emissions not included in Scope 2, such as emissions from employee commuting, employee business travel, transmission and distribution losses associated with purchased electricity, methane emissions from contracted solid waste disposal, methane and nitrous oxide emissions from contracted wastewater treatment, and upstream emissions associated with purchased products and services.

NIH has established agency-wide GHG reduction targets to reduce Scope 1 and Scope 2 GHG emissions by 10.4 percent and Scope 3 emissions by 3.3 percent by FY 2020, relative to emission levels in FY 2008. The NIH GHG inventory is developed in accordance with the *Federal Greenhouse Gas Accounting and Reporting Guidance Technical Support Document* (TSD), issued by CEQ on 6 October 2010.

Affected Environment

Operations at NIHAC produce GHG emissions through a variety of activities, including the following:

1. Operation of boilers, propane heaters, emergency generators, NIH fleet vehicles, and the on-site WTP (Scope 1).
2. Purchase of electricity (Scope 2).
3. Commuting of employees to NIHAC, transmission and distribution losses from purchased electricity, and employee business travel (Scope 3).

These emissions-generating activities provide the baseline to determine any changes in emissions resulting from construction and operation of new facilities under the Master Plan. NIH has developed a GHG inventory addressing activities at NIHAC to satisfy EO 13514 agency-wide GHG reporting requirements. According to the FY 2010 NIH GHG inventory, the operation of emergency generators, propane heaters, south campus boilers, and CUP boilers combined to emit approximately 10,330 metric tons (MT) of CO_2 equivalents (CO_2e) during FY 2010. [Note: To account for the different potencies of GHGs, a common unit of CO_2e is used to represent the amount of CO_2 that would produce the same total global warming potential as the GHGs considered.]

Electricity needed to support the campus is purchased from the Allegheny Power Energy Supply and transmitted to NIHAC through Allegheny Power, which is supplied by multiple generating stations that produce GHG emissions using a variety of fuels.

Based on the FY 2010 NIH GHG inventory, it is estimated that NIH personnel (contractors are not included) release 680 MT CO_2e per year commuting to and from the campus. Table 3-13 summarizes NIHAC GHG emissions for FY 2010.

Direct and Indirect Effects

Proposed Action

Construction, renovation, and demolition activities would generate temporary GHG emissions, while steam generation activities and operation of the new facilities, including periodic emergency generator use, would generate recurring GHG emissions. Current GHG methodologies outlined in the TSD do not describe how to account for construction activities; therefore, they are not included in the current NIH GHG inventory. NIH would strive to minimize GHG emissions by implementing construction, renovation, and demolition best practices. The replacement of existing facilities with more energy efficient buildings is expected to reduce the energy intensity of facilities at NIHAC. A moderate increase in Scope 1 GHG emissions due to increased boiler and emergency generator output would be partially offset by removal of boilers from facilities to be demolished. Similarly, a moderate increase in Scope 2 GHG emissions due to increased electricity consumption associated with new energy efficient buildings would be partially offset by the demolition of energy inefficient facilities.

The Master Plan would increase the number of personnel commuting to and working at NIHAC by approximately 13, some of whom would be federal contractors. Current GHG methodologies as outlined in the TSD do not include federal contractors in Scope 3 employee commuting emissions. Scope 1 GHG emissions associated with the travel of NIH fleet vehicles to NIH Bethesda and between affected facilities throughout the campus are anticipated to be approximately equal to or less than the current emissions. Table 3-13 summarizes the estimated net change in recurring GHG emissions between FY 2010 and full execution of the Master Plan.

Table 3-13. Estimated Annual Greenhouse Gas Emissions (FY 2010 and Master Plan)

Source	Scope	Estimated GHG Emissions (MT CO_2e per year)		
		FY 2010	Master Plan	Net Change
Stationary Combustion	1	10,330	11,979	1,649
Vehicle Fleet	1	56	56	—
On-site Wastewater Treatment	1	10	12	2
Purchased Electricity	2	8,567	11,822	3,255
Federal Employee Commuting [a]	3	680	725	45
Transmission and Distribution Losses	3	622	858	236
	Total [b]:	20,265	25,452	5,187

Notes:
a – Federal Employee Commuting does not include GHG emissions associated with federal contractors.
b – These estimates do not account for temporary GHG emissions associated with construction, renovation, or demolition activities.

No-Action Alternative

Under the No-Action Alternative, the CUP output would not increase and recurring Scope 1 GHG emissions would remain stable. However, inefficient facilities would not be replaced by new energy efficient facilities and the overall campus energy intensity per square foot would not be improved. The No-Action Alternative would generate temporary GHG emissions from construction equipment during demolition activities and during installation of the two new ASTs. NIH would strive to minimize GHG emissions by implementing demolition best practices.

Cumulative Impacts

The Master Plan would generate a minor increase in temporary and ongoing Scope 1 GHG emissions at NIHAC. The use of energy efficient buildings, however, would contribute to NIH-wide goals to reduce overall GHG-intensity of NIH operations.

3.8 Waste

Local, state, and federal regulations and the *NIH Waste Disposal Guide* dictate the handling, storage, and disposal of waste at NIHAC. Table 3-14 provides a summary of waste generated at NIHAC during 2011. The following subsections further characterize the various categories of waste generated at NIHAC.

3.8.1 *Municipal Solid Waste*

Background

Municipal solid waste (MSW) is any garbage, refuse, sludge, or other discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, agricultural, or community activities.

Federal agencies are required to manage their facilities in accordance with various federal and state regulations governing MSW disposal. Subtitle D of the Resource Conservation and Recovery Act (RCRA) encourages states to initiate and oversee the implementation of solid waste management plans in order to promote recycling practices. Maryland requires that each county adopt a ten-year solid waste management plan and that MDE review this plan. *The Montgomery County Comprehensive Solid Waste Management Plan for the Years 2009 through 2019*, developed in response to this requirement, lays out the guidelines for the management of solid waste disposal systems, solid waste acceptance facilities, and the collection and disposal of solid waste. Several EOs set goals for the federal government to conduct operations in a manner that is sound in terms of energy efficiency, toxic chemical reduction, recycling, sustainability, and water conservation (e.g., EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*; EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*; and EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*). In addition, the USEPA's *Guidelines for the Thermal Processing of Solid Wastes* (40 CFR 240) and *Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste* (40 CFR 243) provide specifications for the treatment and disposal of MSW.

Table 3-14. Summary of Waste Generated at NIHAC during 2011

Category	Description	Amount		% of Total
		Pounds	Tons	
Municipal Solid Waste	Office waste, uncontaminated animal bedding, sludge, maintenance waste, and residential trash	640,002	290	72
Recycled Materials	Pallets	63,935	29	7
	Mandatory recyclables (e.g., commingled and mixed paper items, cardboard, scrap metal)	37,479	17	4
Medical Pathological Waste	Microbiological and tissue cultures, clinical specimens, wastes from surgical and autopsy suites, contaminated animal bedding, and sharps and other disposable materials contaminated with pathogenic agents	143,300	65	16
Hazardous Chemical Waste	Toxic compounds and solutions (e.g., trypan blue, phenol, chloroform, formalin, paraformaldehyde)	679	0.3	<1
	Acid solutions	536	0.3	<1
	Sodium and potassium hydroxide solutions	401	0.2	<1
	Flammable liquids	386	0.2	<1
	Lab trash (e.g., gloves, towels, etc. contaminated with trace organics)	135	<0.1	<1
	Flammable paints	68	<0.1	<1
Non-Hazardous Chemical Waste	Oils	906	0.4	<1
	Non-hazardous waste chemicals	613	0.3	<1
	Fluorescent lamps	472	0.2	<1
	Latex paint	49	<0.1	<1
Radioactive Waste	Short half-life isotopes	2,939	1.3	<1
	Long half-life isotopes	44	<0.1	<1
Totals		**891,944**	**405**	**100**

The Maryland Recycling Act (MRA) requires that all counties recycle 15 to 20 percent of the MSW generated, depending on the population. Maryland County Code provides regulations pertaining to residential and commercial recycling (COMCOR 48.00.03, *Solid Waste and Recycling*). In 2012, Montgomery County announced a new goal of reaching an MSW recycling level of 70 percent by 2020 (Montgomery County, 2012).

MSW generation in the U.S. grew from 88 million tons per year in 1960 to 243 million tons per year in 2009. Recent increases in recycling, however, have helped to offset the increase in generation. MSW recycling grew from seven percent in 1960 to 34 percent in 2009. Americans landfilled approximately 54 percent of the MSW generated in 2009. Siting new landfills to accommodate waste generation is difficult due to citizen resistance.

Affected Environment

MSW generated at NIHAC includes office waste; disposable paper, plastic and glass; all used animal bedding except that which has been used by infected animals without being decontaminated; sludge from the WTP; facility and grounds maintenance waste; and a small amount of residential trash. NIH decontaminates animal bedding by treating it with high-pressure steam in an autoclave. Facility and grounds maintenance waste includes grass clippings, raked leaves, building sweepings, miscellaneous building materials, and discarded interior furnishings. The NIHAC MSW stream is more similar to that of a farm than that of an office or residence, with animal bedding and facility and grounds maintenance waste representing a significant proportion of MSW.

As shown in Table 3-14, activities at NIHAC generate an estimated 290 tons of MSW per year (Ketner, 2012). A contractor collects waste twice per week at various site locations and hauls it to the Montgomery County Transfer Station for waste-to-energy incineration. The contractor hauls sludge from the WTP approximately once every two years to a receiving facility in Pennsylvania. The grounds maintenance contractor collects yard waste, mulches it, and uses it in landscaping applications on site. Used bedding and waste from the sheep colony, which currently consists of approximately 10 sheep, is applied to the pastures as fertilizer. All other animal waste and bedding is disposed of as MSW or MPW.

NIH initiated an internal recycling program in 1991 and adopted measures in 1992 to accelerate the program. The NIH-wide recycling program facilitated the increase of recycling at NIHAC and recycling rates are likely to continue to increase. The recycling rate at NIHAC was approximately 11.4 percent (46 tons) of all waste generated during FY 2011, including 13.7 percent of waste that would otherwise be handled as MSW (Table 3-14). Commingled and mixed paper items, pallets, cardboard, and scrap metal are recycled at NIHAC. All of these wastes, with the exception of pallets, are mandatory recyclables per Montgomery County regulations. At NIHAC, the average employee disposes of approximately 14.0 pounds of trash and recycles 2.2 pounds of material on each of the 230 working days per year.

Direct and Indirect Effects

Proposed Action

Expansion of operations under the Master Plan would result in no changes to the types of MSW generated but would result in a moderate increase in the generation, storage, and handling of MSW, especially in the form of animal bedding from expanded animal housing facilities. Quantities of office waste are likely to remain comparable to current levels. Construction, renovation, and demolition under the Master Plan would result in the temporary generation of building debris, pavement debris, and equipment for disposal as MSW. This analysis did not attempt to quantify these sources of waste because their generation would be temporary. NIH is striving for LEED certification for new construction, which would mitigate some of the waste generation through recycling.

Sludge generation at the WTP is likely to increase under the Master Plan due mostly to the expansion of animal facilities and the associated increase in solids generated from cage washdown. Installation of a canopy over the sludge drying bed would reduce rain infiltration and shorten sludge-drying time, resulting in improved sludge storage conditions. NIH would evaluate space needs for open-air storage during the WTP renovation process and, depending on the findings, may need to expand the drying beds to accommodate the potential increase in sludge generation.

No-Action Alternative

The No-Action Alternative would result in minor, temporary generation of MSW associated with demolition activities. The No-Action Alternative would not affect long-term generation of MSW and would not improve sludge storage conditions at NIHAC.

Cumulative Effects

Moderate increases in MSW generation at NIHAC in association with the Master Plan would contribute to the net increase in generation expected in Montgomery County over the next decade. Total MSW generation in the county in 2008 was approximately 1.35 million tons and will likely increase to 1.44 million tons by 2014 and 1.53 million tons by 2019. Total MSW recycling in Montgomery County in 2008 was approximately 41 percent of the MSW generated and will likely increase to 45 percent by 2014 (MDE, 2010). The Montgomery County Transfer Station has the capacity to accommodate these expected increases in waste disposal, including those associated with the Master Plan (Hairey, 2012).

3.8.2 *Medical and Pathological Waste*

Background

MPW is waste that, because of actual or perceived presence of pathogenic agents, requires containment or treatment to prevent occupational or environmental exposure. Pathogenic agents are bacteria, viruses, or other organisms that can cause diseases. Examples of MPW include microbiological cultures; clinical urine, fecal and blood specimens; tissue cultures; wastes from surgical and autopsy suites; contaminated animal bedding; and "sharps". Sharps include needles, syringes, scalpels, razor blades and similar objects. Disposable clothing, paper towels, and sorbent materials contaminated or potentially contaminated with pathogenic agents are also handled as MPW.

Medical waste generation is ubiquitous in modern society. All hospitals generate MPW. Facilities such as medical testing laboratories, private testing laboratories, private biomedical research laboratories, and dentist's and doctor's offices also generate MPW. These generators typically incinerate these MPW types on site at the source or transport it to off-site locations for disposal. For smaller generators, contractors follow established pick-up routes and schedules in the same manner as MSW collectors.

Federal and state regulations control procedures for handling, treatment, storage, and disposal of medical wastes. Pertinent regulations include OSHA regulations for waste containing bloodborne pathogens (29 CFR 1910.1030) and Maryland regulations for handling, treatment, and disposal of special medical waste (COMAR 10.06.06, COMAR 26.13.11, and COMAR 26.13.12).

Affected Environment

NIHAC generated approximately 65 tons of MPW during FY 2011. NIHAC handles all MPW in accordance with the regulations and guidelines described above. Most of the material is infected animal dry bedding that has not been decontaminated (roughly 2,000 pounds/week); infected animal carcasses; and materials generated in veterinary care (e.g., sharps and material contaminated with cytotoxic drugs or infectious agents). Bedding from clean research animals is not MPW. Most of the MPW generation at NIHAC is attributable to veterinary care; research at NIHAC primarily involves observation of animal behavior and contributes comparatively little MPW.

At NIHAC, operators package MPW at the point of generation and send it to designated pick-up locations inside buildings throughout the campus. MPW generated at NIHAC is stored in refrigerators for subsequent collection once a week by a contractor. Current cold storage space is inadequate to accommodate the amount of MPW generated. The MPW is transported to the NIH

Bethesda campus, where it joins the MPW collection stream from that facility and is then hauled off-site collectively for incineration.

Direct and Indirect Effects

Proposed Action

Expansion of operations under the Master Plan would result in no changes to the types of MPW generated but would result in a moderate increase in the generation, storage, and handling of MPW due to expanded animal holding and testing operations. Under the Master Plan, NIHAC would continue to handle all MPW generated in accordance with the regulations and guidelines described above. The Master Plan would improve existing MPW handling procedures by providing additional cold storage space.

No-Action Alternative

The No-Action Alternative would not affect MPW generation and would not resolve existing MPW storage capacity inadequacies.

Cumulative Effects

No cumulative effects associated with MPW are likely to result from implementation of the Master Plan. No changes are expected in the types of MPW generated. The Bethesda campus and Curtis Bay Energy (the incineration facility) have the capacity to accommodate the expected increases in waste disposal associated with the Master Plan (Ketner, 2012; Groenke, 2012).

3.8.3 *Hazardous and Chemical Waste*

Background

A hazardous waste is defined by USEPA as a solid waste that exhibits a characteristic of ignitability, corrosivity, reactivity, or toxicity, or is specifically listed as a hazardous waste. Federal, state, and county laws regulate hazardous wastes. Chemical waste includes discarded non-radioactive chemicals, including hazardous and nonhazardous chemicals. Chemical waste includes items defined as Hazardous Wastes (40 CFR 261), Hazardous Substances (40 CFR 302.4), Hazardous Materials (40 CFR 171.8), and Controlled Hazardous Substances (26 COMAR 13.02.06). Nonhazardous chemical waste includes nonradioactive chemicals that no government agencies regulate as hazardous waste.

RCRA authorizes USEPA to control hazardous waste from "cradle to grave." This lifecycle includes the generation, transportation, treatment, storage, and disposal of waste. USEPA has delegated the enforcement of RCRA in Maryland to MDE. USEPA also controls toxic chemicals through the Toxic Substances Control Act (TSCA), which addresses chemical substances and mixtures whose manufacture, processing, distribution in commerce, use, or disposal may present an unreasonable risk of injury to health or the environment.

Affected Environment

Hazardous chemical wastes generated at NIHAC include flammable liquids and paints, sodium and potassium hydroxide solutions, acid solutions, toxic compounds and solutions, and contaminated lab trash. Most hazardous waste streams result from laboratory operations, equipment sterilization, and janitorial services. Hazardous materials including polychlorinated biphenyls (PCBs), lead, and asbestos may be present throughout the campus in building materials and equipment. Non-hazardous chemical waste includes oils, fluorescent lamps, and latex paint. As shown in Table 3-14, NIHAC generated an estimated 1.1 tons of hazardous chemical waste and 1.0 ton of non-hazardous chemical waste in 2011 (Weidner, 2012).

The NIHAC labs accumulate hazardous and chemical waste in satellite accumulation areas initially (at the point of generation) and then in a 90-day hazardous waste storage area in Building 101A. On a monthly basis, a licensed private contractor retrieves hazardous and chemical wastes from the satellite accumulation areas, segregates them according to hazard classification, packages them in drums for shipment, stores these containers in the 90-day hazardous waste storage area, then transports them to a treatment, storage, and disposal facility in Lewisberry, PA (Weidner, 2012).

NIHAC handles all hazardous and chemical waste in accordance with the regulations described above. NIHAC has a USEPA hazardous waste generator number (MD7750014667) under the Hazardous Materials Use Permit program and was classified as a fully-regulated generator (i.e., a facility that generates or stores greater than 100 kg hazardous waste per month) in 2011 (Weidner, 2012).

Direct and Indirect Effects

Proposed Action

Expansion of operations under the Master Plan would result in no changes to the types of hazardous and chemical waste generated but would result in a net increase in quantity of waste generated. Expanded laboratory activities would result in a moderate increase in hazardous and chemical waste generation, storage, and handling. Under the Master Plan, NIHAC would continue to handle all hazardous and chemical waste in accordance with the regulations described above.

Renovation and demolition under the Master Plan would result in temporary generation of building and equipment debris, which may contain lead, asbestos, and PCBs. All demolition activities involving suspected asbestos-containing materials would be performed in accordance with federal and state requirements for proper management of asbestos for renovation and disposal included in 40 CFR 61, Subpart M, as well as COMAR 26.11.21. Contractors would remove materials suspected of containing asbestos, lead, or PCBs prior to the start of demolition activities; keep these materials separate from general demolition debris; and dispose of them in accordance with applicable regulations. Contractors would sample demolition debris to verify that lead levels are below the RCRA hazardous waste threshold and, if exceeded, would separate and dispose of the contaminated debris in accordance with RCRA regulations. Closing and disposal of USTs may result in the temporary generation of petroleum waste, which would be handled in accordance with applicable regulations and sent to an NIH-approved facility for energy recovery.

No-Action Alternative

The No-Action Alternative would not result in an increase in the long-term generation of hazardous and chemical waste, but would result in minor, temporary generation of demolition debris, which may be contaminated with lead, asbestos, and PCBs. Hazardous materials associated with demolition activities under the No-Action Alternative would be handled and disposed of following the same procedures described for the Proposed Action in accordance with federal and state regulations. Contractors would remove materials suspected of containing asbestos, lead, or PCBs prior to demolition activities and keep materials separated from general demolition debris.

Cumulative Effects

There is minimal potential for cumulative effects associated with the Master Plan due to anticipated generation of very small quantities of hazardous and chemical waste.

3.8.4 *Radiological Waste*

Background

Radioactive wastes display properties of nuclear instability. Low-level waste (LLW) includes items contaminated with radioactive material or exposed to neutron radiation and includes items such as protective clothing, tools, filters, rags, and medical tubes. High-level waste (HLW) is a type of highly radioactive waste that is a byproduct from the reprocessing of spent nuclear fuel. Activities involving radioactive material are strictly controlled by the Nuclear Regulatory Commission (NRC) through regulations, which can be found in 10 CFR 19, 20, 30, and 35. Regulations of the USDOT (49 CFR 171) and USEPA (40 CFR 60) also apply.

Affected Environment

Examples of LLW generated at NIHAC include contaminated paper, plastics and glassware; smoke detectors; radioactive liquid; liquid scintillation counting fluid and vials contaminated with experimental or cleanup materials; carcasses and excreta of animals if radioactive material was used in the study of the animal; and contaminated MPW. No HLW is generated at NIHAC.

The amounts of radioactive waste generated at NIHAC are small and most involve very low levels of radioactivity (Table 3-15). NIHAC generated approximately 2,983 pounds of radioactive waste in FY 2011, approximately 70 percent of which was MPW contaminated with radioactivity (Cabot, 2012). Examples of radioactive materials used are Tritium (3H), Iodine-125, Indium-111, Indium-114m, and Technetium-99m. All radioactive materials used on the campus, with the exception 3H, have half-lives of less than 100 days. The NRC inspects all NIH facilities for compliance with the regulations on a regular basis.

Table 3-15. Radioactive Waste Produced at NIHAC during Calendar Year 2011

Nuclide	Amount Generated (mCi) [a]
Tritium (3H)	0.03
Iodine-125	9.42
Indium-111	96.29
Indium-114m	0.01
Technetium-99m	99.83
TOTAL	**205.56**

Notes:
a – Millicuries (non-SI unit of radioactivity)

A State of Maryland licensed contractor transports the NIHAC radioactive waste to the NIH Bethesda campus on an as-requested basis. At Bethesda, the radioactive waste from all NIH facilities in Maryland is marshaled; separated by type, such as solid or liquid; treated, if required;

temporarily stored for radioactive decay, if the half life is short (less than 120 days); and packaged for shipment to ultimate disposal sites.

Direct and Indirect Effects

Proposed Action

Expansion of operations under the Master Plan would result in no changes to the types of radioactive waste generated but would result in a net increase in quantity of waste generated. Expanded laboratory testing facilities associated with the Master Plan would result in a moderate increase in radioactive waste generation, storage, and handling in the form of animal carcasses and excreta. The *NIH Waste Disposal Guide* and state and federal regulations would continue to dictate all radioactive waste handling at NIHAC.

No-Action Alternative

The No-Action Alternative would not affect radioactive waste generation.

Cumulative Effects

No cumulative effects associated with radioactive waste are likely to result from implementation of the Master Plan due to the generation of small quantities and no changes in the types of radioactive waste generated under the Master Plan.

3.9 Natural Resources

Due in part to the rural setting and proximity to the Potomac River, valuable natural resources are found at and around the NIHAC campus. This section evaluates the potential effects of the Master Plan on NIHAC's topography; soils and farmland; geology and groundwater; vegetation and wildlife; surface waters; wetlands; floodplains; and environmentally sensitive areas.

3.9.1 *Topography*

Background

Topography indicates the relative position and elevation of natural and man-made features within an area. Changes to the topography of an area can affect surface and subsurface water pathways and quantities, result in increased sedimentation, impact stormwater runoff, and ultimately affect water quality in nearby waterways and wetlands. Topography can also influence viewscape, landscape, noise trespass, and land use.

Affected Environment

The NIHAC campus is located on the eastern part of the Piedmont physiographic province, which is generally characterized by rolling hills and low valleys with abundant streams, wetlands, and groundwater. The NIHAC campus is specifically characterized by a landscape that has sporadic forested areas and gently rolling pastures, much like the surrounding areas of the Montgomery County Agricultural Reserve. There are both higher-elevation uplands and lowlands where water collects, which contribute to the undulating topography of the campus. Topography at the NIHAC campus is illustrated in Figures A-1 and A-2, located in Appendix A.

The highest elevation at NIHAC is approximately 315 feet (96 meters) above the mean sea level and is located near the northwest corner of the property where Club Hollow Road intersects Elmer School Road. This marks one corner of the plateau characterized by the higher elevations of the campus, running the entire frontage of Elmer School Road. The plateau slopes gently downward and extends eastward as an elevated area bisected by a large swale running west-to-east along the center of the campus. This swale runs into an intermittent stream that flows eastward to a reservoir and then descends to Broad Run. This drainage pattern creates two bluffs, north and south, that are at roughly the same elevation. There are steep slopes on the sides of the bluffs leading to the lower elevations of the campus near Broad Run and its tributaries.

The plateau and the two bluffs contain gentler slopes, whose low potential for soil erosion and minimal grading requirements make them more conducive to development. Most of the existing development at NIHAC is located along the two bluffs, while the plateau has pastures for the grazing of large animals. While the land immediately adjacent to Broad Run is also gently sloped, these areas are within the floodplain and are separated from the other portions of the campus by steep slopes, making them difficult to access. Most of the areas featuring steep slopes are forested.

The rolling topography at NIHAC limits noise trespass and visibility outside of the campus. Also, while the steeply sloped areas remain mostly undeveloped, they have lower potential to contain archeological resources than the flat, elevated areas of campus (Comer, 1993).

Direct and Indirect Effects

Proposed Action

Construction activities associated with the Master Plan would require grading to provide more suitable topography for new buildings and related infrastructure to control stormwater runoff and minimize soil erosion. Grading would be minimal, however, since most of the construction would occur in previously disturbed and developed areas. Therefore, the Master Plan would result in minor impacts to campus topography that may influence drainage patterns in the immediate vicinity of the proposed facilities. These impacts would be mitigated via conventional and sustainable stormwater management practices (e.g., native bioswales and vernal pools), which are discussed in more detail in Section 3.3.3 (Stormwater and Stormwater Management).

No-Action Alternative

The No-Action Alternative would not involve grading activities and, therefore, would not impact topography at NIHAC.

Cumulative Effects

No other past, present, or reasonably foreseeable projects would affect topography in the vicinity of NIHAC; therefore, no cumulative effects to topography are anticipated as a result of the Master Plan.

