3.15 MITIGATION

This section discusses measures that could be used, or are already integral to the proposed alternatives, to mitigate (i.e., avoid or reduce) environmental impacts resulting from siting, constructing, and operating the proposed NBAF at one of the site alternatives. Mitigation, according to NEPA regulations (40 CFR 1508.20), includes

- Avoiding the impact altogether by not taking a certain action or parts of an action;
- Minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- Rectifying the impact by repairing, rehabilitating, or restoring the affected environment;
- Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- Compensating for the impact by replacing or providing substitute resources or environments.

All practicable means to avoid or minimize environmental harm from the selected alternative have been incorporated into the design of the NBAF. The evaluation for potential health and safety impacts during normal and abnormal operational phase of the proposed NBAF are specifically addressed in Section 3.14.

Under the No Action Alternative, no mitigation measures would be necessary since the NBAF would not be built. If the proposed NBAF is constructed at one of the six alternative sites, measures to mitigate potential environmental, socioeconomic, and health adverse impacts described in Chapter 3 are summarized in Table 3.15.1.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation

Resource	Potential Effect	Mitigation Measure	Mechanism
Land Use and Visual Resources	Visual impacts	Fencing and setbacks landscaping	The design of the NBAF includes a perimeter fence and setback of the facility back from the fence for security purposes. Additionally, portions of the facility would be underground, reducing its height. These design features also serve to mitigate visual impacts by minimizing the impact. Further, the design of the NBAF includes landscaping for aesthetic purposes, specifically calling for the use of native plant material. Landscaping would help reduce visual impacts over time.
Infrastructure and Utilities	Potential for NBAF utility needs to exceed capacity of local providers	Potential and on-going utility improvements	Local utility providers may need to upgrade their public utility. In some cases, upgrades are already planned and would accommodate NBAF requirements; in other cases, the provider would have to upgrade the utility and has agreed to do so, where necessary. Utility upgrades would rectify the impact of potential capacity exceedances of local public utilities.
Air Quality	Dust and particulates during construction	Implementation of approved fugitive dust control measures, good engineering practices, and overall good housekeeping	During construction, contract requirements would be in place that would obligate the contractor to implement measures that would minimize air quality impacts. Such measures would include approved fugitive dust control measures, good engineering practices, and overall good housekeeping.
	Pollutant emissions from laboratory operations, boilers, back-up generators, and incineration	Engineering controls State-of-the-art control technologies with redundant fail safe response measures	The design of the NBAF includes several engineering controls to prevent the escape of gaseous and particulate air emissions due to laboratory operations. These engineering controls include: • High efficiency-particulate air (HEPA) filtration for air exhaust and air intake systems • Design of critical zones as a sealed "box-within-a-box" with interlocks at all points of access • Hardened structural systems to mitigate, and progressive collapse that would help withstand seismic and/or other external threats. Boilers, back-up generators, and incinerators (if used) would be designed and constructed using state-of-the-art technologies that would assure compliance with air permit requirements. Additionally, regulatory oversight would assure compliance. Through these measures, air impacts would be minimized.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation (Continued)

Resource	Potential Effect	Mitigation Measure	Mechanism
Noise	Noise increase from the facility's related traffic, heating, cooling, and filtration systems; noise from use of the back-up generators	Noise abatement design features	The design of the NBAF includes several measures that would reduce both internal and external noise levels. Interior partitions within and between offices would have sound attenuating insulation materials. All laboratory doors would be insulated for sound reduction, and mechanical systems would have sound attenuation equipment based on standard design practices. Laboratory fans would have packless-type sound reducing devices on the exhaust mains and outside air by-pass ducts.
Geology and Soils	Structural integrity during seismic event	Building design Non-expansive soil backfill Deep pile foundation system Engineered conditioning of soils	The final design of the NBAF will ensure sufficient stiffness to minimize structural deflection and vibration and will meet or exceed all applicable seismic building codes. Furthermore, depending on site soils, non-expansive soil backfill, a deep pile foundation system, and/or engineered conditioning of soils may be used. These design and construction features would reduce possible impacts due to a seismic event.
	Soil erosion	Use of BMPs during construction Landscaping	During construction, erosion control measures would be implemented in accordance with applicable permits and a SWPPP. Such measures would be site specific but are likely to include BMPs such as filter fabric fences, drop inlet protection, natural covered swales, and/or sedimentation ponds. Use of these measures would be required in the construction contract. Post-construction, the NBAF design includes landscaping with functional storm water management uses and the maintenance/retention of a healthy soil structure. These construction and design features would help to reduce the likelihood of project-related soil erosion.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation (Continued)

