4 Environmental Consequences and Mitigation Measures

This chapter presents the assessment of environmental impacts. It also presents any special conditions that could be required by the Federal Aviation Administration (FAA) to mitigate or minimize any potential impact below the level of significance, if applicable. As discussed in Chapter 3, Coastal Resources, Farmlands, and Wild and Scenic Rivers are not present within the study areas and would not be affected by the No Action Alternative or the Proposed Action. Therefore, these resources are not discussed further in this chapter.

4.1 Analysis Years

The Environmental Assessment (EA) analyzes potential environmental impacts from construction and operation of the Proposed Action as compared to the No Action Alternative. Construction of the Proposed Action is expected to take approximately eight years. Upon an FAA decision on this EA, construction is proposed to begin in 2023 and end in 2030. The U.S. Army Corps of Engineers (USACE) will also evaluate the project and decide whether to issue, conditionally issue, or deny the proposed work pursuant to applicable procedures of Section 404 of the Clean Water Act (33 United States Code [U.S.C.] 1344). Therefore, the analysis years for construction impacts would be 2023 through 2030.

The EA uses 2028 as a basis for analysis of operational impacts because 2028 is the projected opening year of the proposed runway replacement. Once the relocated Runway 5L/23R is operational, the existing runway would be converted into a taxiway. Construction would continue until 2030 on the proposed conversion of the existing Runway 5L/23R to a taxiway. The year 2033 is used as a basis for analysis of operational impacts in this EA, most notably for air quality and noise-compatible land use, because it represents a condition five years beyond the proposed runway replacement opening year.

Cumulative impacts include past, present, and reasonably foreseeable future actions. The past actions are defined as those that were completed within the last five years (through 2022). Present actions are defined as those where construction is ongoing. Reasonably foreseeable future actions are defined as those planned to be completed between 2023 and 2028 and that have been developed with enough specificity to provide meaningful data for analysis.

4.2 Air Quality

This section presents the summary analysis of the potential for significant adverse air quality impacts resulting from the Future No Action Alternative and the Proposed Action. The existing conditions for Air Quality are discussed in Chapter 3, Section 3.2.

4.2.1 Significance Threshold

As detailed in **Appendix C Air Quality and Climate**, if the General Conformity evaluation for this air quality assessment were to show that any of the applicable *de minimis* thresholds were equaled or exceeded due to the Proposed Action, a more detailed analysis to demonstrate conformity would be required. This is referred to as a General Conformity Determination.[88] Conversely, if the General Conformity evaluation were to show that none of the relevant *de minimis* thresholds were equaled or exceeded, the Proposed Action would be presumed to conform to the applicable state implementation

[88] 40 Code of Federal Regulations (CFR) § 93.153.

plans and no further analysis would be required under the National Environmental Policy Act (NEPA) or the Clean Air Act (CAA). Conformity to the *de minimis* thresholds is relevant only with regard to those pollutants and the precursor pollutants for which the area is designated nonattainment or maintenance. The area is designated as maintenance for ozone and attainment for all other criteria pollutants. Therefore, the pollutants of concern for this project are volatile organic compounds (VOCs) and nitrogen oxides (NOx).

4.2.2 Methodology

Appendix C Air Quality and Climate presents the methodology and inputs used to prepare the emissions inventories. The analysis of significant adverse air quality impacts was prepared in accordance with the guidelines provided in the FAA's *Aviation Emissions and Air Quality Handbook Version 3, Update 1*,[89] and FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, which together with the guidelines of FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, constitute compliance with all the relevant provisions of NEPA and CAA, as amended in 1990.

Final design for the Proposed Action is not yet complete. As part of the potential grading activities at the borrow sites, there is still a possibility of using a conveyor belt system to transport the fill material to the site of the relocated runway. However, for this analysis, diesel trucks were assumed to be used to present a conservative approach in estimating emissions. Emissions from diesel trucks transporting the fill would be greater than emissions using an electric conveyor belt system.

4.2.3 Future Conditions: 2028

4.2.3.1 No Action Alternative

The emissions inventory for the Future (2028) No Action Alternative is shown in **Table 4-1** and provides the total annual pollutant emissions as tons per year. The Future (2028) No Action Alternative emissions inventory shows the pollutants with the greatest emissions are carbon monoxide (CO) and NOx. There were approximately 827 tons of CO and 729 tons of NOx. These pollutants are produced from the incomplete combustion of aircraft and motor vehicle engines.