3.9.2 *Soils and Farmland*

Background

The geology of an area encompasses characteristic rocks, sediments, and land features and the forces affecting them. These geologic features provide the parent material for overlying soils through weathering and supplying of minerals and nutrients. Soils are important because of the significant functions they perform, including the following:

- Sustaining biological activity, diversity, and productivity.
- Regulating and partitioning water and solute flow (e.g., sediment).
- Filtering, buffering, degrading, immobilizing, and detoxifying organic and inorganic materials.
- Storing and cycling nutrients and other elements.
- Supporting socioeconomic structures (e.g., agriculture).

Assessing the soil resources in an area can provide insight on environmental impacts of potential actions on that area and its surroundings. Alterations to the physical makeup of an area can lead to soil contamination, soil erosion, and detrimental impacts on water bodies in or near the area. Unfavorable soil characteristics could make the development of an area impractical.

The physical characteristics of soils can affect the suitability of the site for development and dictate the types of precautionary measures that should be implemented to minimize impacts to human health and the environment during earth disturbance. Various physical characteristics of soils make specific soil types more susceptible to high water erosion rates, wind-throw hazards, and emissions of particulate matter and therefore require the establishment of mitigation and precautionary measures.

MDE approval of stormwater and SEC plans, which address stormwater runoff and prevention of sediment transport during construction and demolition activities, is needed for all project elements with an LOD greater than 5,000 SF and 100 cubic yards (CY). The Maryland Stormwater Act of 2007 requires the design and review of SEC and stormwater management plans to be integrated. Additional information regarding the Maryland Stormwater Act of 2007 and stormwater management plans is provided in Section 3.3.3 (Stormwater and Stormwater Management).

As noted above, soil quality is important for its role in supporting agriculture. The Farmland Protection Policy Act of 1981 (7 U.S.C. §§ 4201 et seq.) aims to minimize the impact of federal actions on farmland and its conversion to nonagricultural uses. The act establishes the following three categories of farmland:

- Prime farmland: Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion.

- Unique farmland: Land other than prime farmland that is used for production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods.

- Other farmland of state or local significance: Land other than prime or unique farmland, that is of statewide or local importance for the production of food feed, fiber, forage, or oilseed crops.

Affected Environment

Geologically, the area that includes the NIHAC campus is known as the New Oxford Formation, which is part of the Newark Group formed in the Triassic age. This formation is characterized by red, maroon and gray sandstone laminated with small amounts of shale and basal conglomerate (Maryland Geological Survey, 2010). The New Oxford Formation can be characterized by its thin layer of soil (two to five feet), which implies that events on the soil surface can easily contaminate the underground water supply (Town of Poolesville, 2010).

Figures A-3 and A-4, located in Appendix A, illustrate the types of soils present at NIHAC, based on the Soil Survey for Montgomery County developed by the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS). Croom and Bucks soils are found in the higher elevated areas of the campus, which include the plateau and the two bluffs. The slopes on the campus are predominantly Penn silt loam; portions that exceed 15 percent slope are considered highly erodible. Elk silt loam, Bowmansville-Melvin silt loams, Delanco silt loam and Rowland silt loam cover most of the Broad Run stream bottom and floodplains. Also, terrace gravel is present near the upper northwest corner of the campus. It is an alluvial formation left over from an earlier floodplain or shoreline.

The soils around the NIHAC campus are also categorized by the NRCS to help identify suitable farmland (see Figures A-5 and A-6, located in Appendix A). At the NIHAC campus, prime farmland is located in the north parcel (north of Club Hollow Road), north of the north bluff and on the southern portion of the campus along Broad Run. Soils of statewide significance are located throughout the whole campus. The areas of no farmland significance are found in small portions of the Penn silt loam, all areas of the Croton silt loam, and all areas of the Readington silt loam.

Direct and Indirect Effects

Proposed Action

The Master Plan would result in moderate soil disturbance associated with construction, demolition, and renovation projects that would impact both previously developed and undisturbed soils. NIH would implement SEC measures during earth disturbance to minimize impacts to soil. Most elements of the Master Plan would likely exceed 5,000 SF of disturbance and SEC plans for these projects would be designed in accordance with the Maryland Standards and Specifications for Soil Erosion and Sediment Control and submitted to MDE for approval. As noted in Section 3.9.1 (Topography), the Master Plan would require minimal grading; accordingly, with the use of appropriate SEC measures, the potential for extensive soil erosion would also be minimal.

Construction and demolition activities could potentially impact soil quality. Soil surface and subsurface compaction may result from heavy machinery traffic around the sites of the Master Plan. Removal of existing fuel USTs would also have the potential to result in soil contamination if they were to be improperly closed and demolished. The Master Plan would remove and permanently close these USTs in accordance with the requirements of 40 CFR Part 280 Subpart G and COMAR 26.10. These requirements include MDE notification at least 30 days prior to tank removal, cleaning and removal of any liquids and sludge, removal of the tank, sampling for the presence of contamination, corrective action as necessary, and maintenance of all necessary documentation. NIH would install the precast concrete vaulted tank system in accordance with the requirements of 40 CFR Part 112 and COMAR 26.10. Overall, the removal of old USTs and installation of the new tank system would likely reduce the potential for future petroleum leaks and soil contamination.

The stability of existing development at NIHAC indicates that soil conditions on the north bluff would be suitable for new development. Geotechnical surveys would be performed to confirm soil constructability prior to construction of new buildings.

The Master Plan would result in the potential net loss of less than five acres of prime or unique farmland and farmland of state significance. In accordance with the Farmland Policy Protection Act, NIH will consult with the local NRCS office to determine a Farmland Conversion Impact Rating for the site of the Master Plan. This impact rating determines the appropriate level of consideration for protection of the evaluated farmland.

Operational use of the proposed facilities is not likely to impact soils or farmland.

No-Action Alternative

The No-Action Alternative would result in minor soil disturbance and potential soil compaction associated with demolition, AST installation, and potable water system repairs. As with the Proposed Action, NIH would obtain an MDE-approved SEC plan for the AST installation and would install the tanks in accordance with 40 CFR Part 112 Subpart B and COMAR 26.10. NIH would ensure proper management of demolition waste to prevent soil contamination. Installation of the precast concrete vaulted tank system would slightly increase the potential for future soil contamination due to petroleum leaks.

Continued operations under the No-Action Alternative would not impact soils, prime or unique farmland, or farmland of state significance.

Cumulative Effects

No other past, present, or reasonably foreseeable projects would affect soils or farmland in the vicinity of NIHAC; therefore, no cumulative effects to soils or farmland are anticipated as a result of the Master Plan.

3.9.3 *Geology and Groundwater*

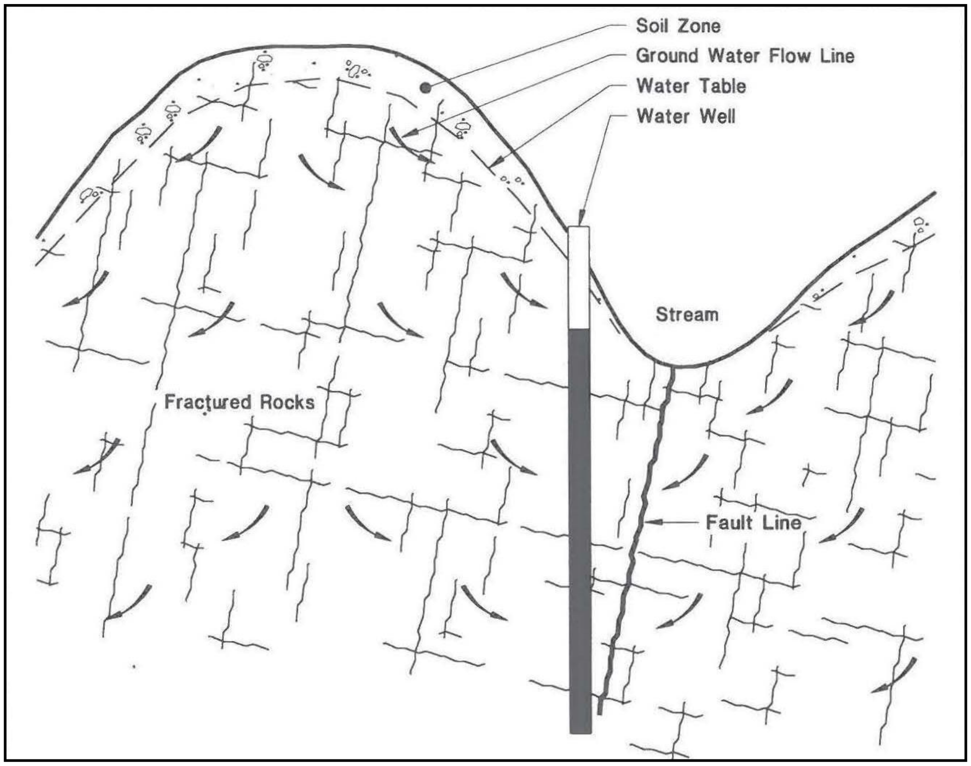
Background

Groundwater is water found beneath the water table in soils and geologic formations. An aquifer is a geological formation, group of formations, or portion of a formation capable of yielding significant quantities of groundwater to wells or springs. Groundwater is the most prevalent source of available freshwater that supports potable, agricultural, and industrial uses, especially in areas that lack access to surface water resources. Groundwater quality is impacted by interactions with soil, sediments, rocks, surface waters, and the atmosphere. Groundwater quality may also be significantly affected by agricultural, industrial urban, and other human actions.

Affected Environment

The NIHAC campus is located in the eastern part of the Piedmont Lowland physiographic province. The Poolesville area is underlain by hard, crystalline igneous and metamorphic rocks. Bedrock in the eastern part of the Piedmont consists of sandstone, shale, and/or siltstone of probable volcanic origin (Maryland Geographical Survey, 2001). A thin layer of soil covers this thick (more than 2,000 feet) mantle of rocks that were deposited in the area millions of years ago. These fractured rocks are part of the New Oxford Formation (Town of Poolesville, 2011).

The groundwater system in the greater Poolesville area occurs in the fissures, cracks, and crevices within this rock formation, and is known as a fractured bedrock aquifer (Figure 3-3). Since the majority of the aquifer is composed of rock, groundwater storage is mostly confined to the cracks and fractures within this rock. The productivity of a well is therefore dependent on the number of cracks and fractures intercepted by a particular well, the storage capacities of those cracks and fractures, and recharge rates due to local precipitation. Once groundwater is withdrawn, there is little to replace it until the next precipitation event.



Source: NIH, 1996.

Figure 3-3. Schematic Hydrogeologic Section in Jointed and Creviced Consolidated Sedimentary Rocks

Groundwater in the greater Poolesville area is separated from groundwater to the west and northwest due to the presence of a diabase dike. Diabase is a type of intrusive igneous rock. This intrusion filled a long, wide fracture and formed a dike, separating the groundwater on either side of it. The diabase dike limits the recharge area of the aquifer underlying the Poolesville area, but substantially reduces the potential for groundwater contamination to migrate from areas to the west and northwest (such as the County Resource Recovery Facility in Dickerson, Maryland) (Town of Poolesville, 2011). As described in Section 3.9.2 (Soils and Farmland), however, the generally thin soil layer within the New Oxford Formation implies that events on the soil surface can easily contaminate the groundwater supply (Town of Poolesville, 2011).

The NIHAC campus is located within the Broad Run watershed, which is one of four watersheds that extend into the Town of Poolesville. The NIHAC campus has five on-site wells that supply potable water. Four of the wells are located on the main campus and supply the on-site water tower. The water tower distributes potable water to all of the buildings on the main campus. The fifth well is located on the north parcel and services the buildings located there. For additional information on the potable water system and use at NIHAC, see Section 3.3.1 (Potable Water Supply).

The Town of Poolesville draws from wells from all four watersheds, including Broad Run. The town plans to explore drilling new wells within the Broad Run watershed, as far removed from potential sources of contamination as possible, to provide back-up water supply in the event that groundwater contamination disables one or more of their wells (Town of Poolesville, 2011). Therefore, it is unlikely that the town would develop new well fields in the immediate vicinity of NIHAC due to the presence of fuel storage tanks on campus and the associated risk of leaks.

Direct and Indirect Effects

Proposed Action

The Master Plan is expected to generate an overall increase in groundwater demand due to increased campus population for both humans and NHPs and increased steam load. As discussed in Section 3.3.1 (Potable Water Supply), water consumption would increase gradually during the four phases of the Master Plan over the next 10 to 20 years, with the largest increases taking place during Phases 3 and 4.

Based on current practices and consumption rates, wash down of additional animal facilities would constitute the majority of the increase in groundwater consumption (an increase of 20,000 gpd), followed by water for use by additional humans and NHPs (7,400 gpd) and additional make-up water for the increased steam load (4,700 gpd). Based on current system operation with no new conservation measures or system upgrades to expand gray water use, this would increase NIHAC groundwater extraction to a rate of approximately 90,000 gpd with little margin of safety to ensure compliance with the MDE withdrawal permit.

To ensure that groundwater extraction remains within permitted levels and to reduce water consumption in accordance with NIH and federal goals, NIH would implement multiple water conservation and reuse strategies. These strategies are discussed in Section 3.3.1 (Potable Water Supply). If NIH implements the Master Plan's recommended approach, the projected extraction would remain within permitted levels while accommodating a 20 percent factor of safety.

The Master Plan has the potential to impact groundwater quality during construction and demolition activities. Appropriate pollution prevention measures would be implemented during execution of the Master Plan to avoid spills and exposure of groundwater to contamination.

The Master Plan would have the potential to result in groundwater contamination during demolition activities if any storage tanks were to be improperly closed and demolished. NIH would remove and permanently close the USTs in accordance with the requirements of 40 CFR Part 280 Subpart G and COMAR 26.10, as described in Section 3.9.2 (Soils and Farmland). NIH would install the precast concrete vaulted tank system in accordance with the requirements of 40 CFR Part 112 and COMAR 26.10. Overall, the removal of old tanks and installation of the new tank system would reduce the potential for future groundwater contamination.

The NIHAC campus is outside Poolesville's current well influence area (Town of Poolesville, 2011). Therefore, NIHAC does not pose a contamination threat to the Town's water supply in the event of a chemical spill on campus, and no impact to groundwater quality is anticipated outside the NIHAC campus.

No-Action Alternative

Under the No-Action Alternative, there would be no increase in groundwater consumption. Therefore, well water extraction would not exceed the 90,000 gpd permit limit. It is NIH's philosophy that there is no acceptable long term leakage rate for potable water; accordingly, the leak detection and repair program would continue to further reduce groundwater consumption.

The No-Action Alternative has the potential to impact groundwater quality during demolition activities and installation of the below-grade, vaulted ASTs at the CUP. Appropriate pollution prevention measures would be implemented during execution of the No-Action Alternative to avoid spills and exposure of groundwater to contamination. The ASTs would be installed in accordance with the requirements of 40 CFR Part 112 and COMAR 26.10.

Cumulative Effects

All expected impacts to the NIHAC groundwater supply are discussed in the Master Plan. The NIHAC groundwater supply would not be impacted by regional development; therefore, no cumulative effects are expected. Due to the nature of the fractured rock aquifer at NIHAC and its location outside of the Town of Poolesville's well influence area, no cumulative effects are anticipated as a result of the proposed increase in groundwater consumption.

3.9.4 *Vegetation and Wildlife*

Background

Vegetation performs the following important functions:

- Slows the flow of stormwater runoff, allowing water to soak into the ground to replenish aquifers.
- Helps maintain the water quality of nearby waterways by filtering runoff and removing harmful sediment and pollutants.
- Prevents erosion by reducing the impact of rain on soil and by holding soil in position with roots.
- Shades paved surfaces, reducing heat island effect and stormwater runoff temperatures that affect aquatic habitats.
- Provides habitat for a variety of organisms.

A diversity of wildlife species is necessary to maintain a functioning habitat or ecosystem. The species within a particular ecosystem may interact or compete with one another for food, shelter, and overall sustenance. Therefore, the loss of a particular species may negatively affect an ecosystem. The Endangered Species Act was enacted in 1973 to protect species in danger of extinction. This act requires federal agencies to ensure that their actions will not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the critical habitat associated with these species.

Affected Environment

The NIHAC campus is located within the Potomac River Basin, most of which is forested and agricultural land (Interstate Commission on the Potomac River Basin, 2012). The vegetation at NIHAC is characteristic of the surrounding historic, agricultural landscape. The NIHAC campus has 120 acres of pasture land, 127 acres of open space, and 217 acres of forest. The open pastures, natural swale, and expansive forest complement the area's agricultural topography and associated rural views.

Grassy vegetated areas surround the existing NIHAC facilities. Campus pastures have been used for animal grazing both historically and under NIH ownership. However, NIH's use of the pastures has declined in recent years, and they are now mowed twice a year, during the warmer months. The natural, grassy swale that runs through the center of campus performs important functions related to stormwater and erosion control.

Forested areas are prevalent on the steep slopes and lower elevations on the NIHAC campus. The large forested area that surrounds Broad Run as it meanders through campus is dominated by deciduous hardwoods, some of which are riparian species. The forested areas on campus perform all of the important functions of vegetation described above. The evergreen trees at NIHAC are confined to a few patches, suggesting that they were planted to provide security screening. The cultivated vegetation on the site includes both ornamental trees and shrubs. Ornamental trees are scattered throughout the campus, clustered as a hedgerow along Elmer School Road and Club Hollow Road. They are also placed between buildings, along parking areas and along the vehicular drives.

The juxtaposition of distinct vegetation communities at NIHAC supports a variety of wildlife. Each community has species unique to it as well as those that take advantage of habitat convergence. For example, the large areas of pasture land, coupled with the tracts of forested areas, lend themselves to wildlife that depend on each, such as deer, turkeys, coyotes and foxes. The streams on campus support a variety of macroinvertebrate and vertebrate species. In 1996, Montgomery County biologists monitored the Broad Run aquatic habitat downstream of the campus and determined that was in good condition. During that study, seventeen species of fish were found near the NIHAC campus, including largemouth bass and five species of sunfish (Montgomery County DEP, 2001).

The continuous forest tract along Broad Run provides valuable wildlife habitat and connects larger habitat areas. This forested area is of sufficient size to support Forest Interior Dwelling Species (FIDS), which are species whose life cycle requires forest interior habitat (i.e., habitat that is more than 300 feet from the forest edge) (MDNR, 2012). Figures A-7 and A-8, located in Appendix A, show potential FIDS habitat (based on model approximation only) in the vicinity of NIHAC. The forested area along Broad Run is part of a larger, contiguous forest that Montgomery County has identified as a prime ecological resource for threatened and endangered species. The county intends to acquire additional properties along Broad Run to complete a linear ecological greenway.

Per consultation with the Maryland Department of Natural Resources (MDNR) Wildlife and Heritage Service and review of U.S. Fish and Wildlife Service (USFWS) online records, there are no state or federal records for rare, threatened, or endangered species within the NIHAC campus. Appendix D provides the associated correspondence with MDNR and USFWS.

Direct and Indirect Effects

Proposed Action

The Master Plan aims to minimize impacts to vegetation by consolidating facilities within previously developed areas. The Master Plan would result in a minor reduction in vegetated area due to removal of grassy areas, urban landscape, and forested area associated with construction. This would require the removal of approximately 21,130 SF (0.49 acres) of mature, hardwood forest due to construction of the proposed emergency access road (Figure 3-4) and the Behavioral Research Facility. This represents 0.22 percent of the forest present at NIHAC. Also, modifications to the perimeter security fence may involve some impacts to forest. The extent of these impacts, however, cannot be determined until NIH completes further study to identify an engineering solution that would provide a stable and secure perimeter fence. At that time, NIH would evaluate the potential effects of the modifications on forested areas and take measures to minimize the associated impacts. NIH would replace trees removed within the campus in accordance with their 1-to-1 tree replacement policy, resulting in no net long-term change to forested area.

Figure 3-4. Location of Trees to be Cleared for Proposed Emergency Access Road

The Master Plan would result in a net loss of approximately 75,703 SF (1.74 acres) of grassy area. In addition, site preparation and utility installation and repairs may result in the temporary disturbance of additional areas of vegetation; these areas would be replanted with native vegetation after completion of work. The footprints of existing facilities and associated infrastructure demolished by the Master Plan would be replanted with native vegetation.

The vegetated areas impacted by the Master Plan represent potential wildlife habitat. The proposed emergency access point would require tree removal in a narrow patch of forest that extends from the edge of a larger stand with an interior area that may be of sufficient size to support FIDS. Because the affected patch of forest does not form part of the core of the larger stand and does not influence the designation of potentially suitable FIDS interior habitat within that stand, tree removal in this area is not likely to reduce FIDS habitat area (Figures A-7 and A-8, located in Appendix A). Therefore, no impact to habitats of concern (e.g., FIDS habitat) is anticipated under the Master Plan. The reduction in grassy vegetated areas represents a slight reduction in potential habitat. Much of these affected grassy areas, however, are routinely landscaped and offer less foraging and habitation value than other vegetated areas around campus. No disturbance of federal or state-listed rare, threatened, or endangered species is anticipated under the Master Plan.

Any hardwood trees removed in association with the Master Plan must be managed in accordance with Maryland Department of Agriculture guidance to prevent the spread of the emerald ash borer. Additionally, the forested area to be cleared may need to be surveyed to comply with the Migratory Bird Treaty Act. Tree clearing would not occur between May 1 and August 31 unless it could be verified that no migratory bird eggs and/or young are present. If a survey reveals that eggs and/or young are present, tree clearing would proceed only after the young fledge or after August 31 (whichever comes first).

The landscape elements of the Master Plan include the following: native vegetation plantings to provide visual buffers; pasture reduction and associated meadow restoration, which would lead to a reduction in necessary grounds maintenance; vernal pool restoration and bioswale additions along the surface waters central to campus; possible construction of a wetland to improve gray water treatment at the WTP; and creation of a campus green. These landscape elements would harmonize with existing historical landscape patterns, protect agricultural views, restore wildlife habitats and create visually rich, and seasonally appealing, landscape. Section 11.2 (Landscape Plan) in the NIHAC Master Plan describes these elements in more detail. The Master Plan would also improve landscaping in accordance with EO 13148 and EO 13514. Overall, the proposed landscape plan and adherence to new federal requirements would result in minor improvements to urban landscape vegetation.

NIH would implement appropriate stormwater management and pollution prevention measures during construction of the proposed facilities to prevent impacts to Broad Run, the intermittent streams, or the aquatic species that inhabit these waterways. Additional information regarding the proposed stormwater management measures is provided in Section 3.3.3 (Stormwater and Stormwater Management).

Refer to Section 3.9.5 (Surface Waters) for discussion regarding impacts to aquatic habitat in Broad Run due to potential changes in water quality under the Master Plan.

Noise emissions from the construction activities under the Master Plan may disturb wildlife in and around the project sites; however, these impacts would be temporary. Construction activities would comply with all applicable local, state, and federal regulations. Impacts to noise are discussed further in Section 3.6 (Noise).

<u>No-Action Alternative</u>

The No-Action Alternative would result in temporary disturbance of grassy vegetated areas and noise emissions due to demolition activities, utility repair, and AST installation. No trees would be removed. NIH would replant disturbed areas with native vegetation, thus increasing vegetated area at NIHAC following demolition activities. Wildlife disturbance due to noise would be negligible and temporary. However, the potential to further improve the existing landscaped areas in accordance with EO 13148 and EO 13514 would not be realized under the No-Action Alternative.

The No-Action alternative would not affect wastewater discharges or stormwater runoff, and thus would not affect aquatic habitat in Broad Run and other surface waters.

No disturbance of federal or state-listed rare, threatened, or endangered species is anticipated under the No-Action Alternative.

Cumulative Effects

This part of the county will remain largely undeveloped according to the Poolesville Master Plan and the growing level of participation in the Montgomery County Agricultural Preservation Programs. Therefore, no cumulative impacts to vegetation and wildlife are anticipated.

3.9.5 *Surface Waters*

Background

Surface waters include oceans, lakes, rivers, streams, and estuaries. These resources supply water for domestic use, recreation, transportation, crop irrigation, and power generation. Natural conditions (e.g., interactions with soil, sediments, rocks, groundwater, and the atmosphere) and human activities can impact the quality of surface water by affecting its chemical, physical, and biological characteristics. Anthropogenic disturbances that may affect surface water quality include agricultural, industrial, and urban activities.

Stormwater runoff from surrounding watersheds directly impacts surface water quality. As discussed in Section 3.3.3 (Stormwater and Stormwater Management), stormwater is typically managed using structural or nonstructural BMPs such as ponds, filters, and LID practices.

Federal surface water regulations, including the Clean Water Act (CWA), the Safe Drinking Water Act (SDWA), and the Rivers and Harbors Act (RHA), focus on rights to water usage and the protection of water quality. The CWA protects surface water quality, and Section 402 of the CWA establishes the NPDES permit program, giving USEPA the authority to limit the discharge of pollutants into navigable waters of the U.S. The SDWA authorizes USEPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants. The RHA prohibits the discharge of refuse or fill material into the navigable waters of the U.S., or any tributary thereof, without a permit from the U.S. Army Corps of Engineers (USACE). Construction activities within navigable waterways also require a permit from USACE.

Development of the Washington, DC region continues to influence the water quality of the Chesapeake Bay, the largest estuary in the U.S. The primary sources of degradation to the Bay are agricultural practices, wastewater discharge, erosion and runoff exacerbated by construction practices, and air pollution (CBP, 2009). Improving the water quality of the Bay remains an important goal in local, regional and national governments. Policies are in place to help establish LID practices aimed at reducing negative impacts of development on water quality such as providing buffers along wetlands and streams to remove nutrients and sediment before they enter the water system.