Resource	Potential Effect	Mitigation Measure	Mechanism
Water Resources	Sedimentation to surface waters	Use of BMPs during construction Buffers	During construction, measures to prevent sedimentation to surface waters would be implemented in accordance with applicable permits and a SWPPP. Such measures would be site specific but are likely to include BMPs such as filter fabric fences, drop inlet protection, natural covered swales, and/or sedimentation ponds. Use of these measures would be required in the construction contract. Post-construction, vegetated buffer strips would be maintained around any surface waters on-site to intercept potential sedimentation.
	Increased storm water runoff due to increase in impervious surface	Storm water management Landscaping	The design of the NBAF includes measures to reduce storm water runoff due to increased impervious surface. For example, design measures include pervious pavement in both parking lots and pedestrian walkways, capturing and using roof runoff for landscape watering, and grading of parking lots to filter storm water through landscaped areas. These design features are consistent with the LID approach. The goal of LID design is to minimize runoff volume and preserve existing flow paths by managing runoff and detaining storm water prior to discharging to a municipal storm water conveyance system.
	Potential groundwater contamination during construction	Use of BMPs during construction	A SPCC plan would be prepared that would describe potential spill sources, locations, volumes, flow directions, and response/mitigation tactics. Response/mitigation tactics would be site specific but are likely to include BMPs and good engineering practices that minimize or prevent either horizontal or vertical pollutant transport. Adherence to this plan would be required in the construction contract.
Biological Resources	Impacts to on- or off-site wetlands and aquatic resources and species that may use these resources from spills and runoff during construction or operation	Avoidance Use of BMPs during construction Adherence to SWPPP and SPCC to prevent and contain storm water runoff and spills Landscaping LID	Wetlands, steams, and aquatic habitats would be avoided through design and siting. Depending on the site, however, some project features such as a utility line, access road, or perimeter fence could cross a wetland or aquatic resource that cannot be avoided. In such a case, proper permits would be obtained; compensation for impacts may be required. During construction, BMPs such as filter fabric fences, drop inlet protection, natural covered swales, and/or sedimentation ponds would be employed to minimize the potential for impacts to wetlands or other aquatic resources, both on- and off-site. Use of these measures would be required in the construction contract. Post-construction, vegetated buffer strips would be maintained around any surface waters on-site to intercept potential sedimentation. Additional measures outlined in a SWPPP and SPCC would be followed. Design measures consistent with the LID approach would be used, such as pervious pavement in both parking lots and pedestrian walkways, capturing and using roof runoff for landscape watering, and grading of parking lots to filter storm water through landscaped areas to minimize runoff.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation (Continued)