TABLE 4-1, FUTURE (2028) NO ACTION ALTERNATIVE EMISSIONS INVENTORY (TONS/YEAR)

EMISSION SOURCE	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Taxiing	547.6	57.5	98.9	26.5	2.1	2.1
Aircraft Landing and Takeoff	271.2	81.0	629.0	41.7	4.1	4.1
Motor Vehicles	8.4	0.1	0.7	0.0	0.0	0.1
Total:	**827.3**	**138.6**	**728.5**	**68.2**	**6.3**	**6.3**

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter. Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.2.3.2 Proposed Action

While it is anticipated that there would be no change to the number of aircraft operations or fleet mix as a result of the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R. Aircraft using the replacement Runway 5L/23R would taxi further to and from the terminal facilities than they would with the No Action Alternative. In addition, vehicles would have to

[89] FAA, Aviation Emissions and Air Quality Handbook Version 3, Update 1, January 2015.

travel approximately 0.23 miles further due to the relocation of Lumley Road as compared to the No Action Alternative.

The emissions inventory for the Future (2028) Proposed Action is shown in **Table 4-2** and provides the total annual pollutant emissions as tons per year. The Future (2028) Proposed Action emissions inventory shows the pollutants with the greatest emissions are CO and NOx. There were approximately 848 tons of CO and 732 tons of NOx.

TABLE 4-2, FUTURE (2028) PROPOSED ACTION EMISSIONS INVENTORY (TONS/YEAR)

EMISSION SOURCE	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Taxiing	567.1	60.7	102.4	27.5	2.2	2.2
Aircraft Landing and Takeoff	271.2	81.0	629.0	41.7	4.1	4.1
Motor Vehicles	9.5	0.1	0.7	0.0	0.0	0.1
Total:	**847.8**	**141.8**	**732.1**	**69.2**	**6.3**	**6.3**

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter. Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.2.4 Future Conditions: 2033

4.2.4.1 No Action Alternative

The emissions inventory for the Future (2033) No Action Alternative is shown in **Table 4-3** and provides the total annual pollutant emissions as tons per year. The Future (2033) No Action Alternative emissions inventory shows the pollutants with the greatest emissions are CO and NOx. There were approximately 913 tons of CO and 834 tons of NOx.

TABLE 4-3, FUTURE (2033) NO ACTION ALTERNATIVE EMISSIONS INVENTORY (TONS/YEAR)

EMISSION SOURCE	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Taxiing	622.0	67.4	112.6	30.2	2.4	2.4
Aircraft Landing and Takeoff	283.7	92.1	720.6	47.4	4.7	4.7
Motor Vehicles	6.8	0.0	0.5	0.0	0.0	0.0
Total:	**912.5**	**159.5**	**833.7**	**77.7**	**7.2**	**7.2**

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter. Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.2.4.2 Proposed Action

The emissions inventory for the Future (2033) Proposed Action is shown in **Table 4-4** and provides the total annual pollutant emissions as tons per year. The Future (2033) Proposed Action emissions inventory shows the pollutants with the greatest emissions are CO and NOx. There were approximately 936 tons of CO and 838 tons of NOx.

TABLE 4-4, FUTURE (2033) PROPOSED ACTION EMISSIONS INVENTORY (TONS/YEAR)

EMISSION SOURCE	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Aircraft Taxiing	644.1	71.1	116.6	31.3	2.5	2.5
Aircraft Landing and Takeoff	283.7	92.1	720.6	47.4	4.7	4.7
Motor Vehicles	7.7	0.0	0.5	0.0	0.0	0.0
Total:	**935.5**	**163.2**	**837.7**	**78.7**	**7.3**	**7.3**

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter. Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.2.5 Construction

Temporary impacts would result from construction activities associated with the Proposed Action. Air pollutants would be emitted by construction equipment and fugitive dust generated during demolition and construction as well as during clearing and grading activities. Construction estimates (including phase durations and estimated quantities) were based on the preliminary engineering data provided by the Raleigh-Durham Airport Authority (Airport Authority) in 2022. Subject to FAA approval, construction could start as soon as 2023 with a duration of eight years. It is anticipated that the proposed runway replacement would be completed in 2028 and the completion of the conversion of the existing runway to a taxiway by 2030. A construction emissions inventory was prepared to reflect the use of construction equipment and vehicles attributed to the Proposed Action. Potential fugitive dust emissions are reflected in the PM_{10} and $PM_{2.5}$ totals. The annual construction emissions inventory is provided in **Table 4-5**.