The Chesapeake Bay Program is a multi-governmental, interstate partnership that includes the states of Virginia, Pennsylvania, Maryland; the District of Columbia; the Chesapeake Bay Commission, a tri-state legislative body; the USEPA, representing the federal government; and participating advisory groups. The Chesapeake Agreements resulting from this partnership set stringent nutrient removal goals, with particular regard to nitrogen and phosphorus loading, to ensure the Bay's restoration and protection for the present and near future. EO 13508, *Chesapeake Bay Protection and Restoration* (May 2009), directs federal facilities to lead the effort to restore and protect the Chesapeake Bay by strengthening stormwater management practices on Federal lands within the Chesapeake Bay watershed and to develop guidelines for stormwater best management practices.

In April 2003, USEPA developed water quality criteria for dissolved oxygen, water clarity, and Chlorophyll A for the Chesapeake Bay and its tidal tributaries. These criteria define the target levels for water quality parameters that, if met, would be expected to render a body of water suitable for its designated use (e.g., contact recreational use such as swimming). The six states within the Bay watershed, along with Washington, DC, agreed to fulfill the requirement to achieve compliance via the Total Maximum Daily Load (TMDL) process by 2010. TMDLs define the maximum amounts of pollutants that a specific body of water can receive while meeting water quality criteria. MDE promulgated state-wide water quality criteria in August 2005 and revised these criteria in April 2010 in order to work toward achieving the Chesapeake Bay water quality criteria formerly established by USEPA.

The Potomac River is a major river running through the metropolitan area of Washington, DC. It is a designated American Heritage River and a drinking water source. The Community Action Plan for the Potomac River, designated under the American Heritage Rivers Initiative, has the following three goals: continued improvement of water quality, promotion of the region's historical heritage and recreational opportunities, and public involvement at the local levels. The Chesapeake Bay Program discussed above provides protection for the Chesapeake Bay watershed, which encompasses the Potomac River that supplies water for more than 80 percent of the four million residents of the Washington, DC area.

Affected Environment

Surface Waters in the Vicinity of NIHAC

There are approximately 1,500 miles of open streams within Montgomery County alone, providing vital habitat for aquatic macroinvertebrates and wildlife. Major surface waters in the vicinity of NIHAC are Broad Run and the Potomac River. Broad Run (Figure 3-5) is a permanent stream and jurisdictional water under the CWA and the State of Maryland classified it as Use I-P, meaning it can support contact recreational use and limited aquatic life. Broad Run originates about one mile to the north-northwest of Poolesville at an elevation of 430 feet and flows generally southward until it empties into the Potomac River to the south of the NIHAC campus. Its total length is about eight miles and its drainage area is approximately 14.2 square miles. Broad Run approaches the NIHAC campus from the east at an elevation of approximately 226 feet. It then meanders along the eastern and southern boundaries of the NIHAC campus, leaving the site at approximately 199 feet. The stream gradient is approximately 0.23 percent. Its width while passing through NIHAC is nearly uniform at 20 feet.

The NIHAC campus is located within the Broad Run watershed (Figure 3-6), and all surface water from the campus eventually finds its way into Broad Run. This includes all stormwater runoff on the campus, as well as effluent from the WTP via outfalls regulated in the MDE-issued NPDES General Permit. The Town of Poolesville and the NIHAC campus are the only significant developments in the entire drainage basin. The catchment area for Broad Run also includes agricultural land outside the NIHAC campus including farms and pastures, woodland, and a few residences. The majority of the water entering Broad Run is surface drainage from precipitation with few shallow groundwater sources in the soil strata; therefore, flow in Broad Run is prone to sharp fluctuations in response to droughts and heavy rainfall.

Three small tributaries from the north and northwest converge through successive confluences to join Broad Run outside the northeast corner of the NIHAC campus. Figure 3-7 shows one of these tributaries as it crosses the NIHAC boundary near Club Hollow Road. These tributaries drain an area of approximately one square mile between Elmer School and Trundle Roads. Although they are some of the largest tributaries of Broad Run, these streams are only a few feet wide when combined and have intermittent flow. A separate small intermittent stream rises in a spring about 500 feet east of Elmer School Road and flows across the middle of campus to a reservoir before emptying into Broad Run (Figure 3-8). The tributaries of Broad Run and the intermittent stream divide the NIHAC campus into distinct topographic areas.

NIH constructed the reservoir and the outdoor animal habitat pond after acquiring the property. NIH initially constructed the 3.0-acre reservoir, situated between two bluffs at an elevation of 244 feet, to supplement the water needs of the NIHAC campus; however, the wells on the site have been the only source of potable water for the campus to date. The reservoir currently serves as an emergency source of water for fire-fighting needs. The 2.2-acre animal habitat pond, situated in the southern portion of the campus at an elevation of 214 feet, is surrounded by approximately five acres of ground within a fenced area that supports long term observation of primates. The east end of the pond includes a 4,000-SF man-made island. Overflow from this pond discharges to Broad Run during heavy precipitation events.

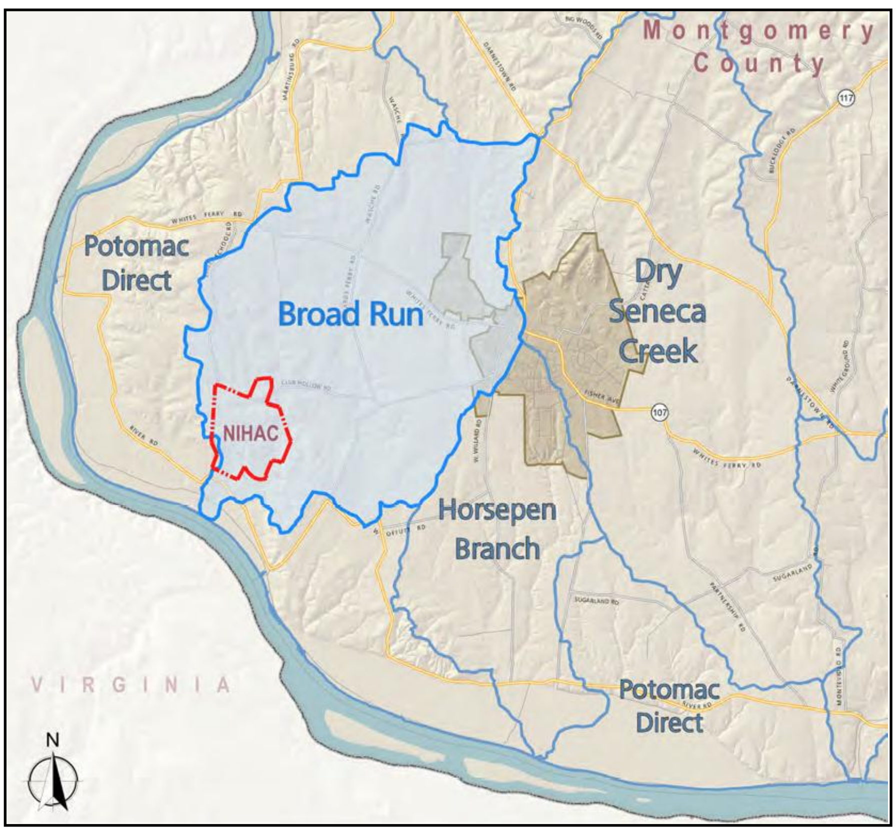
Surface Water Flow Rates

Long term flow monitoring or measurements are not available for Broad Run. The U.S. Geological Survey (USGS) has intermittently monitored flows at a temporary station at the River Road bridge, located approximately 1,000 feet downstream of the campus. USGS made these measurements primarily to correlate flows with other Piedmont streams and did not obtain meaningful or representative data on average, peak, and low flows.

In 1996, NIH calculated peak (Table 3-16) and low (Table 3-17) flow estimations for the Broad Run watershed based on the following assumptions:

- A total drainage area of 14.2 square-miles.
- A drainage area comprised of 17.88 percent forest cover.
- A maximum 24-hour precipitation event of 3.25 inches once every two years.

Figure 3-5. Photograph of Broad Run Southwest of the NHP Habitat



Source: NIH, 2012; MDNR, 1998.

Figure 3-6. Broad Run Watershed

Figure 3-7. Photograph of Broad Run Tributary at Club Hollow Road (Looking South)

Figure 3-8. Aerial Photograph of Intermittent Stream and NIHAC Reservoir (Looking North)

Table 3-16. Estimated Broad Run Peak Flood Flows at River Road

Recurrence Interval	Peak Flow (cfs)	Peak Flow (gpd)	Standard Error of Estimate (+/-)
2 year	905	584,876,160	40%
5 year	1,605	1,037,266,560	38%
10 year	2,350	1,518,739,200	39%
25 year	3,910	2,526,923,520	42%
50 year	4,740	3,063,329,280	45%
100 year	6,250	4,039,200,000	49%

Source: NIH, 1996.

Table 3-17. Estimated Broad Run Low Flow Discharges at River Road

	Low Flow (cfs)	Low Flow (gpd)	Standard Error (%)	
			(-)	(+)
2-year recurrence interval				
7-day average	1.13	730,287	-52	108
14-day average	1.27	820,765	-51	102
30-day average	1.55	1,001,722	-48	91
10-year recurrence interval				
7-day average	0.54	348,986	-57	131
14-day average	0.61	394,226	-55	123
30-day average	0.77	497,629	-52	107
20-year recurrence interval				
7-day average	0.40	258,508	-60	149
14-day average	0.46	297,285	-59	142
30-day average	0.54	348,987	-58	138

Source: NIH, 1996.

Surface Water Quality

As discussed in Section 3.3.2 (Wastewater and Gray Water), the WTP at NIHAC treats wastewater from various sources throughout the campus. Effluent discharges from the WTP are limited to 100,000 gpd as stipulated by the MDE-issued NPDES permit. During calendar year 2011, mean monthly flow rates ranged from 1,845 gpd in the summer to 57,828 gpd in the fall, with occasional spikes due to the inflow and infiltration of stormwater into the system during rainfall events. Table 3-18 provides a summary of the mean monthly concentrations of pollutants discharged to Broad Run during 2011. Figures A-9 and A-10, located in Appendix A, depict the outfall location.

Table 3-18. Mean Pollutant Concentrations in WTP Effluent during Calendar Year 2011

Month	Total Nitrogen (mg/L)	Total Suspended Solids (mg/L)	Total Phosphorus (mg/L)	Nitrate-Nitrite (mg/L)	Ammonia-N (mg/L)	Max Fecal Coliforms (MPN [a])	Biological Oxygen Demand (mg/L)
January	22.2	6.72	30.0	20.0	0.05	2.00	5.44
February	15.9	6.73	16.0	14.0	0.07	2.38	3.79
March	11.9	6.76	11.0	9.8	0.11	2.57	4.47
April	20.8	5.26	19.0	18.0	0.08	2.00	4.39
May	25.3	4.73	18.0	22.0	0.10	3.71	3.11
June	32.8	3.44	16.0	30.0	0.04	4.98	2.67
July	28.9	3.05	16.0	27.0	0.12	2.00	3.00
August	30.8	2.38	20.0	28.0	0.21	4.00	2.56
September	15.4	2.13	13.0	14.0	0.9	6.81	2.85
October	13.5	3.27	13.0	12.0	<0.05	14.0 [b]	3.14
November	19.4	3.48	13.0	18.0	<0.05	13.0 [b]	2.49
December	18.9	3.57	14.0	18.0	<0.05	13.0 [b]	3.26

Source: NIH, 2011.
a – Most Probable Number (MPN) is a statistical value representing the viable bacterial population in a sample through the use of dilution and multiple tube inoculations. The MPN represents the estimated number of organisms per milliliter of sample water.
b – NIH measured fecal contamination for October, November, and December as *E. Coli*.

As discussed in Section 3.3.3 (Stormwater and Stormwater Management), impervious surfaces reduce opportunities for stormwater infiltration into soil, which in turn can increase the quantity of stormwater draining to Broad Run and present water quality concerns due to decreased microbial processing of pollutants. In addition to runoff from improved surfaces, stormwater runoff from agricultural areas can present water quality concerns due to nutrient enrichment and sedimentation. NIH personnel fertilize fields on campus with used bedding and waste from the sheep colony, which currently consists of approximately 10 sheep. NIH personnel may release healthy animals into the fields for foraging and a few outdoor cages are available for primates in addition to the primate observation area. The flock of farm animals on campus is currently below the thresholds that would require maintenance of a Nutrient Management Plan through the Maryland Department of Agriculture. Additionally, these animals do not have access to areas in close proximity to Broad Run. Water quality impacts from field animals are therefore believed to be negligible. The washdown process in the animal holding facilities collects waste from all the animals in the facility and routes it to the WTP for treatment.

Historical studies of the Broad Run watershed have resulted in somewhat inconsistent characterizations of its water quality. In 2000, the Montgomery County Department of Environmental Protection (DEP) performed a comprehensive study of the Broad Run watershed. The study included monitoring water quality parameters including benthic macroinvertebrates, fish, water chemistry, and habitat characteristics at seven stations throughout the watershed. Water chemistry results were in compliance with MDE water quality criteria for all seven sites. The sampling location just upstream of the NIHAC campus displayed good fish and macroinvertebrate community dynamics and habitat. The sampling location just downstream of the NIHAC campus displayed good fish and fair macroinvertebrate community dynamics (Montgomery County DEP, 2001).

In 1997, an MDNR Maryland Biological Stream Survey (MBSS) site was monitored upstream of the NIHAC campus on Broad Run and displayed fair water quality data with a fish index of biotic integrity (IBI) of 4.67, which is an indicator of good stream health, and a benthic IBI of 2.75, which is an indicator of poor stream health (MDNR, 1997a). Additionally, there is an MBSS site in the vicinity of the proposed emergency access point that was monitored in 1997 and indicated fair water quality data with a fish IBI of 3.33 and a benthic IBI of 3.25 (MDNR, 1997b).

In 2010, an MDNR-sponsored volunteer-run program known as Stream Waders conducted a biological assessment of Broad Run. Sampling upstream of the NIHAC campus on the Broad Run tributary that abuts the proposed emergency access point indicated a poor family level benthic IBI (Stream Waders, 2010a). Sampling just below the NIHAC campus at the intersection of Broad Run and River Road indicated a poor family level benthic IBI (Stream Waders, 2010b). However, MDE recently indicated that the results were misclassified and the findings of the survey were actually in an acceptable range (Backus, 2012).

MDE does not currently have any USEPA-approved TMDLs for the Potomac River Montgomery County watershed, which includes NIHAC and the Broad Run watershed. However, USEPA is currently reviewing a TMDL for sediments that MDE recommended on September 28, 2011. Under this proposed TMDL, NIHAC would receive a waste load allocation (WLA) based on its design flow and current permitted sediment concentrations. Separately, in 2011, MDE performed a Water Quality Analysis of nutrient (as opposed to sediment) impacts to the Potomac River Montgomery County watershed. The findings of this study suggest that no impacts to aquatic life are resulting from nutrient concentrations; therefore, MDE will not establish a TMDL for nutrients (MDE, 2011).

Direct and Indirect Effects

<u>Proposed Action</u>

The implementation of the Master Plan could affect surface waters by causing indirect impacts due to runoff from construction sites, changes in the quality and quantity of stormwater runoff, and changes in the quality and quantity of wastewater discharges. The text below describes the predicted intensity of each of these potential impacts.

The proposed locations for the construction, renovation, and demolition activities covered by the Master Plan are widespread and located at varying distances from streams, surface water bodies, Broad Run, and the Potomac River (Figures A-9 and A-10, located in Appendix A). The Master Plan would not result in any direct impacts to surface waters due to construction or other earth disturbance.

The Broad Run tributary (located approximately 70 feet from the proposed location of the emergency access road) and Broad Run (located approximately 170 feet from the proposed location of the addition to Building 132) are the only surface water bodies within 200 feet of development or demolition sites under the Master Plan. The proposed emergency access road and security gate would be located in the vicinity of a tributary to Broad Run. Portions of the existing perimeter security fence near the outdoor NHP habitat are located in close proximity to Broad Run and within the floodplain. This fence is highly unstable due to fast flowing water from Broad Run when the water overflows the stream banks during heavy precipitation events. The Master Plan recommends further study to identify an engineering solution that would provide a stable and secure perimeter fence near Broad Run. Modifications to the perimeter fence may involve temporary work within the stream buffer. Once NIH identifies a feasible solution, they will evaluate the potential effects of the modifications on surface waters and will take measures to minimize the associated impacts.

NIH may have to obtain a number of surface water related permits, certifications, and reviews from federal and state authorities before construction of the emergency access road and associated security gate could begin, including the following:

- Joint USACE, MDNR Permit for Alteration of Floodplain, Waterway, Tidal or Non-tidal Wetland – as required by Section 404 of the CWA (33 U.S.C. 1344) and COMAR 08.05.04 and COMAR 08.05.07.
- MDE Water Quality Certification – as required by Section 401 of the CWA and COMAR 10.05.01.
- NPDES General Permit for Non-point Sources – as required by the Maryland DNR and COMAR 08.05.011.
- Maryland General Waterway Construction Permit – as required by the Maryland DNR and COMAR 08.05.11.

Impacts to surface waters resulting from the construction projects described above are likely to be minimal due to compliance with state and federal regulations and mitigation measures including development of SEC plans, stormwater management plans, and implementation of pollution prevention measures to ensure that petroleum products and other contaminants do not migrate to the stream during construction.

The Master Plan may result in minor impacts to water quality at Broad Run due to stormwater runoff from other temporary construction and demolition activities. NIH would follow SEC plans to prevent sediment transport throughout the campus. Additionally, the Master Plan may result in potential minor impacts to the intermittent stream in the center of campus and Broad Run due to nutrient loadings in runoff from the proposed NHP breeding colony, where NHPs would be free roaming and no excrement cleanup would occur. However, per MDE's Water Quality Analysis of nutrient impacts to the Potomac River Montgomery County watershed, no impacts to aquatic life are currently resulting from nutrient concentrations despite existing agricultural practices and associated runoff in the watershed. Under the Master Plan, there would be at least 100 feet of separation between the NHP breeding colony and water bodies, reducing the potential for nutrient loading.

The Master Plan would likely result in a minor net improvement to surface water quality and reduction in quantity of stormwater discharged to surface waters due to demolition of buildings directly connected to the sanitary sewer system, implementation of LID for new development, and potential reduction in the effective TIA of the campus. Therefore, implementation of the Master Plan is not expected to exacerbate flash flooding conditions in Broad Run during heavy precipitation events. Refer to Section 3.3.3 (Stormwater and Stormwater Management) for a more detailed description of impacts to stormwater and changes in TIA under the Master Plan.

The largest increases in effluent discharges from the WTP would be expected after construction of the Behavioral Research Facility and Multi-Species Animal Holding Facility during Phases 3 and 4, respectively, due to wash down of additional animal facilities. However, the types of pollutants would not change. As illustrated in Table 3-4, daily effluent discharges would increase by approximately 72 percent during the summer and 49 percent during the winter as compared to current discharge levels. These discharges, however, would remain below the current daily effluent discharge limit of 100,000 gpd. During two-year, seven-day low-flow conditions as calculated in 1996 (Table 3-17), expected effluent discharges following completion of the Master Plan would comprise approximately 8.5 percent of the summer flow for Broad Run. This would be considerably lower during normal flow conditions in Broad Run.

As discussed in Sections 3.3.1 (Potable Water Supply) and 3.3.2 (Wastewater and Gray Water), NIH would implement water conservation and reuse strategies, wastewater reduction strategies, and gray water treatment strategies to minimize WTP discharge quantities. If the WTP's treatment capacity requires expansion over the course of the Master Plan, NIH may need to obtain a revised NPDES permit from MDE with updated effluent limitations. NIH would continue to operate the WTP in accordance with the applicable NPDES permit limitations. As a result, the relatively small volume of wastewater contributed by NIHAC to Broad Run is expected to have only minor impacts to water quality and aquatic habitat in Broad Run.

No-Action Alternative

The No-Action Alternative would have no direct impact on surface waters and would slightly reduce stormwater runoff volume at NIHAC through the removal of approximately 10,864 SF of impervious surfaces, potentially improving surface water quality in Broad Run. NIH would implement appropriate SEC and pollution prevention measures during demolition activities and AST installation to prevent impacts to surface waters. The No-Action Alternative, however, would not implement LID or improve existing stormwater management practices to meet the intent of local, state, and federal rules and regulations. NIHAC would continue to discharge effluent from the WTP to Broad Run at current volumes and pollutant concentrations. There would also be no change in impacts to surface waters due to runoff from construction activities or animal waste.

Cumulative Effects

Portions of the Town of Poolesville and the NIHAC campus are currently the only significant developments in the entire Broad Run watershed. Local population increases along with ongoing and reasonably foreseeable developments throughout the watershed have the potential to impact surface water quality in the NIHAC vicinity. Up to six acres of commercial development proposed by American Satellite and up to 890 acres of proposed development of additional detached single-family homes are the only significant reasonably foreseeable developments within the watershed. These proposed developments would result in an increase in TIA within the Broad Run watershed. 403 new homes are proposed for development in the Town of Poolesville; most of the stormwater resulting from this development, however, would drain to the Dry Seneca Creek watershed or the Russell Branch of Dry Seneca Creek with lesser contributions to the Horsepen Branch and branches of Broad Run (Town of Poolesville, 2011). Separately, while the expected population increase of approximately 1,289 people in the Town of Poolesville over the next 15 years would be expected to increase nutrient loading in the receiving water bodies, most of this nutrient loading is not relevant to the Broad Run watershed because most stormwater and all sanitary wastewater will discharge to other watersheds (Yost, 2012). The presence of the Broad Run Stream Park and the C&O Canal National Historical Park should help to ensure protection of surface waters in the vicinity of NIHAC. As a result, there is minimal potential for cumulative effects to surface waters associated with the Master Plan.

3.9.6 *Wetlands*

Background

According to Section 404 of the CWA, "wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." USACE provides criteria to identify wetlands and distinguish them from adjacent upland areas based on the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

Wetlands provide important ecological services including the following:

- Filtering nutrients, sediment, and pollutants from surface and groundwater.
- Absorbing excess floodwater and rainwater.
- Protecting shorelines from erosion.
- Providing habitat for numerous plants and animals.

Non-tidal wetlands, also known as palustrine or freshwater wetlands, function as transitional areas between uplands and water bodies and are covered with, or saturated by, water for all or part of the year (Critical Area Commission, 2008). Non-tidal wetlands can include the edges of rivers and lakes, freshwater marshes, bogs, wooded or shrub swamps, shallow ponds, and bottomland hardwood forests and can be classified as either open wetlands (less than 50 percent tree cover) or forested wetlands (greater than 50 percent tree cover). Tidal wetlands are vegetated or unvegetated areas that border or exist beneath tidal waters and are subject to regular or periodic tidal action. These systems are usually semi-enclosed by land, but are influenced by varying freshwater flows from adjacent rivers and watercourses (Critical Area Commission, 2008).

Wetlands are federally protected by Section 404 of the CWA, EO 11990 (*Wetland Protection*), RHA, and applicable state regulations and permit programs such as the Maryland Non-Tidal Protection Act , Maryland Tidal Wetlands Act, and the Waterway and 100-Year Floodplain Construction Regulations. Section 404 of the CWA prohibits the discharge of dredged or fill material into wetlands or other waters of the U.S. if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's water would be significantly degraded. A permit review process administered by the USACE controls regulated activities. Developers must avoid direct impacts to wetlands to the maximum extent possible. EO 11990, implemented in 1977, protects wetlands and their associated ecosystem services. This EO directs each federal agency to avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds that 1) there is no practicable alternative to such construction, and 2) the agency will take all practicable measures to minimize impacts to the wetlands.

To afford additional protection to jurisdictional wetlands (as defined under the CWA), MDE requires maintaining wetland buffers. COMAR 26.23 and COMAR 26.24 established regulations for activities that may disturb or occur within a non-tidal or tidal wetland or surrounding buffer. According to COMAR 26.23.01, the buffer extends 25 feet around the outer edge of a non-tidal wetland. There is an expanded, 100-foot buffer around wetlands of special State concern and wetlands with adjacent areas containing steep slopes or highly erodible soils. MDE requires the action proponent to obtain a Non-tidal Wetlands and Waterways Permit for any activity that alters a non-tidal wetland or its buffer. In addition, the Chesapeake Bay Critical Area Commission requires maintaining a 100-foot buffer around tidal wetlands and streams to improve runoff water quality and reduce the amounts of toxic substances entering tidal waters (Critical Area Commission, 2008).

Affected Environment

The USFWS developed the National Wetlands Inventory (NWI), which is a wetland classification system used to identify wetlands throughout the U.S. According to NWI data, approximately 70 acres of wetlands are present on the NIHAC campus, all of which are non-tidal. These consist of forested wetlands along Broad Run (65 acres) and emergent wetlands (5 acres). Woody tree species that are adapted to wet soils as well as woody hydrophytic shrub species in the understory dominate the forested wetlands. Grasses, sedges, rushes, forbs, and other rooted, water-tolerant herbaceous plants dominate the emergent wetlands.

The NWI is a very useful system for obtaining a large-scale understanding of approximate wetland locations; however, aerial photography forms the basis for the NWI instead of field surveys and as such it represents a snapshot in time, and therefore may include omission errors depending on seasonal and climatic variability. Therefore, users should consider NWI maps a guide rather than a substitute for manual delineations.

A preliminary field investigation in 1996 declared the Broad Run floodplain within NIHAC to be wetlands unless otherwise indicated by more detailed study and delineation. For further discussion of floodplains, refer to Section 4.9.7 (Floodplains). NIHAC contains no wetlands of special State or County concern. However, the wetlands in the Broad Run and tributary floodplain on the north side of the campus are high in function and value (NIH, 1996).

A preliminary field investigation performed in early 2012 revealed more extensive wetlands in this area than portrayed by the NWI data. For example, Figure 3-9 depicts a photograph of suspected wetlands near Club Hollow Road that were not portrayed by NWI. Collectively, the wetlands in the Broad Run and tributary floodplain on the north side of the campus are large in size and connect to wetlands upstream, as well as wetlands in the Potomac River bottoms about one-half mile to the south. They have been undisturbed for half a century or more.