Resource	Potential Effect	Mitigation Measure	Mechanism
Biological Resources (continued)	Potential adverse effects to wildlife due to accidental release	Design measures to reduce release potential Adherence to BMBL guidelines and NBAF operational procedures and protocols including emergency response plan	The NBAF includes many features specifically designed to reduce the potential release of pathogens and therefore avoid potential impacts. Such features include perimeter fencing, HEPA filtration for air exhaust and air intake systems, design of critical zones as a sealed "box-within-a-box" with interlocks at all points of access, and hardened structural systems to mitigate progressive collapse that would help withstand seismic and/or other external threats. Additionally, adherence to operational procedures, which could include measures such as use of sterile mosquitos, and BMBL guidelines would further reduce release potential. In the event of a release, plans would be developed that identify mitigation measures to minimize impacts to wildlife and livestock. Based on existing plans developed by the USDA and NPS, such measures could include establishment of various zones of response (e.g., infected zone, buffer zone, control zone, and outer surveillance zone); coordination with federal, state, and local agencies; assessment of the risks posed by wildlife based on density and distribution, social organization, habitat, contact with domestic livestock, and the length of time that wildlife could have been exposed to the virus; determination of the required level of management and control measures, potentially including population reduction or procedures to prevent or limit wildlife and livestock interaction; and implementation of mosquito control measures.
Cultural Resources	Damage to historic or cultural sites during construction	Use of BMPs during construction Adherence to any SHPO requirements	Currently no impacts to cultural resources are expected to occur at any of the sites; however, if unknown sites are discovered during construction, BMPs would be implemented and the SHPO notified.
Socioeconomics	Potential adverse effects to agricultural and hunting economy due to accidental release	Design measures to reduce release potential Adherence to BMBL guidelines and NBAF operational procedures and protocols including emergency response plan	The NBAF includes many features specifically designed to reduce the potential release of pathogens that could result in economic impacts. Such measures include perimeter fencing, HEPA filtration for air exhaust and air intake systems, design of critical zones as a sealed "box-within-a-box" with interlocks at all points of access, and hardened structural systems to mitigate progressive collapse that would help withstand seismic and/or other external threats. Additionally, adherence to operational procedures, which could include measures such as use of sterile mosquitos, and BMBL guidelines would further reduce release potential.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation (Continued)

Resource	Potential Effect	Mitigation Measure	Mechanism
Traffic and Transportation	Increased traffic	Vehicular and pedestrian reroutes during construction Potential and ongoing roadway improvements	During construction, it may be necessary at certain times to reroute vehicular and pedestrian traffic near the construction site. Any such reroutes would be coordinated with the appropriate state and/or local agencies. Depending on the site, some roadway improvements, such as turning lanes, may be necessary to accommodate traffic volume increases associated with NBAF.
Existing Hazardous, Toxic, and Radiologic Waste	Exposure of construction workers to existing contaminants	Additional evaluations to determine the extent and nature of existing waste and remediation measures Development of Health and Safety Plan, Soil Management Plan Worker training prior to construction	Depending on the site, additional hazardous, toxic, and radiologic waste evaluations may be undertaken prior to construction. Based on the results of the evaluation, measures would be identified that should be used to mitigate the construction or operational impacts due to former waste management practices. Such measures could include Health and Safety Plan, Soil Management Plan, additional remediation, and specialized worker training.
Waste Management	Potential for NBAF liquid waste stream to exceed acceptance criteria at local sewage treatment facility and to exceed capacity of local providers	Pre-treatment Potential and ongoing utility improvements	Pre-treatment of liquid waste streams, such as pH adjustment, may be necessary and would be implemented to meet sewage acceptance criteria, therefore avoiding potential impacts. At some sites, the local sewer system or wastewater treatment facility may need to be upgraded to accommodate the liquid waste stream from the NBAF. In some cases, upgrades are currently planned or are underway. The upgrades could include installation of additional capacity at the wastewater treatment facility, installation of larger pipes from the NBAF to the treatment facility, or installation of connecting pipe from the NBAF to the sewer system. The local utility would make the upgrades. Utility upgrades would rectify the impact of potential capacity exceedances of local public utilities.