TABLE 4-5, PROPOSED ACTION CONSTRUCTION EMISSIONS INVENTORY (TONS/YEAR)

YEAR	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
2023	21.3	1.6	25.6	0.1	166.2	17.9
2024	45.9	3.0	47.2	0.2	167.4	19.1
2025	38.4	2.3	33.0	0.1	175.7	19.5
2026	9.8	0.8	12.3	0.0	169.9	17.7
2027	8.6	0.4	5.3	0.0	28.3	3.1
2028	8.6	0.4	5.3	0.0	28.3	3.1
2029	8.6	0.4	5.3	0.0	28.3	3.1
2030	5.3	0.4	5.0	0.0	28.3	3.1

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter. Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.2.6 Summary

In this section, the emissions inventories prepared for Proposed Action are compared to the emissions inventories prepared for the No Action Alternative of the same future year to disclose the potential increase in emissions. The comparison of the emission inventories, which included an inventory of construction and operational emissions, was used for the evaluation of General Conformity as required by the CAA to determine the potential for significant impact.

Table 4-6 provides the total emissions inventory summary. The area is maintenance for ozone and attainment for all other criteria pollutants. Therefore, the pollutants of concern for this project are VOCs and NOx. The applicable federal *de minimis* thresholds for these pollutants are 100 tons per year each

for the project. The emissions inventories prepared for the air quality assessment also provide the emissions estimates for CO, SOx, PM_{10}, and $PM_{2.5}$ for disclosures purposes only.

From 2023 through 2030, there would be an increase in net emissions due to construction activities associated with the Proposed Action as compared to the No Action Alternative. There would also be an overall increase in operational emissions with the Proposed Action compared to the No Action Alternative due to increased aircraft taxiing and motor vehicle operations from the relocated runway and relocated Lumley Road, respectively. However, Table 4-6 shows that neither of the relevant federal *de minimis* thresholds would be equaled or exceeded for the Proposed Action on any analysis year. Operational emissions are only provided for 2028 and 2033 because these are the operational analysis years, as identified in Section 4.1.

TABLE 4-6, TOTAL EMISSIONS INVENTORY – PROPOSED ACTION (TONS/YEAR)

YEAR	SOURCE	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
2023	Proposed Action (Construction)	21.3	1.6	25.6	0.1	166.2	17.9
	2023 Increase in Emissions	***21.3***	***1.6***	***25.6***	***0.1***	***166.2***	***17.9***
2024	Proposed Action (Construction)	45.9	3.0	47.2	0.2	167.4	19.1
	2024 Increase in Emissions	***45.9***	***3.0***	***47.2***	***0.2***	***167.4***	***19.1***
2025	Proposed Action (Construction)	38.4	2.3	33.0	0.1	175.7	19.5
	2025 Increase in Emissions	***38.4***	***2.3***	***33.0***	***0.1***	***175.7***	***19.5***
2026	Proposed Action (Construction)	9.8	0.8	12.3	0.0	169.9	17.7
	2026 Increase in Emissions	***9.8***	***0.8***	***12.3***	***0.0***	***169.9***	***17.7***
2027	Proposed Action (Construction)	8.6	0.4	5.3	0.0	28.3	3.1
	2027 Increase in Emissions	***8.6***	***0.4***	***5.3***	***0.0***	***28.3***	***3.1***
2028	No Action Alternative	827.3	138.6	728.5	68.2	6.3	6.3
2028	Proposed Action (Construction and Operation)	856.4	142.2	737.4	69.2	34.7	9.5
	2028 Increase in Emissions	***29.1***	***3.6***	***8.9***	***1.0***	***28.4***	***3.2***
2029	No Action Alternative	912.5	159.5	833.7	77.7	7.2	7.2
2029	Proposed Action (Construction and Operation)	944.0	163.6	843.0	78.8	35.6	10.4
	2029 Increase in Emissions	***31.6***	***4.1***	***9.3***	***1.1***	***28.4***	***3.2***
2030	No Action Alternative	912.5	159.5	833.7	77.7	7.2	7.2
2030	Proposed Action (Construction and Operation)	940.8	163.6	842.7	78.7	35.6	10.4
	2030 Increase in Emissions	***28.3***	***4.1***	***9.1***	***1.1***	***28.4***	***3.2***
2033	No Action Alternative	912.5	159.5	833.7	77.7	7.2	7.2
2033	Proposed Action (Operation)	935.5	163.2	837.7	78.7	7.3	7.3
	2033 Increase in Emissions	***23.0***	***3.7***	***4.0***	***1.1***	***0.1***	***0.1***
	Federal *de minimis* Threshold	***N/A***	***100***	***100***	***N/A***	***N/A***	***N/A***
	Federal Threshold Exceeded?	*N/A*	***No***	***No***	*N/A*	*N/A*	*N/A*