Figure 3-9. Photograph of Suspected Wetland in Vicinity of Proposed Emergency Access Road

Direct and Indirect Effects

Proposed Action

The implementation of the Master Plan could affect wetlands by causing direct impacts as a result of construction and disturbance, changes in the quality and quantity of stormwater runoff, changes in the quality and quantity of wastewater discharges, and indirect impacts due to runoff from construction sites. The text below describes the predicted intensity of each of these potential impacts.

The proposed locations for the construction, renovation, and demolition activities covered by the Master Plan are widespread and located at varying distances from wetlands (Figures A-9 and A-10, located in Appendix A). The Master Plan would directly impact approximately 0.5 acres of palustrine forested wetland due to construction of the emergency access road and associated security gate. In accordance with EO 11990, NIH considered whether practicable alternatives exist that would present lesser impacts to wetlands. NIH considered locating the emergency access point along Elmer School Road (where no wetlands are present) but eliminated this from further consideration because an access point on Club Hollow Road would afford quicker access to the campus by emergency response vehicles coming from the Town of Poolesville. Also, constructing the access point on Elmer School Road would require bisecting pastures that NIH intends to keep under the Master Plan. NIH considered several alternative locations along the entire frontage of Club Hollow Road but dismissed these locations due to the following concerns:

- An access road across the northwest corner of the campus would afford less direct accessibility to the center of campus by emergency vehicles.
- An access road across the northwest corner of the campus would impact pastures and modify the rolling topography, thus impacting the rural character of the campus.
- An access road across the north-central portion of the campus (west of the allée of trees) would require extensive grading due to steep topography.
- An access road to the immediate west or east of the proposed location would involve more extensive impacts to the Broad Run tributary and associated wetlands and environmentally sensitive areas.

NIH would perform formal wetland delineation prior to disturbance of this area and would coordinate with USACE and MDE to obtain the appropriate permits for disturbance of a non-tidal wetland and its buffer. NIH would mitigate this impact by incorporating design features such as culverts to maintain hydrologic connectivity between wetland areas up gradient and down gradient of the proposed development. NIH would develop and adhere to stormwater and SEC plans to prevent sediment transport into wetlands from construction activities. Use of the access point would occur only during emergencies; as a result, impacts from vehicle use and the associated fluid leaks (e.g., petroleum) should be negligible.

NIH would have to obtain a number of permits, certifications, and reviews pertaining to disturbance of wetlands before construction of the emergency access road and associated security gate could begin, including the following:

- Wetland Delineation and Assessment – as required by COMAR 26.23.

- Joint USACE, MDNR Permit for Alteration of Floodplain, Waterway, Tidal or Non-tidal Wetland – as required by Section 404 of the CWA (33 U.S.C. 1344) and COMAR 08.05.04 and COMAR 08.05.07.

- Maryland General Permit for Non-tidal Wetlands Construction (MDGP-1) – as required by COMAR 26.23.

Modifications to the perimeter fence may involve temporary work within wetland buffers. Once NIH identifies a feasible solution, they would evaluate the potential effects of the modifications on wetlands and would take measures to minimize the associated impacts.

The Master Plan would likely result in a minor net improvement to wetlands due to demolition of buildings directly connected to the sanitary sewer system, implementation of LID for new development, and potential reduction in the effective TIA of the campus, which would result in an improvement to stormwater quality and likely a decrease in the quantity of stormwater runoff into wetlands.

The Master Plan would result in a potential minor impact to wetlands adjacent to the intermittent stream in the center of campus and Broad Run due to runoff of animal waste from the proposed NHP breeding colony, where NHPs would be free roaming and no excrement cleanup would occur. Per MDE's Water Quality Analysis of nutrient impacts to the Potomac River Montgomery County watershed, no impacts to aquatic life are currently resulting from nutrient concentrations despite existing agricultural practices and associated runoff in the watershed. Under the Master Plan, there would be at least 100 feet of separation between the NHP breeding colony and water bodies, reducing potential for nutrient loading to wetlands.

No elements of the Master Plan are located within 100 feet of any tidal wetlands.

<u>No-Action Alternative</u>

The No-Action Alternative would have no direct impacts to wetlands and would slightly reduce stormwater runoff volume at NIHAC, potentially improving surface water quality in the wetlands surrounding Broad Run. NIH would implement appropriate SEC and pollution prevention measures during demolition activities and AST installation to prevent impacts to wetlands. The No-Action Alternative, however, would not implement LID or improve existing stormwater management practices to meet the intent of local, state, and federal rules and regulations. NIHAC would continue to discharge effluent from the WTP to Broad Run and the associated wetlands at current volumes and pollutant concentrations. There would also be no change in impacts to wetlands due to runoff from construction activities or animal waste.

Cumulative Effects

As discussed in Section 3.9.5 (Surface Waters), proposed development and population expansion in the vicinity of NIHAC are expected to have minimal potential for significant impacts to the Broad Run watershed. The presence of the Broad Run Stream Park and the C&O Canal National Historical Park should help to ensure protection of wetlands in the vicinity of NIHAC. As a result, the Master Plan is expected to have minimal potential for cumulative effects to wetlands.

3.9.7 *Floodplains*

Background

A floodplain is the area along or adjacent to a stream or a body of water that is capable of storing or conveying floodwaters. Floodplains perform important natural functions, including moderating peak flows, maintaining water quality, recharging groundwater, and preventing erosion. In addition, floodplains provide wildlife habitat, recreational opportunities, and aesthetic benefits. The 100-year floodplain is an area that is subject to a one-percent or greater chance of flooding in any given year.

To protect floodplains and minimize future flood damage, EO 11988 (as amended by EO 12148) restricts development within the 100-year floodplain. Under EO 11988, all federal agencies must 1) determine if any of their actions would occur within a floodplain, 2) evaluate the potential effects of these actions, and 3) analyze alternatives to these actions. Utility crossings within a 100-year floodplain are regulated under COMAR 26.17.04.08, which establishes technical requirements for temporary construction activities within a 100-year floodplain.

Affected Environment

Steep-sloped hills, some of which rise abruptly and almost vertically for 20 to 30 feet from the floodplain floor, border the floodplain of Broad Run and its tributaries within NIHAC. Broad Run meanders from one edge of the floodplain to the other in reaches of approximately 1,000 feet in length. The floodplain is flat and is about 300 to 800 feet in width. Figures A-9 and A-10, located in Appendix A, illustrate floodplains in the vicinity of NIHAC.

Federal Emergency Management Agency (FEMA) maps indicate that all access routes to NIHAC pass through the 100-year floodplain. Broad Run overflows all bridges along its length under 100-year flood conditions, including two locations on Whites Ferry Road. Under 100-year flood conditions, Broad Run and its tributaries intersect Edwards Ferry, Club Hollow, River, and Elmer School Roads at several locations. NIHAC employees report that, historically, flooding created by heavy thunderstorms has briefly isolated the NIHAC campus or that only a single route to the NIHAC campus may be open. The maximum duration for loss of access would likely be of the order of 48 to 72 hours. Portions of the perimeter security fence and the outdoor habitat area are located within the 100-year floodplain around Broad Run. No other campus infrastructure or facilities are located within the floodplain.

Direct and Indirect Effects

<u>Proposed Action</u>

The Master Plan would not construct any facilities within the 100-year floodplain and would not affect use of the outdoor habitat area, other than to construct an addition to Building 132 that is outside of the floodplain. Modifications to the perimeter fence would involve temporary work within the 100-year floodplain. Once NIH identifies a feasible solution, they would evaluate the potential effects in accordance with EO 11988 and would take measures to minimize the associated impacts to vegetation, habitat, and water quality within the floodplain.

The NIHAC campus has resident animal caretakers, security, power plant, and other personnel on duty around the clock to tend facilities and animals. Therefore, animal care, security, and utility operation would likely be able to continue during instances of temporary isolation due to flooding.

<u>No-Action Alternative</u>

The No-Action Alternative would not involve any impacts or changes in activities within the 100-year floodplain.

Cumulative Effects

No other recent, ongoing, or foreseeable actions would take place within floodplains at the NIHAC campus. The Master Plan would result in no cumulative effects to floodplains.

3.9.8 *Environmentally Sensitive Areas*

Background

All local jurisdictions in Maryland must define Environmentally Sensitive Areas pursuant to COMAR Article 66B (Zoning and Planning), Section 03.05.01 with the goal of protecting sensitive areas from adverse development. Montgomery County defines Environmentally Sensitive Areas as areas that meet any of the following criteria (MCDPP and MNCPPC, 2000):

- Streams and stream buffers of 100 feet as measured from the bank of the stream.
- The 100-year floodplain.
- Wetlands and wetland buffers of 25 feet as measured from the border of the wetland.
- Areas hydrologically connected to a water body and with steep slopes over 25 percent.

Affected Environment

The NIHAC campus includes approximately 144 acres that satisfy at least one of the criteria for Environmentally Sensitive Areas. These areas comprise approximately 28 percent of the campus and are mostly located along the northern and eastern perimeters of the campus along Broad Run and adjoining tributaries. Figures A-9 and A-10, located in Appendix A, illustrate Environmentally Sensitive Areas within NIHAC.

Direct and Indirect Effects

<u>Proposed Action</u>

The proposed emergency access road and associated security gate would be located within an Environmentally Sensitive Area. Section 3.9.5 (Surface Waters), Section 3.9.6 (Wetlands), and Section 3.9.7 (Floodplains) discuss the effects to resources within the Environmentally Sensitive Area. NIH would have to obtain a number of permits, certifications, and reviews from federal and state authorities before construction of the emergency access road and associated security gate could begin.

Installation of the proposed security gate associated with Building 101A may also involve minor impacts to an Environmentally Sensitive Area due to its location in a steeply sloped area uphill of the intermittent stream that divides the campus. In addition, modifications to the perimeter fence may involve temporary work within Environmentally Sensitive Areas associated with Broad Run. Once NIH identifies a feasible solution, they would evaluate the potential effects of the modifications and would take measures to minimize the associated impacts to Environmentally Sensitive Areas. Impacts from these activities are expected to be temporary and very small-scale, and the permitting, certification, and reviews by federal and state authorities described earlier would not likely be required.

No-Action Alternative

The No-Action Alternative would not involve any activities within Environmentally Sensitive Areas.

Cumulative Effects

Proposed development and population expansion in the vicinity of NIHAC, as discussed in Section 3.9.5 (Surface Waters), are expected to have minimal potential for significant impacts to Environmentally Sensitive Areas in the Broad Run watershed. The presence of the Broad Run Stream Park and the C&O Canal National Historical Park should help to ensure protection of Environmentally Sensitive Areas in the vicinity of NIHAC. As a result, there is minimal potential for cumulative effects to Environmentally Sensitive Areas associated with the Master Plan.

3.10 Historic Properties

Background

Historic properties include prehistoric or historic districts, sites, buildings, structures, or objects that are significant in American history, architecture, archeology, engineering, and culture. Historic properties serve as resources, as they provide valuable information about the history of human life and cultures.

To ensure the protection of historic resources, the U.S. Congress passed the National Historic Preservation Act (NHPA) in 1966 and then amended the NHPA in 1976, 1980, and 1992. The NHPA established the Advisory Council on Historic Preservation (ACHP) and authorized the creation and maintenance of the National Register of Historic Places ("the National Register"). The National Register is composed of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

Typically, properties considered eligible for inclusion in the National Register are at least 50 years old. A property is eligible for inclusion in the National Register if it 1) possesses the integrity of location, design, setting, materials, workmanship, feeling, and association, and 2) meets at least one of the following National Register Criteria for Evaluation (USDOI, 2002):

1. It is associated with events that have made a significant contribution to the broad pattern of U.S. history (Criterion A).
2. It is associated with the lives of persons significant in our past (Criterion B).
3. It embodies the distinctive characteristics of a type, period, or method of construction; it represents the work of a master; it possesses high artistic values; or it represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C).
4. It has yielded or may be likely to yield important information in prehistory or history (Criterion D).

Section 106 of the NHPA, which is implemented under 36 CFR 800, requires federal agencies to consider the effects of undertakings (i.e., actions) on any historic property, and to afford the ACHP a reasonable opportunity to comment on such undertakings. An adverse effect is anything that could alter the historic fabric (i.e., characteristics) that makes the property eligible. Examples of adverse effects may include changes to the property or alterations to landscape, noise levels, visual characteristics, traffic patterns, or land use near the property, depending on how these changes specifically impact the property.

The NHPA also authorized the creation of a State Historic Preservation Officer (SHPO) for each state. The SHPO participates in statewide historic preservation planning and surveying activities; nominates properties for the National Register; provides advice, assistance, training, and public outreach; and participates in Section 106 undertaking reviews. In Maryland, the Maryland Historical Trust (MHT, a division of the Maryland Department of Planning) serves as the SHPO.

Additionally, the MHT administers its own program for properties that are of significance to American history and culture. The Maryland Register of Historic Properties ("the Maryland Register") includes all properties from the National Register that are located in Maryland, plus additional properties that are considered significant in Maryland history and culture. Properties listed in the Maryland Register are afforded certain regulatory protections.

Historic properties can be broadly classified into prehistoric resources and historic resources, which are discussed below.

3.10.1 *Prehistoric Resources*

Prehistoric resources are physical properties resulting from human activities that predate Native American/European contact, and are generally identified via archeological investigations.

Affected Environment

The proximity of the NIHAC campus to the Potomac River, Broad Run, and several natural springs, combined with the positive findings from previous field investigations in the vicinity, indicates a high likelihood of prehistoric archeological resources at the campus. A 1993 archeological assessment of the campus indicated that prehistoric sites are most likely to be found in the vicinity of springheads on flat, elevated, well-drained land. Previous development at the campus, however, is likely to have disturbed many of these sites. Additional prehistoric sites are most likely to exist near flat, elevated, well-drained areas within 600 feet of Broad Run and the intermittent stream that divides the campus (Comer, 1993).

In 1994, following the campus-wide archeological assessment, NIH performed a survey of the 5.5-acre site for a proposed animal holding facility on the northern side of North Drive. This survey revealed a prehistoric site designated as 18MO392. In 2000, a survey of the 10-acre site for the proposed CUP revealed a site designated as 18MO551. These surveys found that prehistoric inhabitants likely obtained quartz from exposed veins within site 18MO392 and worked them into points at site 18MO551. Due to the extent of disturbance resulting from construction activities and deforestation, however, both sites were determined to be not eligible for inclusion in the National Register and did not warrant further archeological evaluation (Comer, 1994, 2000).

Due to the high potential for prehistoric archeological sites, many areas throughout the NIHAC campus still require archeological investigations prior to earth-disturbing activities.

Direct and Indirect Effects

Proposed Action

The majority of the areas proposed for development under the Master Plan have been previously disturbed and/or surveyed. Some previously undeveloped areas (e.g., emergency access point), however, would require archeological investigations prior to earth-disturbing activities associated with the Master Plan. Demolition activities would take place within areas that were disturbed during construction and are therefore not likely to contain intact prehistoric archeological resources.

NIH would comply with NHPA Section 106 by consulting with MHT on the need for particular archeological studies as individual Master Plan project elements are funded, designed, and executed. In the event that eligible prehistoric resources are identified and adverse effects are anticipated, NIH would continue Section 106 consultation with the appropriate consulting parties (which would include MHT and may also include ACHP and Native American tribes) to establish a Memorandum of Agreement (MOA) to resolve adverse effects. Mitigation measures identified through this consultation could include in-place preservation through site avoidance, protection, or easement acquisition; development and implementation of a data recovery plan to retrieve and analyze the site's resources; implementation of innovative, alternative mitigation measures; or a combination of these measures.

No-Action Alternative

The No-Action Alternative would not involve any earth disturbance in areas that are likely to contain prehistoric archeological resources. Therefore, there would be no adverse effect to prehistoric resources.

Cumulative Effects

Significant archeological sites in the NIHAC vicinity are most likely to be found near flat, elevated, well-drained areas close to a water source (Comer, 2000). These high-potential areas include historical and county parks near the Potomac River that are likely to have limited development in the future. As a result, significant prehistoric resources (if they are present) would have a relatively low probability of being impacted by present and future activities in the NIHAC vicinity. Therefore, while the Master Plan has some minor potential to affect prehistoric resources, no significant cumulative effects are anticipated.

3.10.2 *Historic Resources*

Historic resources are physical properties resulting from human activities that postdate Native American/European contact, and can be identified via archeological or historic architectural investigations.

Affected Environment

The NIHAC property was used as a dairy farm until NIH purchased it in 1960. A second farmstead dating from the nineteenth century or earlier may have existed in the north portion of the campus that is now heavily developed. Deed research and oral history indicate that a sawmill was present in the early twentieth century and that a slave graveyard may also exist somewhere on campus

(Comer, 2000). The suspected locations of these historical development sites are illustrated in Figure 3-10.

Following acquisition of the property, NIH demolished most of the structures associated with the dairy farm. Of the remaining pre-NIH structures, only the dairy barn (Building T-1), the loafing shed (Building T-2), and the implement shed (Building T-7) possess potential for historical significance due to their association with the dairy farm. In addition, some of the structures constructed by NIH after acquisition of the property are known to be older than or approaching 50 years of age. Of these structures, the original CUP (Building 101), the residences (Buildings 116 and 117), and the sign at the campus entrance are believed to possess potential for historic significance. Properties that may warrant evaluation at a later date include Building 132 (constructed in 1989) and the associated outdoor habitat and pond in the southern tip of the campus. This is likely to be the oldest such outdoor habitat, if not unique, in this region. Overall, the NIHAC campus is unique in that it is the only rural campus owned by HHS and used by NIH for behavioral research and animal holding programs. This may contribute to the likelihood that NIHAC properties may be eligible for inclusion in the National Register.

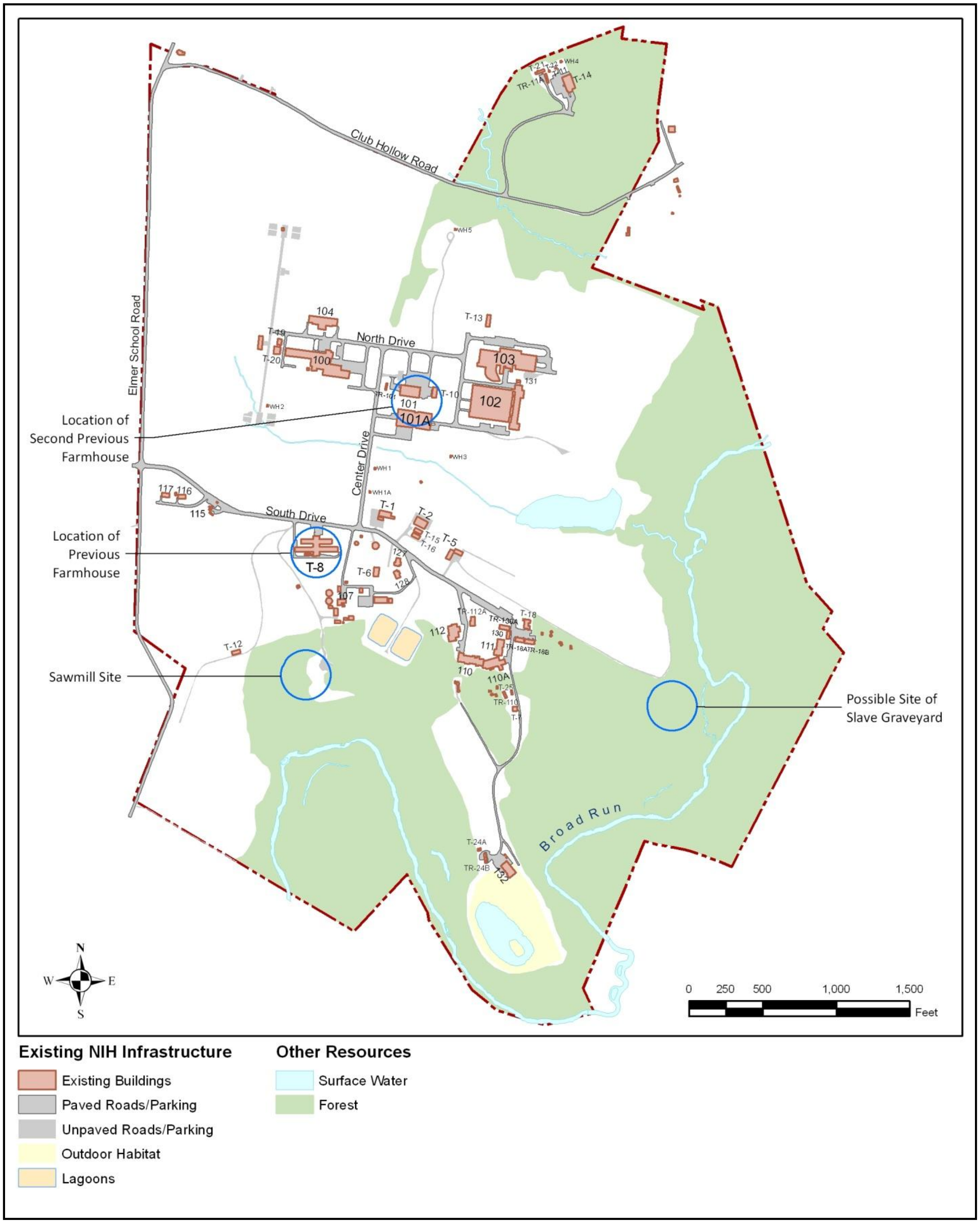
In accordance with the NHPA, NIH is currently evaluating these potentially significant properties to determine whether they may be eligible for inclusion in the National Register as individual properties or as contributing elements to a historic district. NIH is also evaluating unique landscape elements for potential inclusion in the National Register. These include the reservoir, the overflow basins at the WTP, and the allée of trees on the north section of the campus that aligns with Center Drive. NIH will complete determinations of eligibility for these potentially significant properties and landscapes and will submit them to the MHT for their concurrence.

Additional historic properties are found in the vicinity of the NIHAC campus, as illustrated in Figure 3-11. The Nathan Dickerson Poole House, located southeast of the campus, and the C&O Canal National Historical Park are listed in both the National Register and the Maryland Register. In addition, the following 11 properties within a half-mile of the campus boundary are documented in the Maryland Inventory of Historic Properties: Elmer School, Oak Hill Houses, Dorsey-Scott House, John Jones House, Thomas H. White House, Edwards Ferry Cemetery, Bridge M-40, Graham Log House (site), Green-Hebron House (site), Oak Hill Post Office & Green Dwelling House (site), and Jenkins Log House. Some of these properties may be eligible for listing in the Maryland Register.

Direct and Indirect Effects

Proposed Action

Of the buildings described above as warranting survey to determine their historic significance, only two—the implement shed (Building T-7) and the original CUP (Building 101)—would be demolished under the Master Plan. Also, construction and operation of the proposed facilities could result in minor indirect visual and/or acoustical impacts to potentially historic properties within campus boundaries.



Source: NIH, 1996; Comer, 2000.

Figure 3-10. Suspected Areas of Historical Development within the NIHAC Campus

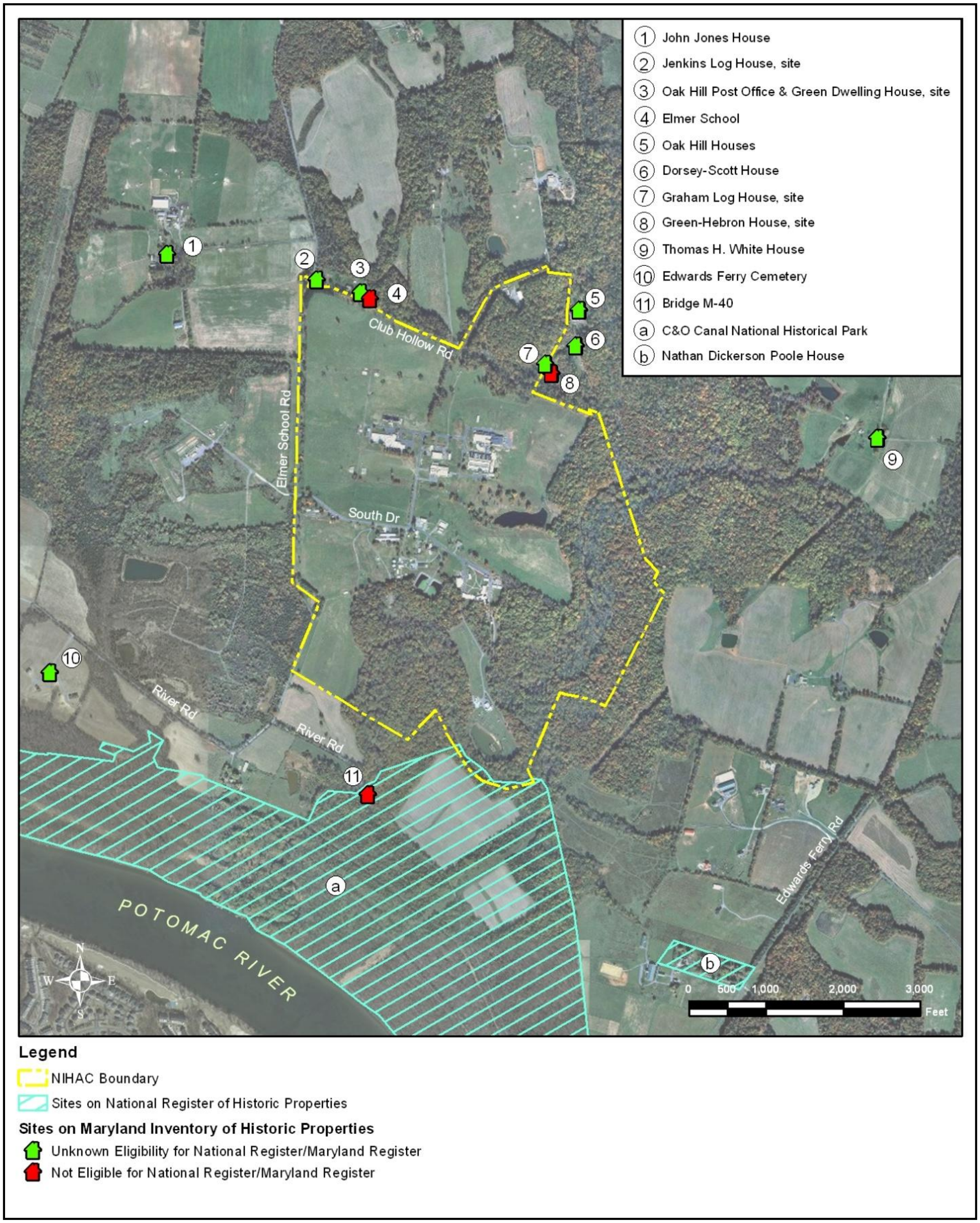


Figure 3-11. Potentially Historic Properties in the Vicinity of the NIHAC Campus

If NIH and MHT concur that certain properties are eligible for the National Register, NIH would evaluate the elements of the Master Plan to determine whether they would have the potential to affect these historic properties. If so, NIH would enter a Section 106 consultation with the appropriate consulting parties to determine whether these effects would be adverse, and to establish an MOA to resolve adverse effects for each property. Mitigation measures identified through this consultation could include documentation of the affected properties, reuse of certain distinctive features, or preservation of other historic properties on campus. NIH would pursue this consultation as individual Master Plan project elements are funded, designed, and executed.