Table 3.15-1 — Summary of Potential Effects, Mitigation Measures, and Mechanisms for Implementation (Continued)

Resource	Potential Effect	Mitigation Measure	Mechanism
Health and Safety	Worker health and safety during operations	Adherence to BMBL and OSHA safety standards, adherence to NBAF safety procedures and protocols	Compliance with CDC/NIH requirements and OSHA standards including procedural controls and use of primary containment barriers (e.g., biosafety cabinets, special process equipment, and safety suits).
	Public safety during operations	Adherence to BMBL and OSHA safety standards, adherence to NBAF safety procedures and protocols	Compliance with CDC/NIH requirements and OSHA standards including procedural controls and use of secondary containment barriers (e.g., robust facility design, HEPA filtration, and fire supression).

3.16 UNAVOIDABLE ADVERSE IMPACTS

Unavoidable adverse impacts are defined as those that meet the following two criteria:

- There are no reasonably practicable mitigation measures to eliminate the impacts; and
- There are no reasonable alternatives to the proposed project that would meet the purpose and need of the action, eliminate the impact, and not cause other or similar significant adverse impacts.

The previous section (Section 3.15 Mitigation) describes potential effects to resources and measures to mitigate those effects. However, many of these effects would not be completely mitigated. The following adverse effects cannot be fully mitigated while still allowing the Proposed Action at one of the alternative sites to proceed and meet the stated purpose and need as described in Chapter 1. Because the No Action Alternative would not result in any additional impacts, unavoidable adverse impacts are not associated with this alternative.

Visual Resources. As described in Section 3.2 (Land Use and Visual Resources), the visual impact from the proposed NBAF, particularly at the South Milledge Avenue Site, the Flora Industrial Park Site, and the Umstead Research Farm Site, would be prominent but would be partially ameliorated by limited screening and setbacks. However, due to the prominence of the facility at the site's topographical high point, visual effects would be sustained. Visual effects from exterior lighting would be an additional sustained effect, particularly at the sites previously mentioned. The proposed NBAF and perimeter fence would be well lit for security purposes.

Air Quality. As described in Section 3.4 (Air Quality), there would be unavoidable effects to air quality during site preparation and construction. Measures to reduce the effects have been described, but not all air pollutants would be eliminated. There would be additional effects to air quality from operation of the proposed NBAF, including effects from a back-up generator system and a boiler system, as well as from operation-related traffic.

Noise. As described in Section 3.5 (Noise), there would be some unavoidable noise impacts during both construction and operation. Noise levels during construction would vary by construction phase and equipment used. The magnitude of impact would also vary by site with some sites having more sensitive noise receptors within close proximity than other sites. Unavoidable impacts during operation would be noise impacts associated with use of the emergency generators and noise from increased traffic associated with NBAF. The generators are a back-up response system and would not be a routine noise source.

Traffic. As described in Section 3.11 (Traffic and Transportation), there would be unavoidable impacts to traffic during both site preparation/construction activities and NBAF operations. Short-term construction activities followed by long-term NBAF operations would impact traffic and roadway infrastructure by increasing the number of vehicles in the immediate and surrounding areas during peak travel times. Measures to mitigate the impacts from increased vehicle utilization of surrounding roadway infrastructure are generally described in the previous Section 3.17, Mitigation.

3.17 THE RELATIONSHIP BETWEEN SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

This section describes whether the benefit from construction and operation of the NBAF would be worth loss of resources at the alternative sites that provide benefits to the environment in comparison to the No Action Alternative. The previous sections in Chapter 3 provide descriptions of the potential adverse effects and benefits from the construction and operation of the NBAF at one of the proposed sites.

Short-term effects would be similar for all sites. For this DEIS, short-term refers primarily to the period of construction of the NBAF. A loss of undeveloped land would occur at each site, but no protected species or other prominent natural resource would be directly affected with the exception of the South Milledge Avenue

Site, where minimal (<0.5 acres) wetlands would be effected from road crossings. Energy and resource use for construction of the NBAF would not vary to a great degree from site to site.