Note: CO = Carbon Monoxide; VOC = Volatile Organic Compounds; NOx = Nitrous Oxides; SOx = Sulfur Oxides; PM_{10} = Coarse Particulate Matter; $PM_{2.5}$ = Fine Particulate Matter; N/A = Not applicable. Numbers may not sum due to rounding.

Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

The air quality assessment demonstrates that the Proposed Action would not cause an increase in air emissions above the applicable *de minimis* thresholds. Therefore, the Proposed Action conforms to the State Implementation Plan and the CAA and would not create any new violation of the National Ambient Air Quality Standards (NAAQS), delay the attainment of any NAAQS, nor increase the frequency or severity of any existing violations of the NAAQS. As such, no adverse impact on local or regional air quality is expected by construction and implementation of the Proposed Action. No further analysis or reporting is required under the CAA or NEPA.

4.2.7 Mitigation, Avoidance, and Minimization Measures

The Proposed Action would not exceed the applicable thresholds of significance for any pollutants; therefore, no mitigation measures are required. However, as stated above, construction would result in a short-term increase of particulate matter (airborne fugitive dust) emissions from vehicle movement, soil excavation, and blasting activities in and around the construction site. The following minimization measures and best management practices (BMPs) are incorporated to further minimize air quality impacts from the Proposed Action. Note, these measures are provided for disclosure and were not included as part of the modeling or reflected in the emissions inventory.

The Airport Authority will ensure that minimization measures are taken to reduce fugitive dust emissions by adhering to guidelines included in FAA Advisory Circular (AC) 150/5370-10H, *Standard Specifications for Construction of Airports*.[90] Methods of controlling dust and other airborne particles would include, but would not be limited to, the following:

- Exposing the minimum area of erodible earth;
- Applying temporary mulch with or without seeding;
- Using water sprinkler trucks;
- Using covered haul trucks;
- Using dust palliatives or penetration asphalt on haul roads; and
- Using plastic sheet coverings.

In addition to the methods identified in FAA AC 150/5370-10H, the Airport Authority would look to utilize alternatively fueled equipment and reduce the idling time on equipment to minimize potential air quality impacts. To further reduce dust emissions, the Airport Authority will prepare and implement a Blasting Plan. This would also ensure the safety of people in the area, but also prevent property damage. Blasting operations would be conducted per the Blasting Plan and all applicable federal, state, and local laws and regulations.

4.3 Biological Resources (including fish, wildlife, and plants)

This section presents the analysis of potential impacts to biological resources as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for biological resources are discussed in Chapter 3, Section 3.3.