Demolition of non-eligible structures within proposed historic districts under the Master Plan may improve the integrity of potentially historic properties by restoring the landscape and viewscape to the period of significance. No impacts to historic landscape elements or historic properties outside of the campus are anticipated. The Master Plan would strive to maintain the rural character and viewscape of the campus by avoiding development within rolling pastures.

No-Action Alternative

The No-Action Alternative would not involve direct or indirect impacts to potentially historic properties at NIHAC or in the surrounding area. The facilities to be demolished under the No-Action Alternative are all trailers or, in the case of Building T-18, are not approaching 50 years of age. Therefore, there would be no adverse effect to historic resources.

Cumulative Effects

As mentioned earlier, the NIHAC campus is unique as the only rural campus used by the NIH intramural program for behavioral research and animal holding programs, while the historic properties in the NIHAC vicinity can be generally described as residences, schools, cemeteries, and parks. The potential historical significance of properties at NIHAC, if any, is therefore likely to be driven by criteria and associations that differ considerably from those that led the surrounding properties to be considered historic. Additionally, there are no known ongoing or foreseeable actions that would adversely affect other historic properties in the NIHAC vicinity. As a result, the Master Plan is not expected to contribute to cumulative effects to historic properties.

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4. LITERATURE CITED

1. Backus, John. Personal communication (email) with John Backus, Science Services Administration, Maryland Department of the Environment. 1 November 2011.

2. Cabot, Andrew. 2012. Personal communication (email) with Andrew Cabot, Health Physicist, Division of Radiation Safety, NIH. 16 April 2012.

3. Chesapeake Bay Program (CBP). 2009. Bay Barometer: A Health and Restoration Assessment of the Chesapeake Bay and Watershed in 2008. http://www.chesapeakebay.net/content/publications/cbp_34915.pdf. Date accessed: 22 April 2012.

4. CBP. 2012. The Chesapeake Bay Watershed. http://www.chesapeakebay.net/discover/baywatershed. Date accessed: 30 April 2012.

5. Comer, E.A. 1993. Archeological Assessment National Institutes of Health Animal Center, Montgomery County, Maryland. 10 June 1993.

6. Comer, E.A. 1994. Phase I Archeological Survey, Building 124 Non-Human Primate Facility, National Institutes of Health Animal Center, Montgomery County, Maryland.

7. Comer, E.A. 2000. Phase I Archaeological Investigation and Phase II Archaeological Evaluation, National Institutes of Health Animal Center Power Plant, Montgomery County, Maryland.

8. Critical Area Commission. 2008. Critical Area Commission for the Chesapeake and Atlantic Coastal Bays. http://www.dnr.state.md.us/criticalarea/index.html. Date accessed: 14 April 2012.

9. Curtis Bay Energy (CBE). 2012. http://www.curtisbayenergy.com/emissionscontrol.html. Date accessed: 20 April 2012.

10. Federal Emergency Management Agency (FEMA). 2011. National Flood Hazard Layer. http://www.msc.fema.gov. Date accessed: 8 August 2012.

11. Groenke, Steve. 2012. Personal communication (telephone) with Steve Groenke, Curtis Bay Energy. 14 June 2012.

12. Hairey, Dave. 2012. Personal communication (telephone) with Dave Hairey, Executive Administrative Aide, Montgomery County Transfer Station. 18 April 2012.

13. Intergovernmental Panel on Climate Change (IPCC). 2007. Climate Change 2007: Synthesis Report. Summary for Policy Makers (SPM), p. 5. http://www.ipcc.ch/index.htm, http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_spm.pdf. Date accessed: 26 September 2009.

14. International Dark-Sky Association (IDA). 2012. Practical Guide: Introduction to Light Pollution (PG1). http://docs.darksky.org/PG/PG1-light-pollution.pdf. Date accessed: 27 March 2012.

15. International Institute for Sustainable Development (IISD). 2012. Sustainable Development. http://www.iisd.org/sd/. Date accessed: 17 April 2012.

16. Interstate Commission on the Potomac River Basin. 2012. General Facts & FAQs. http://www.potomacriver.org/2012/facts-a-faqs/faqs. Date accessed: 30 April 2012.

17. Ketner, William. 2012. Personal communication (email) with Bill Ketner, NIH. 10 April 2012.

18. Maryland Biotechnology Center. 2012. Maryland Biotechnology Center. 2012. Facts and Figures. http://marylandbiocenter.org/Bioscience%20of%20Maryland/Pages/factsandfigures.aspx. Date accessed: 6 June 2012.

19. Maryland Department of the Environment (MDE). 2007. The Stormwater Management Act of 2007- A State Perspective. http://www.mde.state.md.us/assets/document/act%20-%20a%20state%20perspective.pdf. Date accessed: 30 April 2012.

20. MDE. 2009. 2000 Maryland Stormwater Design Manual, Volumes I & II (2000) Supplement No. 1. http://www.mde.state.md.us/assets/document/IBR%20Package%20Complete%2004%20 2009.pdf. Date accessed: 30 April 2012.

21. MDE. 2010. Maryland Stormwater Management Guidelines for State & Federal Projects. 15 April 2010. http://www.mde.state.md.us/assets/document/State%20and%20Federal%20SWM%20Guidelines%20final.pdf. Date accessed: 18 April 2012.

22. MDE. 2011. Water Quality Analysis of Eutrophication for the Potomac River Montgomery County Watershed, Montgomery and Frederick Counties, Maryland. June 2011. http://www.mde.state.md.us/programs/Water/TMDL/DraftTMDLforPublicComment/Documents/www.mde.state.md.us/assets/document/Draft_MoCo_NutWQA_060611_Public_Review.pdf. Date accessed: 23 April 2012.

23. MDE. 2012a. Maryland Ambient Monitoring Network. http://www.mde.state.md.us/programs/Air/AirQualityMonitoring/Pages/Network.aspx. Date accessed: 3 April 2012.

24. MDE. 2012b. Title V Program Fact Sheet. http://www.mde.state.md.us/programs/Permits/AirManagementPermits/TitleVProgramInformation/Pages/title5factsheet.aspx. Date accessed: 30 March 2012.

25. Maryland Department of Natural Resources (MDNR).1993. DNR Wetlands. www.msgic.state.md.us/techtool. Date accessed: 8 August 2012.

26. MDNR.1998. Maryland's Third Order Watershed. www.msgic.state.md.us/techtool. Date accessed: 8 August 2012.

27. MDNR. 1997a. Maryland Biological Stream Survey: MO-P-206-311-97. http://mddnr.chesapeakebay.net/mbss/SA_site2k.cfm?siteyr=MO-P-206-311-97. Date accessed: 23 April 2012.

28. MDNR. 1997b. Maryland Biological Stream Survey: MO-P-496-215-97. http://mddnr.chesapeakebay.net/mbss/SA_site2k.cfm?siteyr=MO-P-496-215-97. Date accessed: 23 April 2012.

29. MDNR. 2003. FIDS-Potential Habitat for Forest Interior Dwelling Species (FIDS). http://www.dnr.state.md.us/forests/planning/sfla/indicators/potential_fids.htm. Date accessed: 8 August 2012.

30. MDNR. 2012. Potential FIDS Habitat. http://www.dnr.state.md.us/forests/planning/sfla/indicators/potential_fids.htm. Date accessed: 18 April 2012.

31. Maryland Geographical Survey. 2001. A Brief Description of the Geology of Maryland. January 2001.

32. Maryland Geological Survey. 2010. Geologic Maps of Maryland: Montgomery County (1968). http://www.mgs.md.gov/esic/geo/mon.html. Date accessed: 16 April 2012.

33. Maryland-National Capital Park and Planning Commission (M-NCPPC). 2005. 2005 Land Preservation, Parks, and Recreation Plan: A Parks Recreation Open Space Plan for Montgomery County, Maryland. December 2005.

34. M-NCPPC and Montgomery County Department of Park and Planning (MCDPP). 2005. Countywide Bikeways Functional Master Plan. March 2005. http://www.montgomeryplanning.org/transportation/bikeways/A_A/contents.shtm. Date accessed: 1 May 2012.

35. Maryland State Highway Administration. 2012. Traffic Trends System Report Module. http://shagbhisdadt.mdot.state.md.us/traffictrends2/. Date accessed: 10 June 2012.

36. Mayberry, D. 2012. Personal communication (telephone) with Don Mayberry, NIHAC CUP Operator, NIH Animal Center. 4 April 2012.

37. Montgomery County. 2012. Press Release: Leggett Announces New Recycling Goal for County; 70% by 2020 is Among Highest in Region. 23 May 2012. http://www.montgomerycountymd.gov/apps/News/press/PR_details.asp?PrID=8525. Date accessed: 14 June 2012.

38. Montgomery County Department of Economic Development. 2009. http://www.montgomerycountymd.gov/dedtmpl.asp?url=/content/ded/index.asp. Date accessed: 1 May 2012.

39. Montgomery County Department of Environmental Protection (DEP) Watershed Management Division. 2001. Broad Run Watershed Study. Montgomery County, MD. February 2001.

40. Montgomery County DEP. 2010. Comprehensive Solid Waste Management 10 Year Plan. 9 February 2010.

41. Montgomery County Department of Finance. 2012. FY12 Third Quarter Revenue Update. Presentation to the Montgomery County Council. March 2012. http://www.montgomerycountymd.gov/content/finance/data/economic/Revenue_Update_to_Council_March2012.pdf. Date accessed: 8 June 2012.

42. Montgomery County Department of Parks. 2007. Memorandum regarding Legacy Open Space Recommendations for New Sites: Recommend the addition of seven sites to Legacy Open Space. 15 November 2007. http://www.montgomeryplanningboard.org/agenda/2007/documents/11152007_legacyopenspace.pdf. Date accessed: 7 June 2012.

43. MCDPP and M-NCPPC. 2000. Guidelines for Environmental Management of Development in Montgomery County. Montgomery County, MD. January 2000.

44. Montgomery County Planning Department. 2011. Reducing Our Footprint - Planning Board Draft 2009-2011 Growth Policy.

45. Montgomery County Public Schools. 2012. Schools at a Glance 2011-2012. http://www.montgomeryschoolsmd.org/departments/regulatoryaccountability/glance/currentyear/cluster.shtm. Date accessed: 13 April 2012.

46. National Geographic. 2012. National Geographic World Map. http://services.arcgisonline.com/ArcGIS/rest/services/NatGeo_World_Map/MapServer. Date accessed: 8 August 2012.

47. National Institutes of Health (NIH). 1996. Final Environmental Impact Statement for the 1996 Master Plan National Institutes of Health Animal Center. Poolesville, Montgomery County, Maryland. October 1996.

48. NIH. 2009. Final Environmental Impact Statement for the Rocky Mountain Laboratories Master Plan. March 2009.

49. NIH. 2011. Discharge Monitoring Reports. Jan-Dec. 2011.

50. NIH. 2012. National Institutes of Health Animal Center, Dickerson, Maryland: Draft Master Plan. March 2012.

51. National Research Council of the National Academies (NRC). 2011. Guide for the Care and Use of Laboratory Animals, 8th Edition. 2011.

52. New Hampshire Department of Environmental Services (NHDES). 2011. National Air Quality Regulations – Industrial, Commercial and Institutional Boilers. September 30, 2011. http://des.nh.gov/organization/divisions/air/boiler-rule/documents/naqr-industrial-boilers.pdf. Date accessed: 4 April 2012.

53. Office of the Press Secretary (OPS). 2011. Statement by the President on the Ozone National Ambient Air Quality Standards. http://www.whitehouse.gov/the-press-office/2011/09/02/statement-president-ozone-national-ambient-air-quality-standards/. Date accessed: 3 April 2012.

54. Roxby, S. 2012. Personal communication (telephone) with Scott Roxby, NIHAC CUP Operator, NIH Animal Center. 4 April 2012.

55. Schueler, T. 1994. "The Importance of Imperviousness." Watershed Protection Techniques, 1(3), p. 100-111.

56. Shaw, D. 2012. Personal communication (telephone) with David Shaw, Facility Manager/Supervisor, NIH Animal Center. 14 March 2012.

57. Stream Waders. 2010a. Broad Run UT near Club Hollow Road in Montgomery County. http://mddnr.chesapeakebay.net/mbss/v_site.cfm?site=0851-02-2010

58. Stream Waders. 2010b. Broad Run near River Road (south) in Montgomery County. http://mddnr.chesapeakebay.net/mbss/v_site.cfm?site=0851-01-2010. Date accessed: 23 April 2012.

59. Town of Poolesville. 2011. Comprehensive Master Plan. 5 December 2011.

60. Transportation Research Board. 2011. Highway Capacity Manual (HCM 2010). April 2011.

61. U.S. Department of Agriculture (USDA), Natural Resources Conservation Service. 2007. Soil Survey Geographic (SSURGO) database for Montgomery County, Maryland. http://SoilDataMart.nrcs.usda.gov/. Date accessed: 8 August 2012.

62. U.S. Census Bureau. 2012. Fact Finder. http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml. Date accessed: 11 June 2012.

63. U.S. Department of the Interior (USDOI), National Park Service. 2002. National Register Bulletin: How to Apply the National Register Criteria for Evaluation. Section II. National Register Criteria for Evaluation. http://www.nps.gov/nr/publications/bulletins/nrb15/nrb15_2.htm. Date accessed: 23 February 2012.

64. U.S. Environmental Protection Agency (USEPA). 2004. Office of Research and Development. The Use of Best Management Practices in Urban Watersheds. http://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=2000D1LM.txt. Date accessed: 10 May 2012.

65. USEPA. 2010. Six Common Air Pollutants. http://www.epa.gov/air/urbanair/. Date accessed: 3 April 2012.

66. USEPA. 2011. Climate Change Science. Last updated: 29 November 2011. http://www.epa.gov/climatechange/science/index.html. Date accessed: 3 April 2012.

67. USEPA. 2012a. AirData Monitor Value Reports. http://www.epa.gov/airdata/ad_rep_mon.html. Date accessed: 2 April 2012.

68. USEPA. 2012b. Indoor Air Quality Glossary of Terms. Last updated: 24 January 2012. http://www.epa.gov/iaq/glossary.html. Date accessed: 30 March 2012.

69. Virginia Department of Environmental Quality (VADEQ). 2011. Virginia Ambient Air Monitoring 2010 Data Report. http://www.deq.virginia.gov/Portals/0/DEQ/Air/AirMonitoring/Annual_Report_10.pdf. Date accessed: 8 April 2012.

70. Weidner, Roger. 2012. Personal communication (email) with Roger Weidner, NIH. 5 April 2012.

71. Yost, Wade. 2012. Personal communication (telephone) with Wade Yost, Town of Poolesville. 25 April 2012.

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Agency: Maryland Department of Natural Resources, Wildlife and Heritage Service
Reason: Potential presence of rare, threatened, or endangered species at NIHAC

Agency: Maryland Department of Planning, Maryland Historical Trust
Reason: Review of Draft NIHAC Master Plan for potential impacts to cultural resources

Agency: National Park Service
Reason: Review of Draft NIHAC Master Plan for potential impacts to the C&O Canal National Historical Park

Agency: U.S. Fish and Wildlife Service, Chesapeake Bay Field Office
Reason: Potential presence of rare, threatened, or endangered species at NIHAC

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7. DISTRIBUTION LIST

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APPENDIX A
FIGURES

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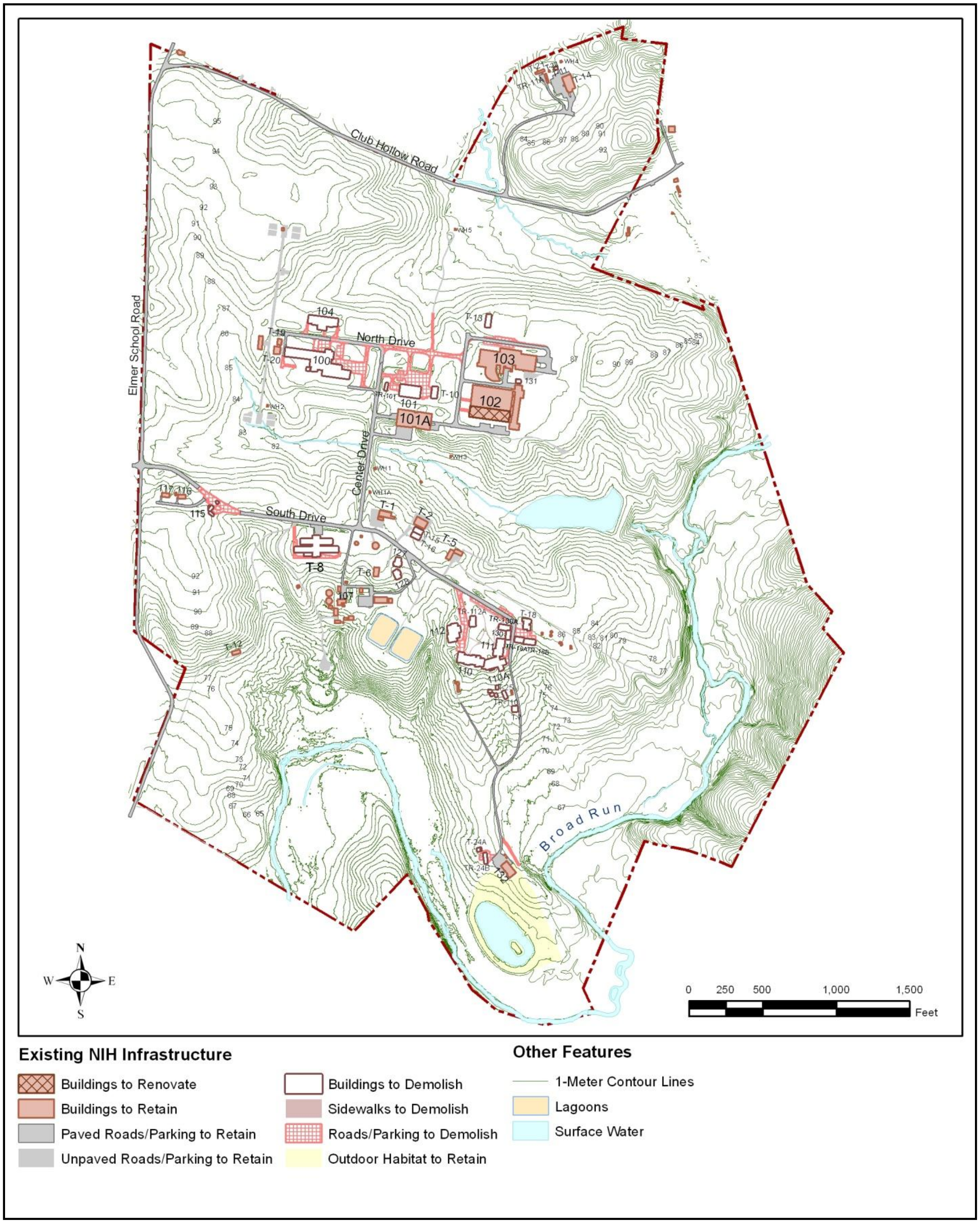


Figure A-1. Topography and NIHAC Master Plan (Existing Facilities)

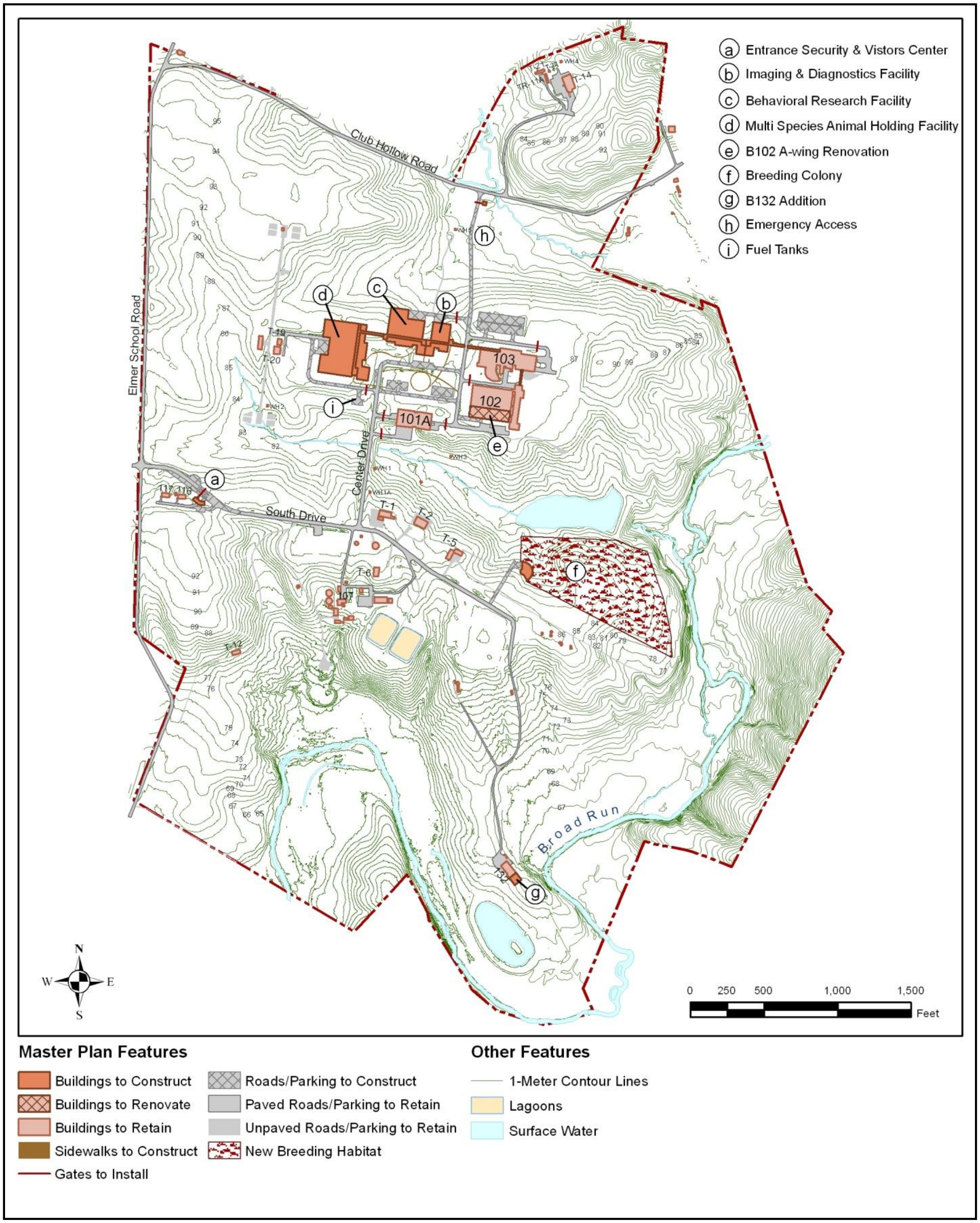
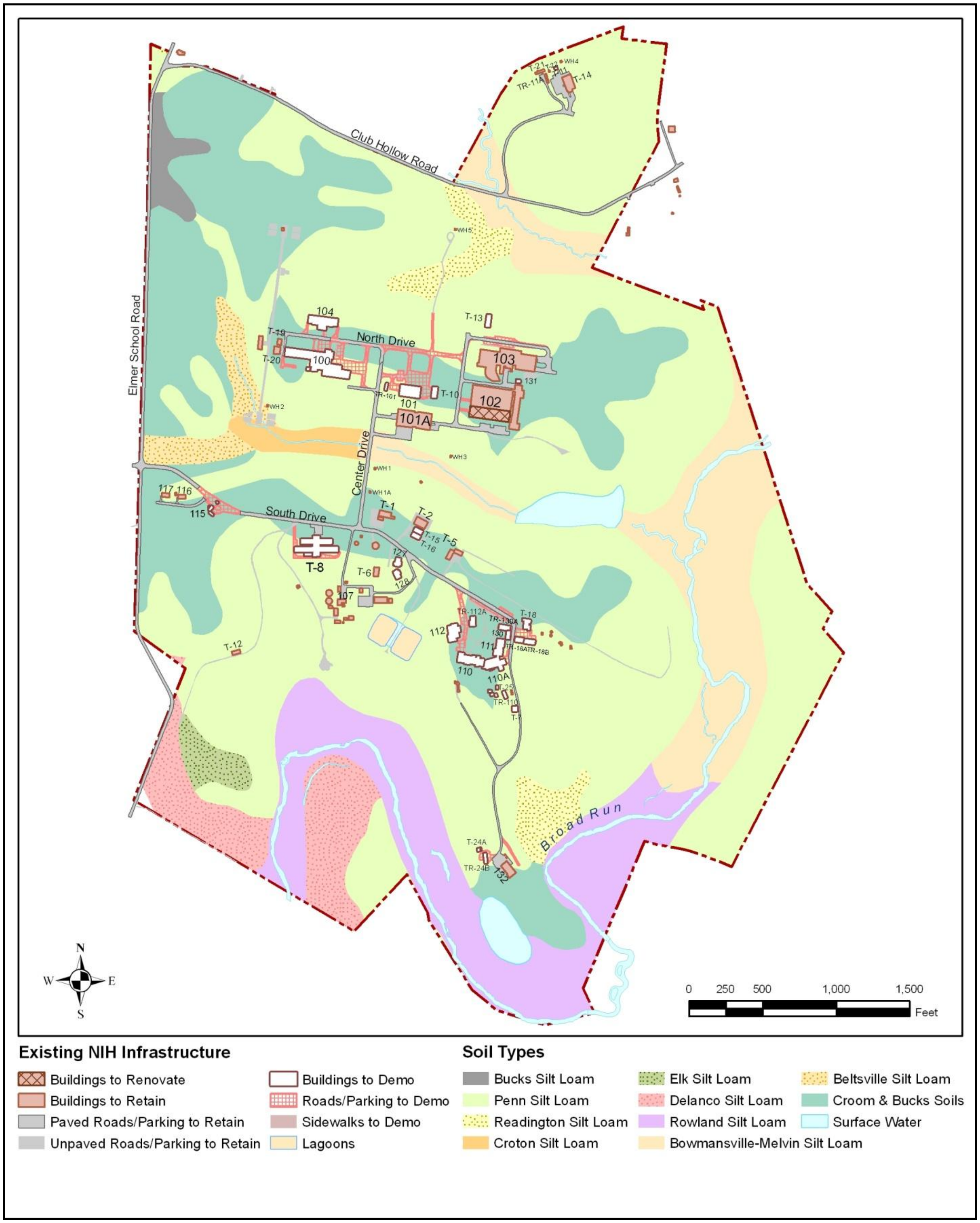
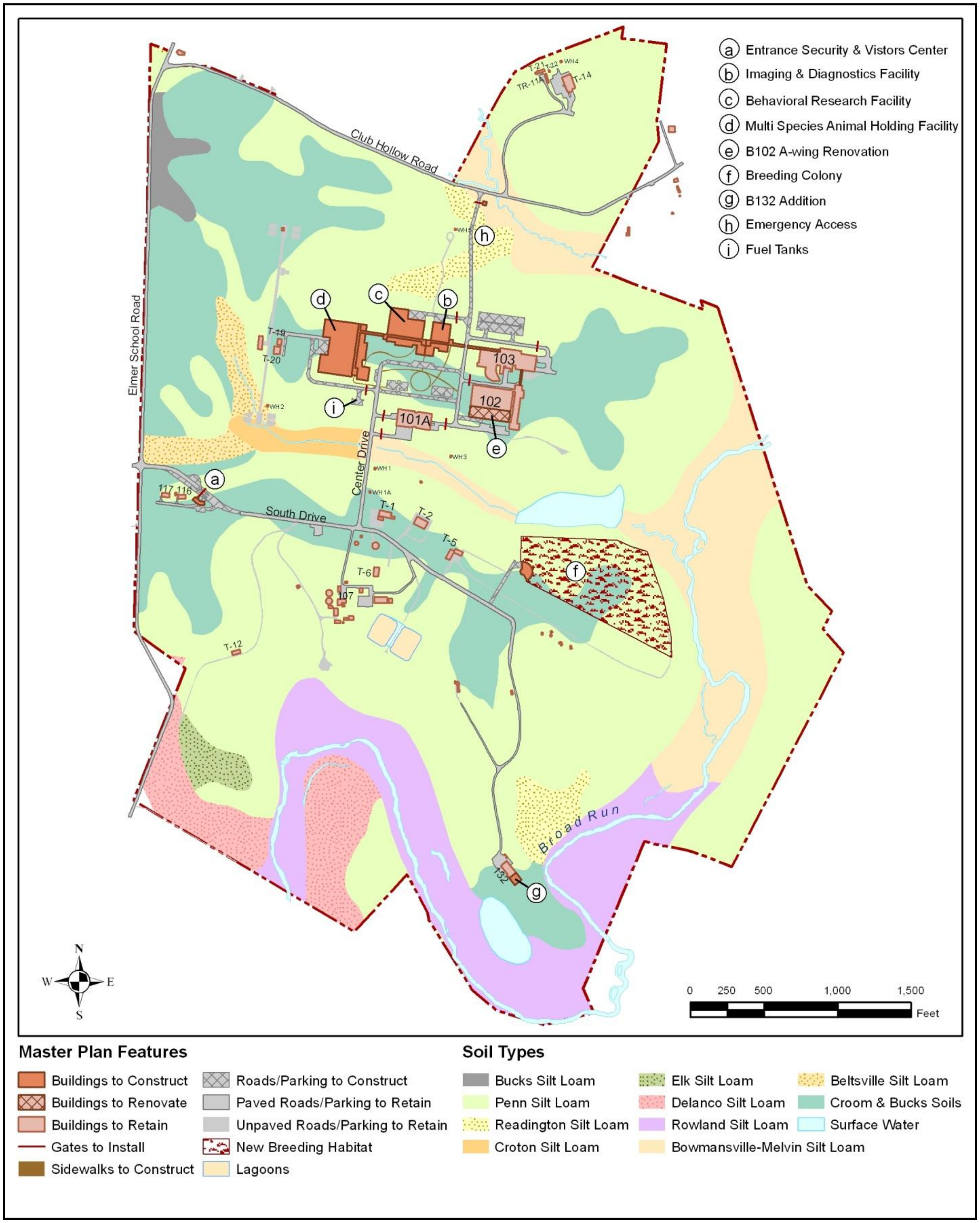