The long-term effects would also be similar to a great degree for all sites. Long-term refers to the effects to resources due to operation of the NBAF over time. The potential for indirect effects to off-site surface and groundwater features would be minimized through BMPs and appropriate project design features. Energy and resource use for operation of the NBAF would not vary from site to site to a great degree, but those effects include a variation in fuel costs for heating, cooling, and chilled water production.

Long-term benefits of the NBAF would include protection of livestock and wildlife resources as well as protecting the economy from an outbreak of any FAD or zoonotic diseases in the United States by developing diagnostic techniques, vaccines, and other countermeasures.

The No Action Alternative would not result in any additional short- or long-term effects. However, the No Action Alternative would also not result in the scale of long-term benefits to livestock and wildlife resources as would be realized with the NBAF. Although research to improve protection from FAD and zoonotic diseases is currently conducted at PIADC and other facilities in the United States, none have the capabilities that would be available with the NBAF.

3.18 SUMMARY OF SIGNIFICANT EFFECTS

Table 3.18-1 provides a description of the effect categories used in Table 3.18-2. The effects categories provide the basis for comparison of the alternatives and their effects on the resources described in Chapter 3.

Table 3.18-1 — Environmental Effects Categories

Effect Category		Definition
Beneficial Effects	Significant	An action that would greatly improve current conditions
	Moderate	An action that would moderately improve current conditions
	Minor	An action that would slightly improve current conditions
Negligible or No Effect		An action that would neither improve nor degrade current conditions
Adverse Effects	Minor	An action that would slightly degrade current conditions
	Moderate	An action that would moderately degrade current conditions
	Significant	An action that would greatly degrade current conditions

No significant adverse effects to environmental or human resources would be expected from any of the alternatives with normal operation of the NBAF. Moderate effects that would occur would be to the following resources:

- Potable water – use of 36 million to 52 million gallons of potable water per year.
- Wastewater treatment capacity – generation of 25 million to 30 million gallons of wastewater per year.
- Visual Quality – visual prominence of the NBAF at four of the alternative site locations.
- Air Quality – Potential for air emissions to affect local air compliance plans in Suffolk County, New York and Bexar County, Texas.
- Traffic – Potential adverse traffic flow effects at the South Milledge Avenue Site and the Texas Research Park Site.

Significant beneficial effects to biological resources (wildlife), economics, and health and safety could occur with the development of new vaccines, diagnostic procedures, or rapid responses to potential FAD outbreacks.

Table 3.18-2 — Comparison of Environmental Effects

Resource	No Action	South Milledge Avenue Site	Manhattan Campus Site	Flora Industrial Park Site	Plum Island Site	Umstead Research Farm Site	Texas Research Park Site
Potential Adverse Effects for Normal Operations							
Land Use	None	Minor	Minor	Minor	Minor	Minor	Minor
Visual	None	Moderate	Moderate	Moderate	Minor	Moderate	Minor
Infrastructure	Minor	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Air Quality	Minor	Minor	Minor	Minor	Moderate	Minor	Moderate
Noise	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Geology and Soils	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Water	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Biology	Negligible	Minor	Negligible	Negligible	Negligible	Minor	Negligible
Cultural	None	None	None	None	None	None	None
Socioeconomics	None	Minor	Minor	Minor	Minor	Minor	Minor
Traffic and Transportation	None	Moderate	Minor	Minor	Negligible	Minor	Moderate
Hazardous Waste	None	Negligible	Negligible	Negligible	Minor	Minor	Negligible
Waste Management	Minor	Minor	Minor	Minor	Minor	Minor	Minor
Health and Safety[1]	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Environmental Justice	None	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Cumulative Effects	None	Minor	Minor	Moderate	Negligible	Minor	Moderate
Potential Beneficial Effects for Normal Operations							
Biology	None	Significant	Significant	Significant	Significant	Significant	Significant
Socioeconomics	None	Significant	Significant	Significant	Significant	Significant	Significant
Health and Safety	None	Significant	Significant	Significant	Significant	Significant	Significant