4.3.1 Significance Threshold

FAA Order 1050.1F states that a significant impact to biological resources (including fish, wildlife, and plants) would occur when the U.S. Fish and Wildlife Service (USFWS) or the National Marine Fisheries Service (NMFS) determines that the action would be likely to jeopardize the continued existence of a federally-listed threatened or endangered species, or would result in the destruction or adverse

[90] FAA AC, 2014, Standard Specifications for Construction of Airports, Item C-102, Temporary Air and Water Pollution, Soil Erosion, and Siltation Control, AC 150/5370-10H.

modification of federally-designated critical habitat. The FAA has not established a threshold of significance for species of concern or non-listed species; however, the following factors should be considered, as noted in Order 1050.1F:

- A long-term or permanent loss of unlisted plant or wildlife species (i.e., extirpation of the species from a large project area);
- Adverse impacts to special status species (e.g., state species of concern, species proposed for listing, migratory birds, bald and golden eagles) or their habitats;
- Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or
- Adverse impacts on a species' reproductive success rates, natural mortality rates, non-natural mortality (e.g., road kills and hunting), or ability to sustain the minimum population levels required for population maintenance.

4.3.2 Methodology

A Biological Resources Assessment was prepared to be used by the FAA in its consultation with the USFWS. The Biological Resources Assessment and the coordination efforts with the USFWS are provided in **Appendix D Biological Resources**. The analysis included an evaluation for potential impacts to Endangered Species Act-listed threatened and endangered species and associated critical habitat under the jurisdiction of the USFWS.

4.3.3 Future Conditions: 2028

4.3.3.1 No Action Alternative

The No Action Alternative includes no new construction or changes in operating procedures in 2028. Therefore, the implementation of the No Action Alternative would have no effect on any federal or state threatened or endangered species, no effect on any biotic or critical habitat supporting a federal or state endangered or threatened species, and would not result in the development, conversion, or removal of any existing habitat. Therefore, the No Action Alternative would have no impact not already occurring or anticipated to occur on biological resources.

4.3.3.2 Proposed Action

There would be no change to the number of aircraft operations or fleet mix as a result of the Proposed Action. Therefore, there would be no operational impacts to biological resources with the Proposed Action.

However, the Proposed Action includes construction activities. Fill material would be needed to level the area of the relocated runway prior to construction. The Airport Authority has identified potential borrow sites to obtain the fill material on existing Airport property. These proposed borrow sites are located on both the east and west sides of Pleasant Grove Church Road near Brier Creek Reservoir. Details of the proposed contours and depth of cut are provided in Chapter 1.

In order to determine the potential impacts, an ArcView Geographic Information Systems (GIS) program was used to identify the limits of disturbance. The limits of disturbance, as shown on **Exhibit 4-1,** identify the footprint of the areas that would be disturbed, including tree clearing during construction activities. The limits of disturbance are within the Detailed Study Area (DSA) but are smaller to only account for areas that would be impacted by construction activities. For example, the limits of disturbance do not include the 100 feet of the existing trees and vegetation that would be left in place as a buffer.