Figure A-2. Topography and NIHAC Master Plan (New Facilities)



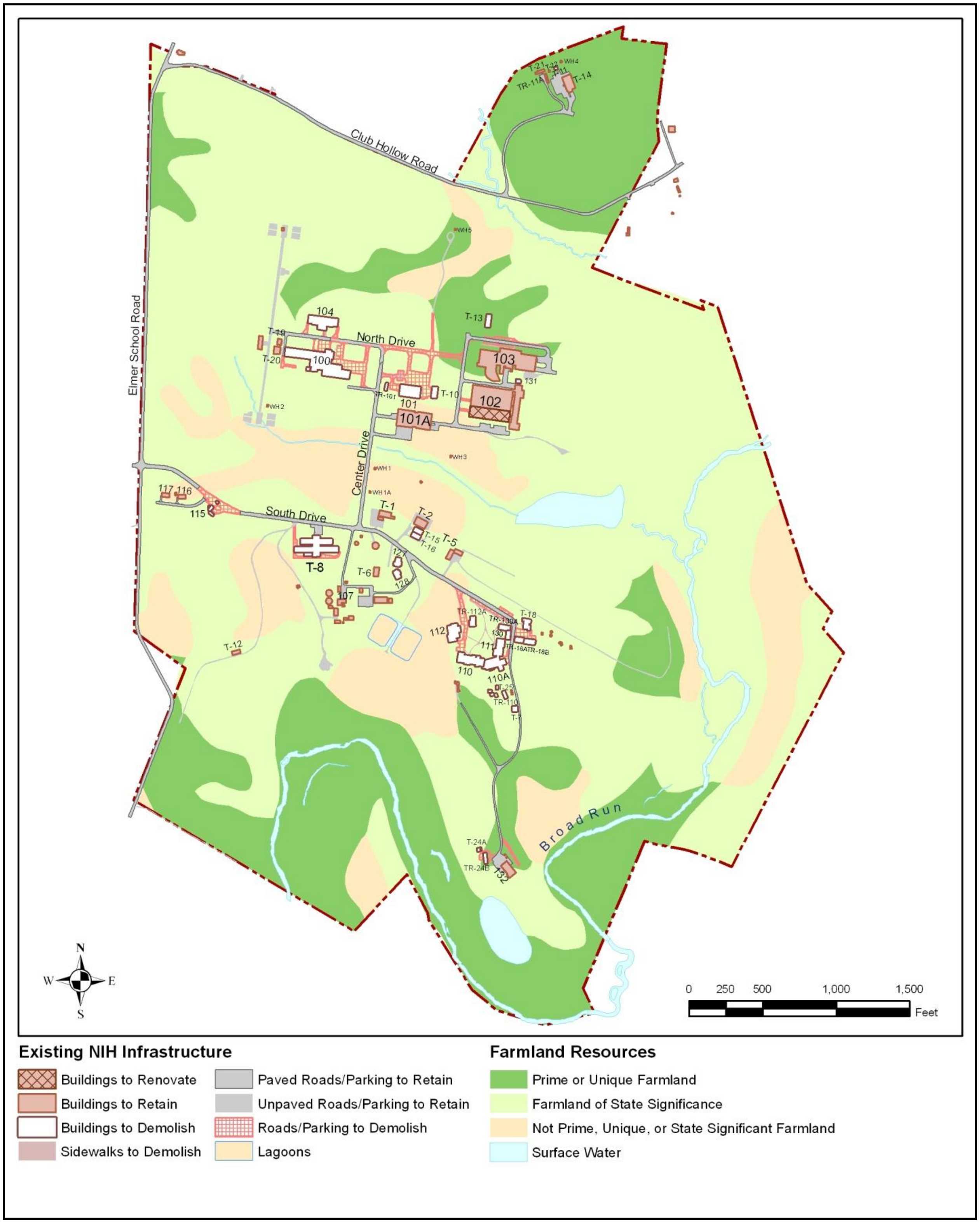
Source: USDA, 2007.

Figure A-3. Soil Resources and NIHAC Master Plan (Existing Facilities)



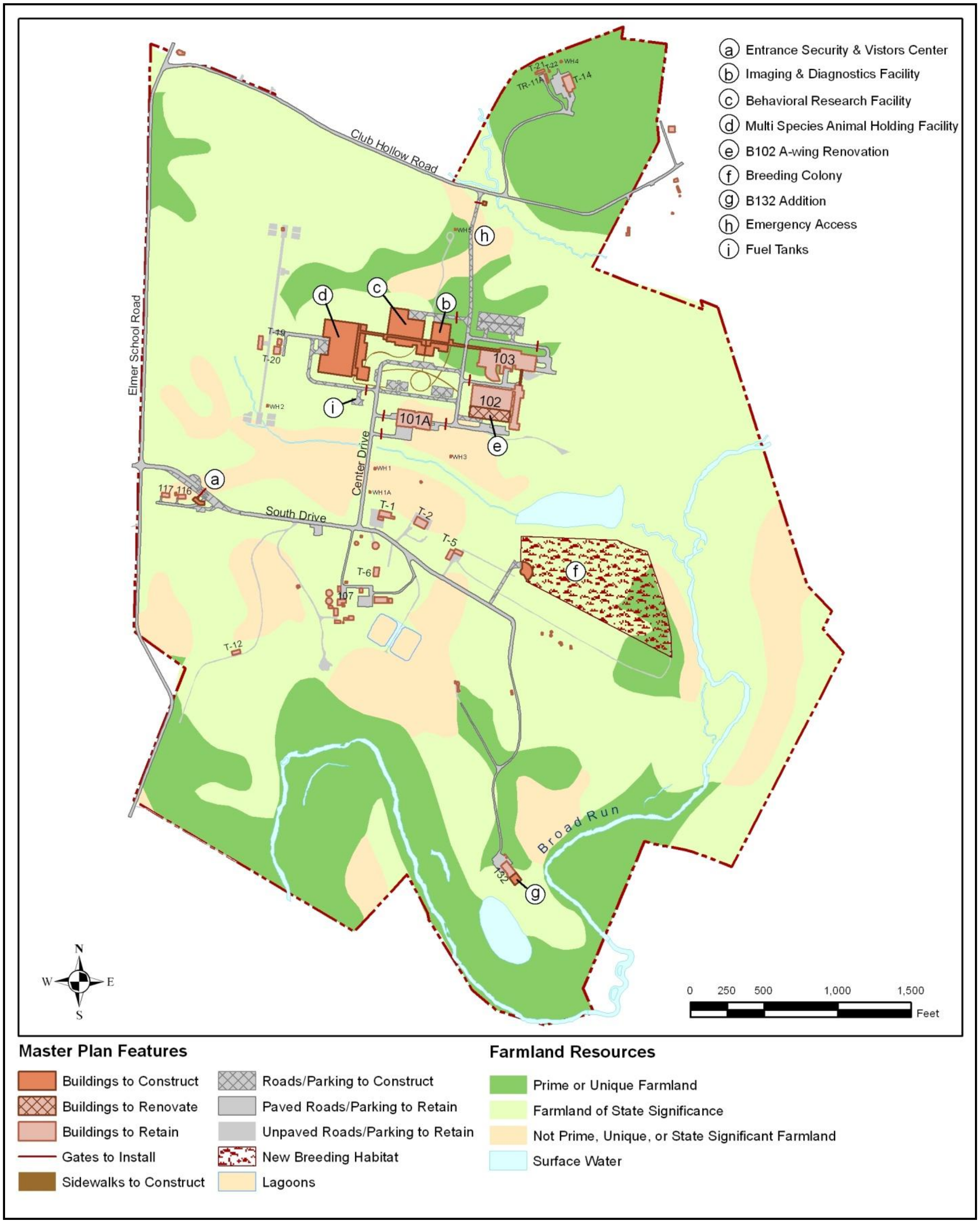
Source: USDA, 2007.

Figure A-4. Soil Resources and NIHAC Master Plan (New Facilities)



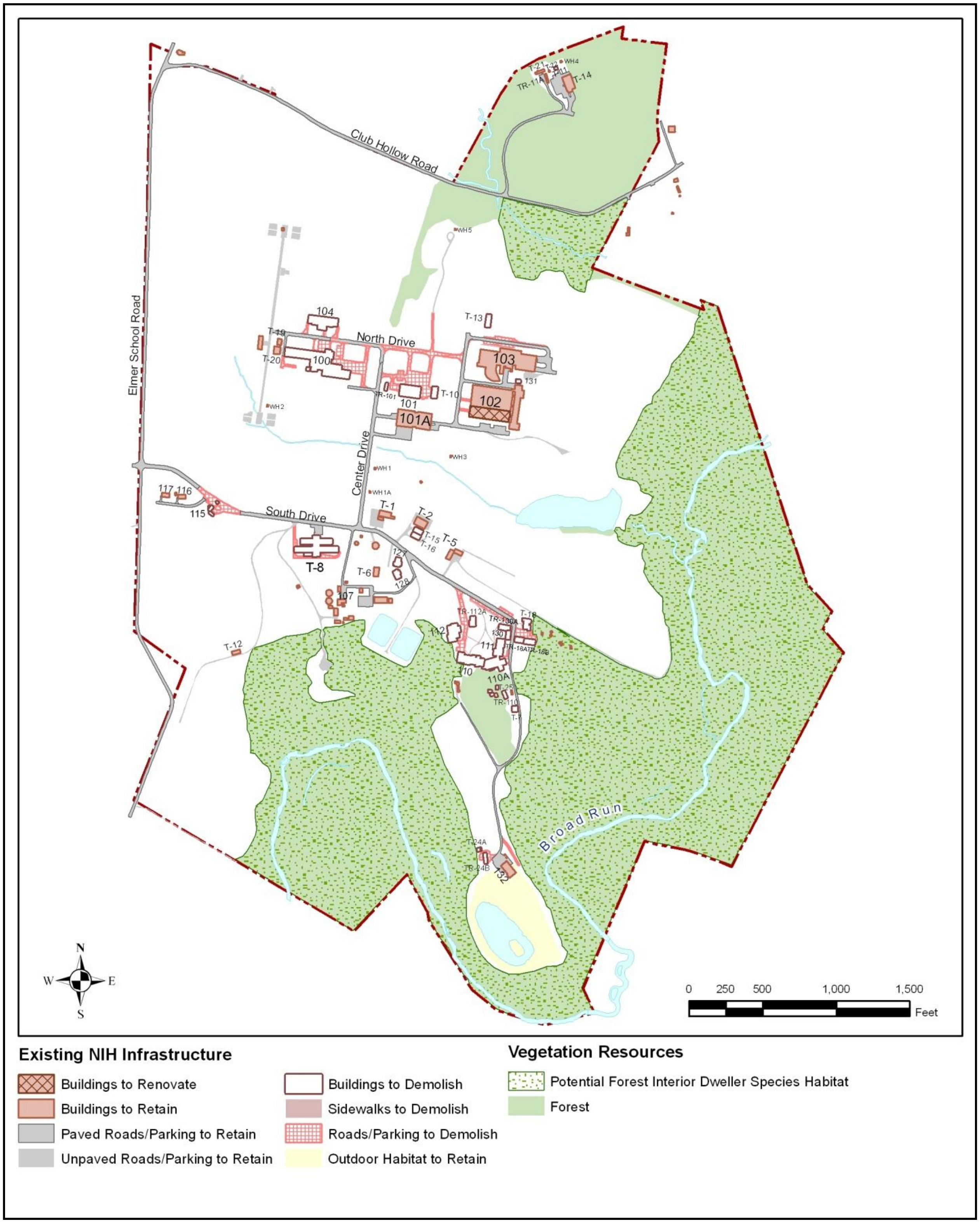
Source: NIH, 1996.

Figure A-5. Farmland Resources and NIHAC Master Plan (Existing Facilities)



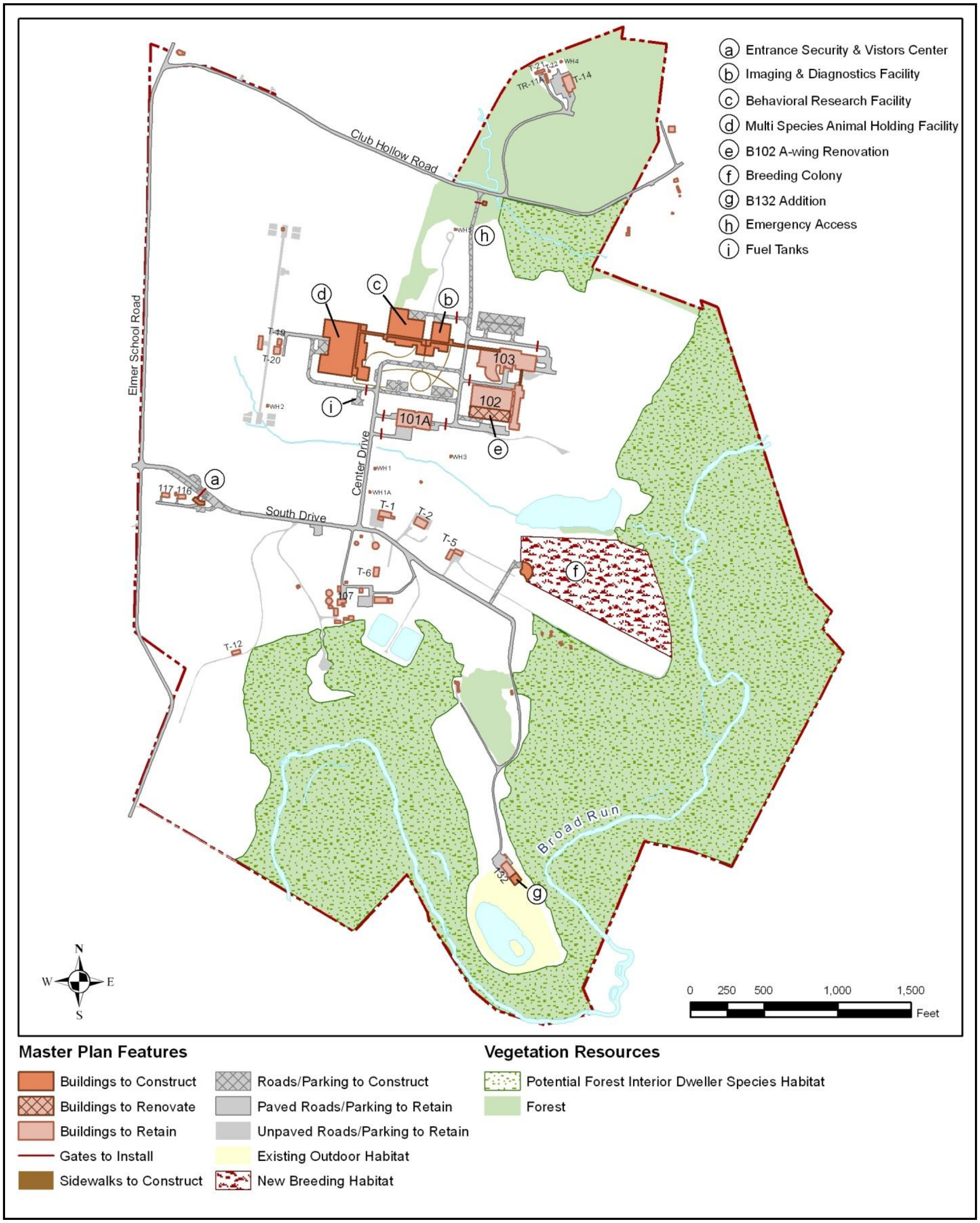
Source: NIH, 1996.

Figure A-6. Farmland Resources and NIHAC Master Plan (New Facilities)



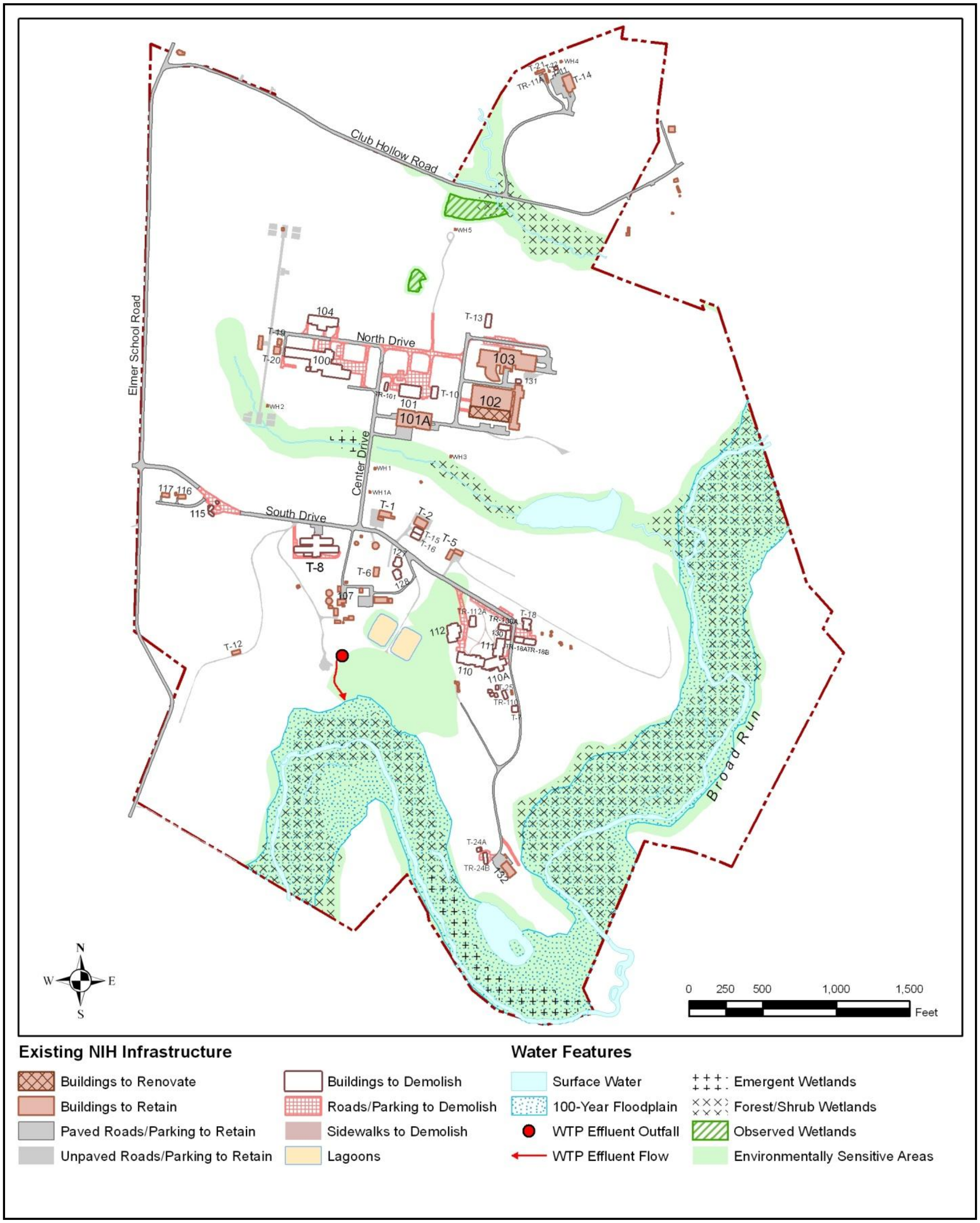
Source: MDNR, 2003.