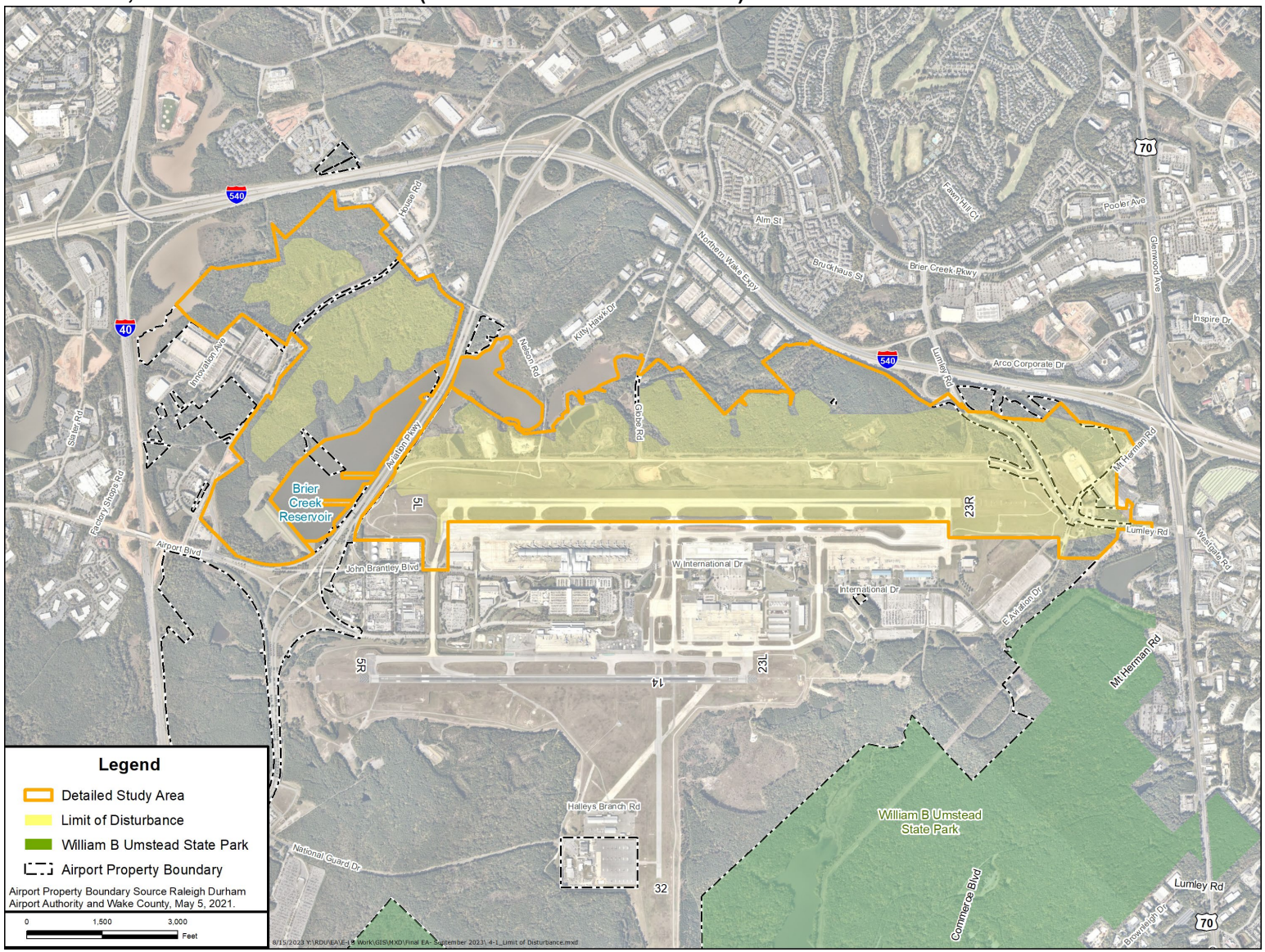
Approximately 200 acres of the proposed borrow sites, all of which are currently forested, would be cleared of all vegetation strata. After the fill material is excavated, the area would be graded and planted with appropriate ground cover vegetation approved by the NCDEQ to prevent erosion. The Airport Authority would leave 100 feet of the existing trees and vegetation in place around the perimeter of the borrow sites as a buffer area. Additionally, a buffer plan will be submitted to the NCDEQ for authorization under the Neuse River Riparian Buffer Rule. See Section 4.13 for a discussion of the Neuse River buffers.

In addition to the borrow site areas, up to 280 acres of forested areas would also be impacted by tree removal for utility relocations, stormwater drainage improvements, Lumley Road relocation, and removal of trees that pose an obstruction to aircraft operation. Furthermore, a portion of that 280 acres would be entirely cleared directly adjacent to the airfield to accommodate the proposed relocated runway, runway safety areas, and the perimeter roadway.

The 480 acres of forested areas that would be removed are comprised of three primary forest types: mixed/pine hardwood forest, pine-dominant forest, and hardwood forest (altered). The mixed pine/hardwood forest community is comprised of a mixed canopy of loblolly pine and various hardwood species. It has a moderate to open sub-canopy and relatively open shrub and herbaceous (i.e., plants with little to no persistent above-ground woody stem) layers. Stands of this type are more mature and developed, as indicated by the size of the trees and stand heterogeneity. The pine-dominant forest community has a canopy primarily comprised of loblolly pine. Although more mature in terms of age, the homogeneity of this forest type indicates some level of disturbance in the past. The hardwood forest (altered) community is specific to an area west of Pleasant Grove Church Road. At some point in the recent to moderate past, this area was altered/cleared; older aerial imagery suggests fields of unknown use.

No additional biological resource impacts would be anticipated due to the trucking of the fill material or the use of the conveyor system.