Figure A-7. Vegetation Resources and NIHAC Master Plan (Existing Facilities)



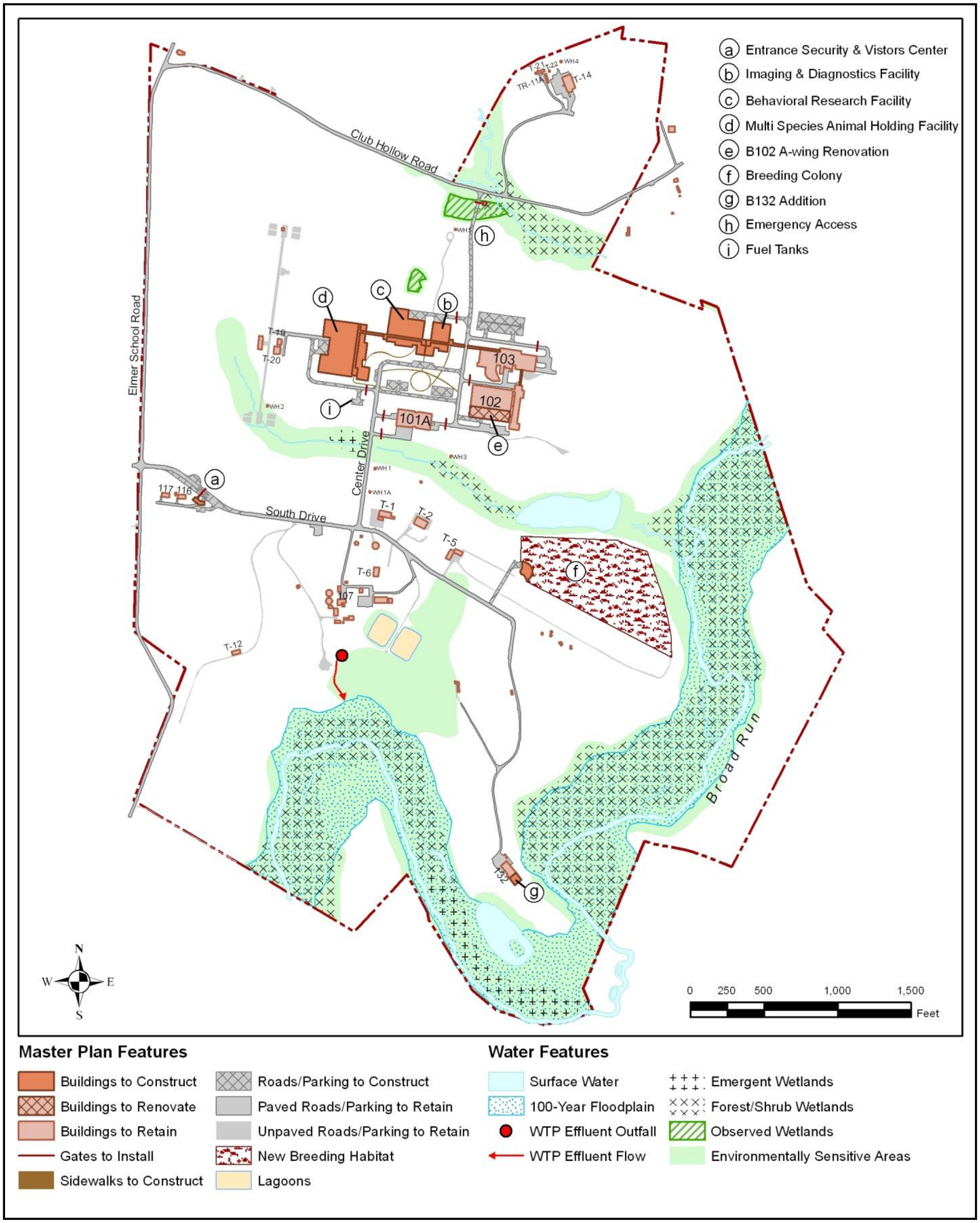
Source: MDNR, 2003.

Figure A-8. Vegetation Resources and NIHAC Master Plan (New Facilities)



Source: FEMA, 2011; MDNR, 1993.

Figure A-9. Water Resources and NIHAC Master Plan (Existing Facilities)



Source: FEMA, 2011; MDNR, 1993.

Figure A-10. Water Resources and NIHAC Master Plan (New Facilities)

APPENDIX B
GENERAL CONFORMITY RULE APPLICABILITY ANALYSIS

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EXECUTIVE SUMMARY

The General Conformity Rule (GCR) was established to ensure that federal activities do not hamper local efforts to control air pollution. In particular, the GCR implements Section 176(c) of the Clean Air Act, which prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, licensing, or approving any action that does not conform to an approved state or federal implementation plan. The purpose of the GCR Applicability Analysis is to determine whether the Proposed Action—execution of a Master Plan for the National Institutes of Health Animal Center (NIHAC)—is subject to the federal GCR.

The Proposed Action would demolish approximately 131,000 GSF of aging, insufficient animal holding and research facilities. These facilities would be replaced and expanded by the construction of five new facilities, totaling approximately 245,000 GSF. The Proposed Action would also demolish approximately 169,000 SF of pavement and sidewalks associated with the demolished facilities and would install approximately 189,000 SF of pavement and sidewalks to support the new facilities. The Proposed Action would occur in four distinct phases over a 20-year period. These activities would result in emissions due to the use of equipment and vehicles during construction activities and building demolition. In addition, the construction of new facilities that would be serviced by the NIHAC Central Utility Plant (CUP) would result in annual operational emissions from increased heating and cooling demand. Conversely, the demolition of the aging facilities would eliminate emissions from operation of boilers and emergency generators at these facilities. Using USEPA's *National Mobile Inventory Model*, this analysis estimated the resulting emissions of nitrogen oxides, fine particulate matter, sulfur dioxide, and volatile organic compounds. These calculations demonstrate that the emissions resulting from the Proposed Action would be below the *de minimis* levels defined for those pollutants in the Applicability Section of the GCR for the years 2013 through 2025. Therefore, the GCR is not applicable to the Proposed Action.

INTRODUCTION

The purpose of this analysis is to determine whether the Proposed Action—execution of a Master Plan for the National Institute of Health Animal Center (NIHAC) in Dickerson, Maryland—is subject to the federal General Conformity Rule (GCR) established in 40 Code of Federal Regulations (CFR), Part 51, Subpart W, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*. The GCR was 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 that does not conform to an approved state or federal implementation plan. This analysis will determine under which of the following areas the Proposed Action will fall:

- <u>Not subject to the rule</u> - The action does not emit criteria pollutants or precursors for which the area is designated as a nonattainment or maintenance area—all procurement actions are excluded from the GCR.

- <u>Exempt or below *de minimis* levels</u> - Emissions from the action are below *de minimis* levels and are not regionally significant, or the action is exempt.

- <u>Does not meet *de minimis* levels or is regionally significant</u> - Emissions from the action exceed *de minimis* levels—a Conformity Determination must be prepared for such actions.

This analysis is organized into the following sections:

- Background (Section 2)—Information on applicable air emission programs and limitations, including *de minimis* levels.
- Proposed Action (Section 3)—A description of the Proposed Master Plan at NIHAC.
- Emissions Calculation Methods and Results (Section 4)—Procedures and results for estimating emissions associated with the Proposed Action.
- Conclusion (Section 5)—Assessment of whether the GCR is applicable to the Proposed Action.

BACKGROUND

As part of the implementation of the CAA Amendments, the United States Environmental Protection Agency (USEPA) issued National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) and 2.5 micrometers ($PM_{2.5}$), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). USEPA defines ambient air in 40 CFR Part 50.1(e) as "that portion of the atmosphere, external to buildings, to which the general public has access."

The CAA divides the U.S. into geographic areas called "air quality control regions" (AQCR). These AQCRs are established areas such as counties, urbanized areas, and consolidated metropolitan statistical areas. An AQCR in which levels of a criteria air pollutant meet the health-based NAAQS is defined as an *attainment* area for the pollutant, while an area that does not meet the NAAQS is designated a *nonattainment* area for the pollutant. An area that was once designated a nonattainment area but was later reclassified as an attainment area is known as a *maintenance* area. Nonattainment and maintenance areas can be further classified as extreme, severe, serious, moderate, or marginal. An AQCR may have an acceptable level for one criteria air pollutant but may have unacceptable levels for other criteria air pollutants. Thus, an area could be attainment, maintenance, and/or nonattainment at the same time for different pollutants.

Each nonattainment air quality control region is responsible for submitting a State Implementation Plan (SIP), which specifies the manner in which NAAQS will be achieved and maintained. Maintenance areas must adhere to a maintenance plan for the specific pollutant for which the area was initially designated nonattainment.

NIHAC is located in Montgomery County, Maryland. Montgomery County is part of the Washington, D.C.-MD-VA Metropolitan Area, which is included in the larger North-East/Mid-Atlantic Ozone Transport Region. USEPA has designated Montgomery County a moderate nonattainment area for 8-hour ozone, a nonattainment area for $PM_{2.5}$, and an attainment area for PM_{10}, CO, SO_2, NO_2, and lead (40 CFR 81.321). Montgomery County is located in the Metropolitan Washington AQCR, which is managed by the Metropolitan Washington Air Quality Committee (MWAQC).

On May 23, 2007, the MWAQC approved the *Plan to Improve Air Quality in the Washington, DC-MD-VA Region, State Implementation Plan (SIP) for 8-hour Ozone Standard*, which addresses how the Metropolitan Washington AQCR will achieve attainment with the 8-hour ozone standard.[1] The

[1] Based on a court ruling and consent decree, EPA issued a new 8-hour ozone rule on March 12, 2008, which strengthens the NAAQS for ozone from 0.08 ppm to 0.075 ppm. EPA designated area attainment status in 2010, and states subsequently have three years to submit a revised SIP. Because only the May 23, 2007 SIP is

designation of Montgomery County as a nonattainment area for $PM_{2.5}$ became effective on April 5, 2005. MWAQC approved a *Plan to Improve Air Quality in the Washington, DC-MD-VA Region: State Implementation Plan (SIP) for Fine Particle ($PM_{2.5}$) Standard and 2002 Base Year Inventory for the Washington DC-MD-VA Nonattainment Area* on March 7, 2008, and the plan was submitted to USEPA by the states before the April 5, 2008 deadline. While air monitors in the AQCR indicated compliance with the $PM_{2.5}$ standard in 2005 and 2006, the SIP goes beyond the requirements of the CAA to attain further reductions in fine particle pollution (MWCOG, 2008).

The Applicability Analysis Section of the GCR, 40 CFR 93.153, states that Federal actions are required to perform a conformity determination for each nonattainment criteria pollutant (or precursor to those pollutants) if the total of direct and indirect emissions of those pollutants would equal or exceed the *de minimis* levels defined in that section. Table B-1 identifies the *de minimis* levels that would apply to actions in Montgomery County, Maryland. This GCR applicability analysis will determine whether the Proposed Action has the potential to result in emissions above the levels listed in Table B-1.

Table B-1. General Conformity Rule De Minimis Levels for Nonattainment Pollutants in Montgomery County, Maryland

Pollutant	*De Minimis* Level (tons per year)
Ozone precursors (moderate nonattainment area inside an ozone transport region)	
Volatile Organic Compounds (VOCs)	50
Nitrogen Oxides (NOx)	100
$PM_{2.5}$ and precursors	
$PM_{2.5}$ (direct emissions)	100
SO_2	100
NOx [a]	100

Source: USEPA, 2011b.
a– NOx is considered a precursor to $PM_{2.5}$ in all nonattainment and maintenance areas unless both the State and USEPA determine that it is not a significant precursor.

In addition to the $PM_{2.5}$ precursors listed in Table B-1, Section 93.153(b) of the GCR also establishes a *de minimis* level of 100 tons per year for VOCs and ammonia. However, VOCs and ammonia are considered precursors to $PM_{2.5}$ only in nonattainment and maintenance areas where either the State or USEPA determines that they are significant precursors. Based on Chapter 2.8 of the *SIP for Fine Particles ($PM_{2.5}$)*, VOCs and ammonia are not considered significant sources of $PM_{2.5}$ in the area (MWCOG, 2008). However, VOC *de minimis* levels for ozone nonattainment still apply and are used in this analysis. In summary, the following *de minimis* levels are used in this applicability analysis:

- NO_x – 100 tons/yr.
- VOCs – 50 tons/yr.
- $PM_{2.5}$ – 100 tons/yr.
- SO_2 – 100 tons/yr.

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available, the General Conformity Rule applicability analysis for the Proposed Action is based on the AQCR's designation as a moderate nonattainment area.

USEPA promulgated revisions to the General Conformity regulations on March 24, 2010. The revised rule removes requirements for federal agencies to conduct conformity determinations for "regionally significant" actions that have emissions greater than 10 percent of the emissions inventory for a nonattainment area if expected pollutant emissions do not exceed *de minimis* levels. Therefore, this applicability analysis does not evaluate the Proposed Action for "regional significance."

PROPOSED ACTION

The need for the NIHAC Master Plan, and the campus improvements prescribed therein, is driven by both institutional policy and the inability of existing facilities to support current and projected mission requirements at NIHAC. New and renovated facilities are necessary to replace aging facilities that do not provide adequate space or appropriate configuration to accommodate the projected animal holding and research programs at NIHAC. The Master Plan would demolish approximately 131,000 GSF of insufficient facilities. These facilities would be replaced and expanded by the construction of five new facilities, totaling approximately 245,000 GSF, including an Imaging and Diagnostics Facility, a Behavioral Research Facility, a Multi-Species Animal Holding Facility, a new breeding colony, and a new Entrance Security and Visitor Center. The Master Plan would also demolish approximately 169,000 SF of pavement and sidewalks associated with the demolished facilities and would install approximately 189,000 SF of pavement and sidewalks to support the new facilities

The Master Plan would occur in four distinct phases over a 20-year period. See Table B-2 for a summary of construction and demolition activities and the associated square footage for each project phase.

Table B-2. Phased Construction Schedule under the Master Plan

	Phase 1	Phase 2	Phase 3	Phase 4	Total
Construction (SF)					
Buildings	12,200	49,000	80,800	103,100	245,100
Pavement/Sidewalks	9,256	67,470	62,663	49,796	189,185
Demolition (SF)					
Buildings	88,093	606	38,471	3,849	131,019
Pavement/Sidewalks	96,106	22,839	49,737	--	168,682

EMISSIONS CALCULATION METHODS AND RESULTS

Because USEPA has designated the Washington, DC-MD-VA area a moderate nonattainment area for ozone and a nonattainment area for $PM_{2.5}$, this applicability analysis estimates emissions of ozone precursors (VOCs and NOx), $PM_{2.5}$ (direct emissions), and $PM_{2.5}$ precursors (SO_2, NOx, VOCs) associated with the Master Plan. As noted above, ammonia and VOCs are not considered significant precursors for $PM_{2.5}$. This analysis considers the changes in emissions resulting from temporary construction and demolition activities and operation of boilers and emergency generators.

It is unlikely that the entirety of each phase of the Master Plan, including all construction and demolition projects, would be completed within the same calendar year. However, to provide a worst-case estimate of emissions on a calendar-year basis, this analysis assumes that the construction and demolition aspects for each phase of the Master Plan would be completed within one calendar year and the phases would be implemented every four years.

Construction and Demolition Equipment Emissions

Emissions associated with the Master Plan would originate from mobile sources such as excavators, bulldozers, loaders, dump trucks, and privately owned vehicles (POVs). Emissions from these vehicles were estimated using USEPA's National Mobile Inventory Model (NMIM), which models both on-road (i.e., dump trucks and POVs) and nonroad vehicles (i.e., excavators, bulldozers, loaders). USEPA developed NMIM to help states develop estimates of current and future emission inventories for on-road motor vehicles and nonroad equipment. NMIM uses current versions of the MOBILE6 and NONROAD models to calculate emission inventories, based on multiple input scenarios that the user enters into the system. NMIM is primarily intended to calculate national, individual state or county inventories, but through its fleet modeling function, emissions from user-defined fleets of vehicles also can be estimated.

NMIM requires the following inputs for fleet modeling of on-road and nonroad vehicles:

- MOBILE6 class (on-road) or source classification code (SCC) (nonroad).
- Vehicle model year.
- Number of vehicles.
- Average annual mileage (on-road) or average annual operating hours (nonroad).
- Maximum horsepower (only nonroad).
- Technology type (only nonroad).
- Monthly activity allocation (only nonroad).

NMIM also requires the user to set global parameters, which are specified in Table B-3.

Other inputs used to model the on-road and nonroad fleets for the Master Plan are shown in Table B-4 and Table B-5, below. The model year of the vehicles was assumed to be five years before the start of each construction phase. The technology type and monthly activity allocation was left as the NMIM default. The vehicle types, number of vehicles, mileage, and operating hours were based on information gathered from comparable federal demolition and construction projects. On-road and nonroad input files were created for each year of construction and demolition to model these scenarios.

Total estimated annual temporary emissions from construction and demolition for the Master Plan are shown in Table B-6.

Table B-3. NMIM Global Parameters

NMIM Parameter	GCR Analysis Setting
Perform On-road Fleet Modeling	Yes
Perform Nonroad Fleet Modeling	Yes
Geography	Montgomery County, MD
Time	Year of Modeling Scenario (i.e., 2013, 2017, 2021, 2025)
Use Yearly Weather Data	No
Pollutants	Exhaust $PM_{2.5}$ microns
	Tire $PM_{2.5}$ microns
	Brake $PM_{2.5}$ microns
	HC as VOC
	NOx
	SO_2
Advanced Features	None
Diesel Retrofit	None

Table B-4. On-Road Vehicle NMIM Inputs and Estimated Emissions

Phase (Year)	Vehicle Type	Vehicle Class	Average Distance Traveled (mi/ vehicle)	No. of Vehicles	Emissions (tons)			
					NO_X	$PM_{2.5}$	SO_2	VOC
Phase I (2013)	POVs	LDGT3	6,816	25	0.046	0.002	0.002	0.045
	Flatbed trucks, tractor trailers	HDDV3	4,665	6	0.045	0.0004	0.0002	0.005
	Dump trucks	HDDV8A/B	3,197	16	0.092	0.001	0.0003	0.010
				2013 Totals:	**0.183**	**0.003**	**0.003**	**0.060**
Phase II (2017)	POVs	LDGT3	9,089	40	0.099	0.005	0.005	0.093
	Flatbed trucks, tractor trailers	HDDV3	7,259	15	0.027	0.002	0.001	0.019
	Dump trucks	HDDV8A/B	5,933	16	0.028	0.001	0.001	0.019
				2017 Totals:	**0.154**	**0.008**	**0.006**	**0.131**
Phase III (2021)	POVs	LDGT3	10,427	60	0.170	0.008	0.008	0.159
	Flatbed trucks, tractor trailers	HDDV3	11,995	15	0.045	0.003	0.001	0.031
	Dump trucks	HDDV8A/B	10,049	16	0.047	0.003	0.001	0.033
				2021 Totals:	**0.262**	**0.013**	**0.010**	**0.223**
Phase IV (2025)	POVs	LDGT3	7,521	100	0.204	0.009	0.010	0.192
	Flatbed trucks, tractor trailers	HDDV3	15,275	15	0.057	0.004	0.002	0.040
	Dump trucks	HDDV8A/B	11,457	16	0.054	0.003	0.001	0.037
				2025 Totals:	**0.315**	**0.016**	**0.012**	**0.269**

Table B-5. Nonroad Vehicle NMIM Inputs and Estimated Emissions

Phase (Year)	Equipment Type	SCC	Max. HP	Avg. Operating Hrs/Vehicle	No. of Vehicles	Emissions (tons) NOx	$PM_{2.5}$	SO_2	VOC
Phase I (2013)	Roller	2270002015	100	244	1	0.05	0.01	0.0001	0.00
	Vibratory Compactor		6	244	1				
	Asphalt Paver	2270002021	175	74	1	0.02	0.002	0.00002	0.001
	Excavator	2270002036	600	244	1	0.17	0.01	0.0002	0.01
	Crane	2270002045	175	1380	1	0.27	0.02	0.0003	0.02
	Backhoe Loader	2270002066	175	510	3	0.40	0.03	0.0004	0.04
	Steel Track Loader		50	1265	4				
	Bulldozer	2270002069	175	635	3	0.49	0.06	0.001	0.04
	Skid Steer Loader	2270002072	75	968	1	0.04	0.003	0.0001	0.004
	Gas Powered Generator	2270006005	40	1464	2	0.22	0.01	0.0002	0.01
	Gas Powered Air Compressor	2270006015	16	1464	2	0.08	0.01	0.0001	0.01
					2013 Totals:	**1.75**	**0.16**	**0.002**	**0.14**
Phase II (2017)	Roller	2270002015	100	980	1	0.104	0.002	0.0002	0.010
	Vibratory Compactor		6	980	1				
	Asphalt Paver	2270002021	175	540	1	0.064	0.0004	0.0001	0.006
	Excavator	2270002036	600	980	1	0.366	0.003	0.001	0.036
	Cranes	2270002045	175	1,047	3	0.302	0.002	0.001	0.030
	Loader	2270002066	175	474	4	0.094	0.001	0.0002	0.009
	Steel Track Loader		50	390	1				
	Bulldozer	2270002069	175	751	3	0.279	0.002	0.001	0.028
	Skid Steer Loader	2270002072	75	946	2	0.076	0.005	0.0001	0.005
	Gas Powered Generator	2270006005	40	1,176	10	0.881	0.040	0.001	0.055
	Gas Powered Air Compressor	2270006015	16	1,176	10	0.331	0.027	0.0003	0.035
					2017 Totals:	**2.50**	**0.08**	**0.003**	**0.21**

Table B-5. Nonroad Vehicle NMIM Inputs and Estimated Emissions

Phase (Year)	Equipment Type	SCC	Max. HP	Avg. Operating Hrs/Vehicle	Emissions (tons)				
					No. of Vehicles	NOx	$PM_{2.5}$	SO_2	VOC
Phase III (2021)	Roller	2270002015	100	808	2	0.050	0.003	0.0003	0.016
	Vibratory Compactor		6	808	2				
	Asphalt Paver	2270002021	175	406	1	0.010	0.0003	0.0001	0.005
	Excavator	2270002036	600	808	2	0.122	0.004	0.001	0.060
	Cranes	2270002045	175	1,358	4	0.105	0.004	0.001	0.052
	Loader	2270002066	175	742	4	0.099	0.001	0.0003	0.015
	Steel Track Loader		50	1,167	2				
	Bulldozer	2270002069	175	1,085	3	0.081	0.003	0.001	0.040
	Skid Steer Loader	2270002072	75	1,361	2	0.109	0.001	0.0001	0.005
	Gas Powered Generator	2270006005	40	1,616	12	0.921	0.006	0.001	0.042
	Gas Powered Air Compressor	2270006015	16	1,616	12	0.546	0.046	0.0005	0.058
					2021 Totals:	**2.04**	**0.07**	**0.005**	**0.29**
Phase IV (2025)	Roller	2270002015	100	687	3	0.064	0.004	0.0004	0.020
	Vibratory Compactor		6	687	3				
	Asphalt Paver	2270002021	175	398	1	0.010	0.0003	0.0001	0.005
	Excavator	2270002036	600	687	3	0.155	0.005	0.001	0.077
	Cranes	2270002045	175	1,104	6	0.128	0.005	0.001	0.063
	Loader	2270002066	175	557	5	0.027	0.001	0.0002	0.011
	Steel Track Loader		50	154	1				
	Bulldozer	2270002069	175	911	3	0.068	0.003	0.001	0.034
	Skid Steer Loader	2270002072	75	920	3	0.111	0.001	0.0001	0.005
	Gas Powered Generator	2270006005	40	1,125	22	1.175	0.008	0.001	0.054
	Gas Powered Air Compressor	2270006015	16	1,125	22	0.697	0.058	0.001	0.074
					2025 Totals:	**2.44**	**0.08**	**0.006**	**0.34**

Table B-6. Total Estimated Construction and Demolition Equipment Emissions under the Master Plan

Phase (Year)	Emission Source	Emissions (tons)			
		NO_X	$PM_{2.5}$	SO_2	VOC
Phase I (2013)	Onroad	0.18	0.003	0.003	0.06
	Nonroad	1.75	0.16	0.002	0.14
	2013 Totals:	**1.93**	**0.16**	**0.005**	**0.20**
Phase II (2017)	Onroad	0.15	0.008	0.006	0.13
	Nonroad	2.50	0.08	0.003	0.21
	2017 Totals:	**2.65**	**0.09**	**0.01**	**0.34**
Phase III (2021)	Onroad	0.26	0.01	0.01	0.22
	Nonroad	2.04	0.07	0.01	0.29
	2021 Totals:	**2.30**	**0.08**	**0.02**	**0.52**
Phase IV (2025)	Onroad	0.32	0.02	0.01	0.27
	Nonroad	2.44	0.08	0.01	0.34
	2025 Totals:	**2.75**	**0.10**	**0.02**	**0.61**

Surface Disturbance (Fugitive $PM_{2.5}$ Emissions)

Construction activities have the potential to generate PM emissions during many operations, including land clearing, ground excavation, site preparation, and, in particular, equipment traffic on unpaved roads. The quantity of PM emissions from construction operations is proportional to the level of activity, duration of activity, and the area of land being worked. Emission factors derived from AP-42 Sections 11.9 and 13.2 were used to calculate PM emissions associated with surface disturbance.

PM emissions from surface disturbance due to construction equipment are summarized by phase in Table B-7.

Table B-7. Total Estimated Surface Disturbance (Fugitive $PM_{2.5}$) Emissions under the Master Plan

Phase (Year)	$PM_{2.5}$ Emissions (tons)
Phase I (2013)	1.7
Phase II (2017)	3.5
Phase III (2021)	5.7
Phase IV (2025)	6.6

Painting Activities (VOC Emissions)

VOCs are emitted as gases from a variety of construction materials, including paints and coatings. For the purposes of this analysis, it is conservatively assumed that the interior surface area requiring painting is three times the total building footprint, three coats of paint will be applied (one primer and two finish), and the average VOC content of the paint will be 1 lb VOC per gallon (gal) of paint.

VOC emissions from painting activities are summarized by phase in Table B-8.

Table B-8. Total Estimated VOC Emissions from Painting Activities under the Master Plan

Phase (Year)	VOC Emissions (tons)
Phase I (2013)	0.18
Phase II (2017)	0.7
Phase III (2021)	1.2
Phase IV (2025)	1.5

<u>Operating Emissions</u>

Operational emissions changes were assessed by comparing the total emissions generated from NIHAC boilers in FY 2010 with the expected annual emissions from the boilers during each phase of the Master Plan. The CUP boilers will consume greater quantities of fuel as new facilities are constructed and the heating demand on the CUP boilers increases. This increase will be partially offset by the demolition of south campus facilities with boilers (Buildings 110A, 110, 111, 112, 127, 128). The heat input capacity of these boilers ranges from 0.35 million British thermal units (MMBtu) per hour to 0.65 MMBtu per hour. In FY 2010, the boilers in the south campus consumed 164,553 gal of fuel oil.

Propane is used at the CUP as igniter fuel for the CUP boilers and is also used in the winter to heat the semi-enclosed non-human primate (NHP) area of Building 112. In FY 2010, NIHAC operations consumed 21,086 gallons of propane. It is likely that propane consumption would be reduced due to the demolition of Building 112; however, for the purposes of this analysis it is conservatively assumed that propane consumption will remain constant.

The CUP also houses four 1,450-kilowatt (kW) emergency generators with 2,088-brake horsepower engines that supply emergency power to the entire campus. In the event that the emergency generators at the CUP were to fail, each individual building also has its own emergency generator. Building 103 (Primate Unit) is supported by an 800-kW emergency generator and the Building 107 (WTP office/lab) is supported by a 515-kW generator. A total of 16 other emergency generators, ranging from 55 kW to 230 kW, support individual buildings throughout the rest of the campus. In FY 2010, the generators consumed 10,881 gal of fuel oil. The emergency generators operate approximately one hour per week for regular testing to ensure system functionality. Additional emergency generators will be installed at each new facility constructed under the Master Plan. Emissions associated with these new generators will be offset by the elimination of emissions from emergency generators at facilities that will be demolished under the Master Plan. Thus, for this analysis it is assumed that emergency generator fuel consumption and the associated emissions will remain constant.

The total annual operational emissions for CUP and south campus boilers were estimated based on the projected net square footage (NSF) for each phase and the corresponding fuel consumption estimates shown in Table B-9. Total estimated annual emissions from operation of the boilers during each phase are shown in Table B-10. The net change in operational emissions as a result of the Master Plan is shown in Table B-11.

Table B-9. Summary of Existing and Projected Boiler Fuel Consumption under the Master Plan

Metric	Existing (2010)	Phase I (2013)	Phase II (2017)	Phase III (2021)	Phase IV (2025)
CUP Boilers					
Proposed Construction (NSF)	n/a	6,785	24,632	45,340	66,890
Proposed Demolition (NSF)	n/a	(62,997)	--	--	--
Area Serviced (NSF)	136,527	80,315	104,947	150,287	217,177
Fuel Consumption (kgal)	822	484	632	905	1,308
Secondary Boilers					
Proposed Construction (NSF)	n/a	--	--	--	--
Proposed Demolition (NSF)	n/a	--	--	(20,571)	(1,920)
Area Serviced (NSF)	26,397	26,397	26,397	5,826	3,906
Fuel Consumption (kgal)	164.5	164.5	164.5	36.3	24.3
Total					
Fuel Consumption (kgal)	987	648	797	941	1,332

Notes:
a – Net square footage (NSF) data was obtained from the NIHAC Master Plan Utility Sub-Study (December 15, 2011).
b – Fuel consumption estimates assume that the boiler fuel consumption for each phase will be proportionate to the NSF.

Table B-10. Summary of Estimated Annual Emissions from Operational Equipment under the Master Plan

Equipment	Pollutant	Emissions Factor (lb/kgal fuel oil)	2010 Actual Emissions (tons)	2013 (I) Projected Emissions (tons)	2017 (II) Projected Emissions (tons)	2021 (III) Projected Emissions (tons)	2025 (IV) Projected Emissions (tons)
All Boilers	VOCs	0.34[a]	0.2	0.1	0.1	0.2	0.2
	NOx	21[b]	10.4	6.8	8.4	9.9	14.0
	$PM_{2.5}$	1.6[a]	0.8	0.5	0.6	0.8	1.1
	SO_2	0.21[a]	0.1	0.1	0.1	0.1	0.1

Notes:
a – Emission factor from AP-42, Chapter 1.3 (fuel oil combustion), a USEPA Compilation of Air Emission Factors.
b – Emission factor derived from manufacturer data.
c – Emissions from emergency generators and propane combustion are not expected to change under the Proposed Action; therefore, these emission sources are not included in this table.

Table B-11. Net Change in Operational Emissions under the Master Plan

Pollutant	2013 (Phase I) (tons)	2017 (Phase II) (tons)	2021 (Phase III) (tons)	2025 (Phase IV) (tons)
VOCs	(0.1)	(0.03)	(0.01)	0.1
NOx	(3.6)	(2.0)	(0.5)	3.6
$PM_{2.5}$	(0.3)	(0.2)	(0.04)	0.3
SO_2	(0.04)	(0.02)	(0.01)	0.04

CONCLUSION

The projected levels of emissions generated by the Master Plan, resulting from construction and demolition activities and boiler operational changes, would be below *de minimis* thresholds for all phases, as summarized in Table B-12. Therefore, the GCR is not applicable to the Master Plan.

Table B-12. Estimated Emissions from the Master Plan Compared to GCR *De Minimis* Thresholds

Year	Pollutant	Construction and Demolition Activities			Net Change in Operational Emissions (tons)	Total Net Change in Emissions under Proposed Action (tons)	*De Minimis* Level (tons)
		Construction and Demolition Equipment Emissions (tons)	Surface Disturbance Emissions (tons)	Painting Activity Emissions (tons)			
2013	VOCs	0.20	--	0.18	(0.06)	**0.32**	50
	NOx	1.93	--	--	(3.55)	**(1.62)**	100
	$PM_{2.5}$	0.16	1.65	--	(0.27)	**1.54**	100
	SO_2	0.00	--	--	(0.04)	**(0.03)**	100
2017	VOCs	0.34	--	0.74	(0.03)	**1.05**	50
	NOx	2.65	--	--	(2.00)	**0.65**	100
	$PM_{2.5}$	0.09	3.48	--	(0.15)	**3.42**	100
	SO_2	0.01	--	--	(0.02)	**(0.01)**	100
2021	VOCs	0.52	--	1.21	(0.01)	**1.72**	50
	NOx	2.30	--	--	(0.48)	**1.82**	100
	$PM_{2.5}$	0.08	5.73	--	(0.04)	**5.77**	100
	SO_2	0.02	--	--	(0.01)	**0.01**	100
2025	VOCs	0.61	--	1.55	0.06	**2.22**	50
	NOx	2.75	--	--	3.63	**6.38**	100
	$PM_{2.5}$	0.10	6.62	--	0.28	**7.00**	100
	SO_2	0.02	--	--	0.04	**0.06**	100
Post-2025	VOCs	N/A	N/A	N/A	0.06	**0.06**	50
	NOx	N/A	N/A	N/A	3.63	**3.63**	100
	$PM_{2.5}$	N/A	N/A	N/A	0.28	**0.28**	100
	SO_2	N/A	N/A	N/A	0.04	**0.04**	100

REFERENCES

1. Hug, B. 2008. Personal communication (telephone) with Brian Hug, Air Quality Planning & Monitoring Program, Air and Radiation Management Administration, Maryland Department of the Environment, 18 March 2008.

2. Metropolitan Washington Council of Governments (MWCOG). 2007. *Plan to Improve Air Quality in the Washington, DC-MD-VA Region: State Implementation Plan (SIP) for 8-Hour Ozone Standard*. 23 May 2007.

3. Metropolitan Washington Council of Governments (MWCOG). 2008. *Plan to Improve Air Quality in the Washington, DC-MD-VA Region: State Implementation Plan (SIP) for Fine Particle ($PM_{2.5}$) Standard and 2002 Base Year Inventory for the Washington DC-MD-VA Nonattainment Area*. 7 March 2008.

4. National Institutes of Health (NIH). 2011a. *Annual Emissions Certification Report, National Institutes of Health Animal Center (NIHAC), Poolesville, Maryland*. March 2011.

5. National Institutes of Health (NIH). 2011b. *National Institutes of Health Animal Center (NIHAC)* FY 2010 Greenhouse Gas Inventory.

6. National Institutes of Health (NIH). 2012. *Draft Master Plan, National Institutes of Health Animal Center*. March 2012.

7. U.S. Environmental Protection Agency (USEPA). 2011a. The Green Book Nonattainment Areas for Criteria Pollutants. http://www.epa.gov/air/oaqps/greenbk/index.html. Accessed 15 June 2011.

8. U.S. Environmental Protection Agency (USEPA). 2011b. *De Minimis* Levels. http://www.epa.gov/air/genconform/deminimis.html. Accessed 15 June 2011.

APPENDIX C
NOTICE OF INTENT

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intended to support clinical quality management, performance measurement, service delivery, and client monitoring at the system and client levels. The reporting system consists of an online data form—the Grantee Report—and a data file containing the client-level data elements. Data will be submitted every six months. The Grantee Report includes information about program administration, funding, and expenditures, in addition to the medication formulary. The client-level data include demographic, clinical, enrollment, and service data for each patient who is determined eligible and enrolled in the ADAP.

The legislation specifies grantee accountability and links budget to performance. The ADR will be used to ensure compliance with the requirements of the legislation, to evaluate the progress of programs, to monitor grantee performance, to measure the Government Performance and Results Act (GPRA) and the Performance Assessment Rating Tool (PART) goals, and to meet reporting responsibilities to the Department, Congress, and OMB.

In addition to meeting the goal of accountability to Congress, clients, advocacy groups, and the general public, information collected through the ADR is critical to HRSA and grantees for assessing the status of existing HIV-related service delivery systems, investigating trends in service utilization, and identifying the areas of greatest need.

Discussions were held with nine volunteer grantee agencies representing a variety of ADAP models, as a basis for the burden estimates for the ADR that follows. These burden estimates are presented in two tables. The first table represents the estimated burden for the first year, including the estimated time to adjust existing or develop new data collection systems to collect the elements that HRSA is requesting. This is a one-time burden for grantees and will not be a factor after the first year. The second table represents the estimated burden for subsequent years. The Grantee Report burden remains unchanged across the three years of the information collection, as the submission is consistent with current reporting requirements. The Client Report burden is expected to decrease slightly in subsequent years as grantees become more proficient with reporting client-level data, based on feedback and technical assistance resources that HRSA will provide.

The annual estimate of burden for the first year of the information collection is as follows:

Instrument	Number of respondents	Responses per respondent	Total responses	Hours per response	Total burden hours
Grantee Report	57	2	114	12.50	1,425.00
Client Report	57	2	114	34.19	3,897.66
Data Collection System	57	1	57	826.00	47,082.00
Total:					52,404.66

The annual estimate of burden for subsequent years is as follows:

Instrument	Number of respondents	Responses per respondent	Total responses	Hours per response	Total burden hours
Grantee Report	57	2	114	12.50	1,425.00
Client Report	57	2	114	24.00	2,736.00
Total:					4,161.00

Written comments and recommendations concerning the proposed information collection should be sent within 30 days of this notice to the desk officer for HRSA, either by e-mail to *OIRA—submission@omb.eop.gov* or by fax to 202–395–6974. Please direct all correspondence to the ''attention of the desk officer for HRSA.''

Dated: September 26, 2011.

Wendy Ponton,

Director, Office of Management.

[FR Doc. 2011–25339 Filed 9–30–11; 8:45 am]

BILLING CODE 4165–15–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Notice of Intent To Prepare an Environmental Impact Statement

Summary: In accordance with the National Environmental Policy Act, the National Institutes of Health (NIH), an agency of the Department of Health and Human Services (HHS), is issuing this notice to advise the public that an environmental impact statement will be prepared for the NIH Animal Center at Poolesville Master Plan, Poolesville, Montgomery County, Maryland.

For Further Information Contact: Valerie Nottingham, Chief, Environmental Quality Branch, Division of Environmental Protection, Office of Research Facilities, NIH, B13/2S11, 9000 Rockville Pike, Bethesda, Maryland 20892, telephone 301–496–7775; fax 301–480–8056; or e-mail *nihnepa@mail.nih.gov*.

Supplementary Information: The NIH Animal Center is located on 513 acres 4 miles southwest of the City of Poolesville, a small agricultural community located in western Maryland. The campus is a component of the National Institutes of Health (NIH), one of the world's largest biomedical research facilities and the Federal government's focal point for medical and behavioral research. The NIH Animal Center at Poolesville is a major extension of animal holding and production facilities at Bethesda and consists of a number of buildings used to house, quarantine, and study the behavior and immunological conduct of a variety of animal models. The NIH Animal Center at Poolesville conducts and supports research protocols for various Institutes and Centers, which includes the studies of animal behavior, conduct of immunologic procedures and sampling, and surgical investigation. Total building space on the campus amounts to approximately 364,507 gsf. Approximately 199 people work at the NIH Animal Center site.

A Master Plan is an integrated series of documents that present in graphic, narrative, and tabular form the current composition of NIH campuses and the plan for their orderly and comprehensive development over a 20-year period. The plan provides guidance in coordinating the physical development of NIH campuses, including building locations, utility capacities, road alignments, parking facilities, and the treatment of open spaces. General design guidelines are also used to provide detailed guidance for the placement and design of physical improvements.

The proposed action is to develop a long-range physical master plan for the NIH Animal Center. The plan will cover a 20-year planning period and address the future development of the NIH Animal Center site, including placement of future construction; vehicular and pedestrian circulation on- and off-campus; parking within the property boundaries; open space in and around the campus; required setbacks; historic properties; natural and scenic resources; noise; and lighting. The plan will examine potential growth in the NIH Animal Center personnel, and consequent construction of space over the planning period. Future construction on the site could include such facilities as: new animal holding, research laboratories, and support facilities.

In accordance with 40 CFR 1500–1508 and DHHS environmental procedures, NIH will prepare an Environmental Impact Statement (EIS) for the proposed master plan. The EIS will evaluate the impacts of the master plan should development occur as proposed. Among the items the EIS will examine are the implications of the master plan on community infrastructure, including, but not limited to, utilities, storm water management, traffic and transportation, and other public services.

To ensure that the public is afforded the greatest opportunity to participate in the planning and environmental review process, the NIH is inviting oral and written comments on the master plan and related environmental issues.

The NIH will be sponsoring a public Scoping Meeting to provide individuals an opportunity to share their ideas on the master planning effort, including recommended alternatives and environmental issues the EIS should consider. The meeting is planned for 6:30 p.m. to 9 p.m. on October 25, 2011 at the Town Hall Building at 19721 Beall Street, Poolesville, Maryland 20837. All interested parties are encouraged to attend. The NIH has established a 30-day public comment period for the scoping process. Scoping comments must be postmarked *no later than* November 18, 2011 to ensure they are considered. All comments and questions on the EIS should be directed to Valerie Nottingham at the address listed above, telephone 301–496–7775; fax 301–480–8056; or e-mail *nihnepa@mail.nih.gov.*

Dated: September 23, 2011.

Daniel G. Wheeland,

Director, Office of Research Facilities Development and Operations, National Institutes of Health.

[FR Doc. 2011–25385 Filed 9–30–11; 8:45 am]

BILLING CODE 4140–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

Substance Abuse and Mental Health Services Administration

Agency Information Collection Activities: Submission for OMB Review; Comment Request

Periodically, the Substance Abuse and Mental Health Services Administration (SAMHSA) will publish a summary of information collection requests under OMB review, in compliance with the Paperwork Reduction Act (44 U.S.C. Chapter 35). To request a copy of these documents, call the SAMHSA Reports Clearance Officer on (240) 276–1243.

Project: Networking Suicide Prevention Hotlines—Evaluation of the Lifeline Policies for Helping Callers at Imminent Risk (NEW)

This proposed project is a new data collection that builds on previously approved data collection activities [Evaluation of Networking Suicide Prevention Hotlines Follow–Up Assessment (OMB No. 0930–0274) and Call Monitoring of National Suicide Prevention Lifeline Form (OMB No. 0930–0275)]. This new data collection is an effort to advance the understanding of crisis hotline utilization and its impact. The Substance Abuse and Mental Health Services Administration's (SAMHSA), Center for Mental Health Services (CMHS) funds a National Suicide Prevention Lifeline Network (''Lifeline''), consisting of a toll-free telephone number that routes calls from anywhere in the United States to a network of local crisis centers. In turn, the local centers link callers to local emergency, mental health, and social service resources.

The overarching purpose of the proposed Evaluation of the Lifeline Policies for Helping Callers at Imminent Risk is to implement data collection to evaluate hotline counselors' management of imminent risk callers and third party callers concerned about persons at imminent risk, and counselor adherence to *Lifeline Policies and Guidelines for Helping Callers at Imminent Risk of Suicide.* Specifically, the Evaluation of the Lifeline Policies for Helping Callers at Imminent Risk will collect data, using an imminent risk form, to inform the network's knowledge of the extent to which counselors are aware of and being guided by the Lifeline's imminent risk guidelines; counselors' definitions of imminent risk; the rates of active rescue of imminent risk callers; types of rescue; barriers to intervention; and the circumstances in which active rescue is initiated, including the caller's agreement to receive the intervention.

Clearance is being requested for one activity to assess the knowledge, actions, and practices of counselors to aid callers who are determined to be at imminent risk for suicide and who may require active rescue. This evaluation will allow researchers to examine and understand the actions taken by counselors to aid imminent risk callers, the need for active rescue, and, ultimately, to improve the delivery of crisis hotline services to imminent risk callers. A total of eight centers will participate in this evaluation. Thus, SAMHSA is requesting OMB review and approval of the National Suicide Prevention Lifeline—Imminent Risk Form. This activity is distinct from the Crisis Center Survey data collection, which targets the entire network of crisis centers and focuses on a different domain of questions (specifically, the makeup, strengths, and needs of crisis centers.) The information gathered from the Crisis Center Survey cannot provide a profile of imminent risk callers or details about interventions with imminent risk or third party callers.

Crisis counselors at eight participating centers will record information discussed with imminent risk callers on the Imminent Risk Form, which does not require direct data collection from callers. As with previously approved evaluations, callers will maintain

APPENDIX D
CORRESPONDENCE

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United States Department of the Interior
U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573 4575

Online Certification Letter

Today's date: 22 March 2012

Project: National Institutes of Health Animal Center Campus Master Plan and Environmental Impact Statement
Montgomery County, MD

Dear Applicant for online certification:

Thank you for choosing to use the U.S. Fish and Wildlife Service Chesapeake Bay Field Office online list request certification resource. This letter confirms that you have reviewed the conditions in which this online service can be used. On our website (www.fws.gov/chesapeakebay) are the USGS topographic map areas where **no** federally proposed or listed endangered or threatened species are known to occur in Maryland, Washington D.C. and Delaware.

You have indicated that your project is located on the following USGS topographic map
Poolesville, MD and Sterling, VA

Based on this information and in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*), we certify that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

This response relates only to federally protected threatened or endangered species under our jurisdiction. For additional information on threatened or endangered species in Maryland, you should contact the Maryland Wildlife and Heritage Division at (410) 260-8540. For information in Delaware you should contact the Delaware Natural Heritage and Endangered Species Program, at (302) 653-2880. For information in the District of Columbia, you should contact the National Park Service at (202) 535-1739.

The U.S. Fish and Wildlife Service also works with other Federal agencies and states to minimize loss of wetlands, reduce impacts to fish and migratory birds, including bald eagles, and restore habitat for wildlife. Information on these conservation issues and how development projects can avoid affecting these resources can be found on our website (www.fws.gov/chesapeakebay).

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Chesapeake Bay Field Office Threatened and Endangered Species program at (410) 573-4531.

Sincerely,

Genevieve LaRouche
Field Supervisor

DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland 20892

www.nih.gov

Division of Environmental Protection
Bldg. 13/2S11, MSC 5746
Phone: 301-496-7775
Fax: (301) 480-8056

23 March 2012

Lori Byrne
DNR Wildlife & Heritage Service
580 Taylor Ave.
Tawes Office Bldg E-1
Annapolis MD 21401

Subject: **Environmental Review Request**
National Institutes of Health (NIH) Animal Center Master Plan and Environmental Impact Statement (EIS)
Montgomery County, Maryland

Dear Ms. Byrne:

I am writing to request information about any state listed threatened or endangered species that may occur on or adjacent to the areas proposed for development under the Master Plan at the NIH Animal Center in Montgomery County, Maryland. The boundaries of the NIH Animal Center and the potential development areas are shown on the enclosed Master Plan Concept map (Enclosure 1). In addition, an aerial view of the NIH Animal Center boundaries is shown on the enclosed MERLIN Online map (Enclosure 2).

The NIH Animal Center provides animal breeding, holding, and research facilities in support of the NIH mission. Over the next 20 years, the Master Plan would provide a flexible framework for the development of the campus that can adapt to the current and future needs of NIH programs. The Master Plan vision is to provide state-of-the-art, sustainable, cost-effective facilities through campus redevelopment. The proposed action would demolish old facilities, construct new ones, and improve campus consolidation. While specific locations for new facilities have not yet been identified, the general areas being considered for development are indicated on Enclosure 1.

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, an Environmental Impact Statement is being prepared for the proposed action. As shown in the enclosed aerial map, the potential development areas have already been developed or previously disturbed. Some vegetated areas near the proposed action would be affected, but would be replaced in kind.

If you have any questions or need any additional information, you can contact Mark Radtke at 301-451-6467 or radtkem2@mail.nih.gov.

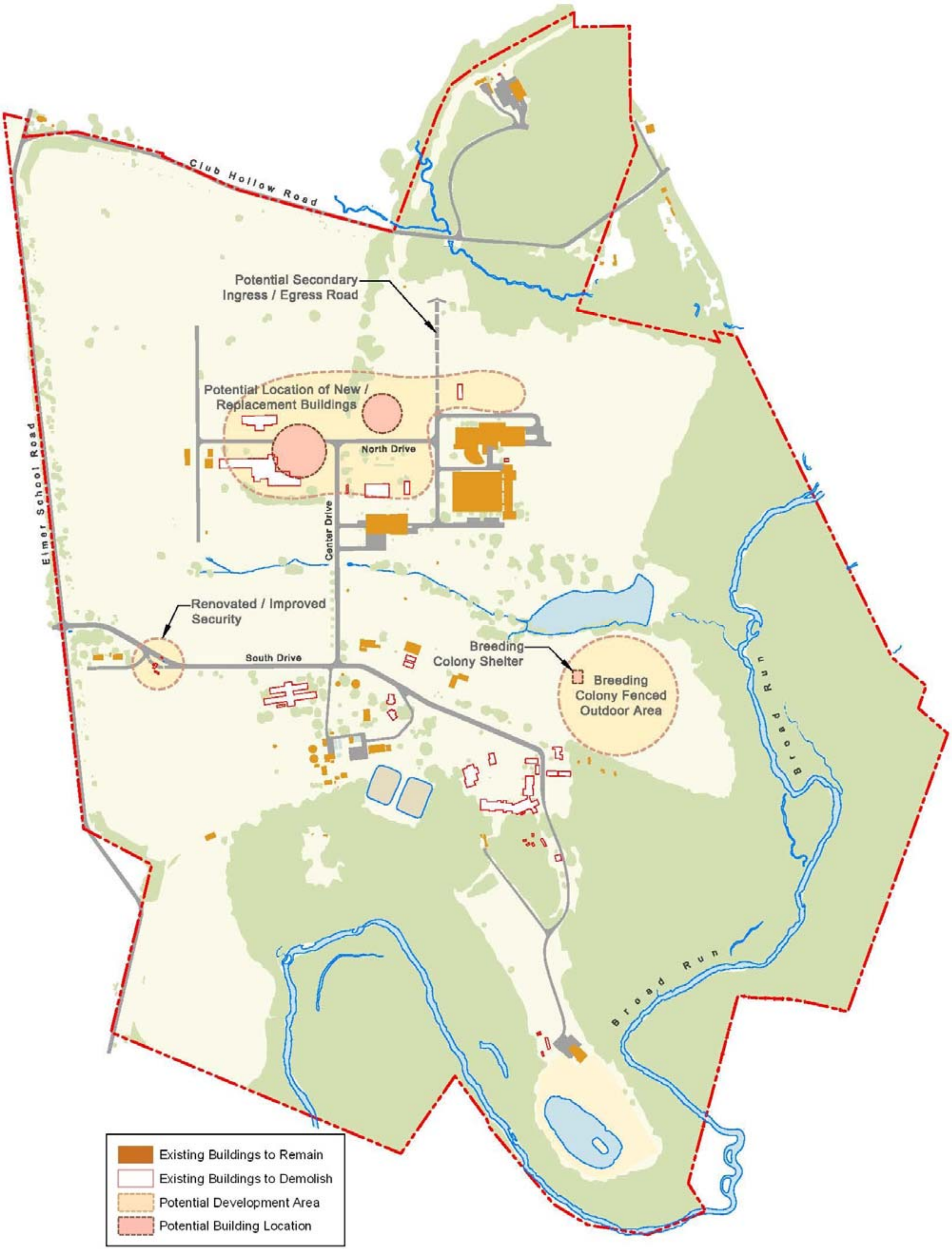
Sincerely yours,

Valerie Nottingham
Chief, Environmental Quality Branch
Division of Environmental Protection, ORF
National Institutes of Health

Enclosure

ENCLOSURE 1

NIH ANIMAL CENTER MASTER PLAN CONCEPT



ENCLOSURE 2
MERLIN ONLINE AERIAL VIEW OF THE NIH ANIMAL CENTER CAMPUS

MERLIN Online

Printed: 03/22/2012 11:42

MARYLAND
DEPARTMENT OF
NATURAL RESOURCES

May 18, 2012

Valerie Nottingham
National Institutes of Health
Bethesda, MD 20892

RE: Environmental Review for National Institutes of Health (NIH) Animal Center Master Plan and Environmental Impact Statement, Montgomery County, MD.

Dear Ms. Nottingham:

The Wildlife and Heritage Service has determined that there are no State or Federal records for rare, threatened or endangered species within the boundaries of the project site as delineated. As a result, we have no specific comments or requirements pertaining to protection measures at this time. This statement should not be interpreted however as meaning that rare, threatened or endangered species are not in fact present. If appropriate habitat is available, certain species could be present without documentation because adequate surveys have not been conducted.

Thank you for allowing us the opportunity to review this project. If you should have any further questions regarding this information, please contact me at (410) 260-8573.

Sincerely,

Lori A. Byrne

Lori A. Byrne,
Environmental Review Coordinator
Wildlife and Heritage Service
MD Dept. of Natural Resources

ER# 2012.0455.mo