EXHIBIT 4-1, LIMITS OF DISTURBANCE (POTENTIAL CLEARING AREA)



Source: Airport Authority and RS&H, 2022.

Federally-Listed Threatened and Endangered Species

Based on the research efforts and field survey results as described in Chapter 3, Section 3.3, the FAA has made the following determinations provided in **Table 4-7** on federally-listed threatened and endangered species.

TABLE 4-7, BIOLOGICAL DETERMINATIONS – PROPOSED ACTION

SCIENTIFIC NAME	COMMON NAME	FEDERAL STATUS	HABITAT PRESENT	BIOLOGICAL CONCLUSION
Acipenser oxyrinchus oxyrinchus	Atlantic sturgeon	Endangered	No	No Effect
Picoides borealis	Red-cockaded woodpecker	Endangered	Yes	No Effect
Necturus lewisi	Neuse River waterdog	Threatened	Yes	May Affect, Not Likely to Adversely Affect
Noturus furiosus	Carolina madtom	Endangered	Yes	May Affect, Not Likely to Adversely Affect
Fusconaia masoni	Atlantic pigtoe	Threatened	Yes	May Affect, Not Likely to Adversely Affect
Alasmidonta heterodon	Dwarf wedgemussel	Endangered	Yes	May Affect, Not Likely to Adversely Affect
Rhus michauxii	Michaux's sumac	Endangered	Yes	No Effect
Canis rufus	Red wolf	Endangered	Yes	No Effect

Source: Three Oaks Engineering, 2022.

Coordination with USFWS

The FAA's determinations were submitted to the USFWS on October 19, 2022. The USFWS has concurred with FAA's determinations in a letter dated November 15, 2022 (see Appendix D Biological Resources). In addition, the USFWS noted they recently published their decision to list the tricolored bat (*Perimyotis subflavus*) (TCB) as endangered on September 14, 2022 (87 Federal Register [FR] 56381–56393). This small bat species is known to occur in Wake County. A tricolored bat was captured by mist-net in 2002 in William B. Umstead State Park, about 3.5 miles from the project site. The tricolored bat is an insectivore, and forages and roosts in forests and on the edges of forests. A culvert survey to determine the presence or absence of the tricolored bat was conducted in March 2023. No bats or evidence of bats was detected. However, there was no mist netting to survey the forests that would be cleared for project construction. See Appendix D Biological Resources for the full survey report. The FAA has determined that while the project would adversely affect the tricolored bat, it would not jeopardize the species (See Appendix D Biological Resources for the revised report). While conferencing on a proposed species is recommended it is not required where the lead Federal agency has determined that the species would not be jeopardized by the proposed action. The Airport Authority has requested no conferencing in order to expedite the review process. However, conferencing may occur at any time up to the listing decision by the USFWS. A final listing decision by USFWS may come as soon as September 2023 and, once formally listed, additional evaluation of the species would be required. In order to comply with the endangered species act, a special condition would require the Airport Authority to cease all construction if the tricolored bat is listed and formal conferencing has not been initiated and completed.

State-Designated Threatened, Endangered, Special Concern, or Significantly Rare Species

As of the completion of the Biological Resources Assessment, there are 24 animals and 26 plants that the State has designated threatened, endangered, special concern, or significantly rare species that may occur in Wake County. Of those listed for Wake County, 15 animals and 20 plants have potential

habitat in areas that would be impacted by the Proposed Action. The list is provided in Appendix D Biological Resources.

The Proposed Action would remove up to 480 acres of forested area, which would result in additional forest fragmentation in the region. In order to reduce the level of impact of fragmentation and in order to maintain a wildlife corridor, a special condition requiring the Airport Authority to leave 100 feet of the existing trees and vegetation along the perimeter of the borrow sites in place as a buffer with the exception of access for trucks. The areas of access will be replanted with trees of similar species to either side of the access, after removal of the borrow material is removed from the site. The planting plan must be approved by NCDEQ. This would help provide state-designated threatened, endangered, special concern, or significantly rare species a remaining functional corridor to other forested areas. Most wildlife in the impact area would respond to the disturbance by relocating to other forested areas.

Migratory Bird Treaty Act

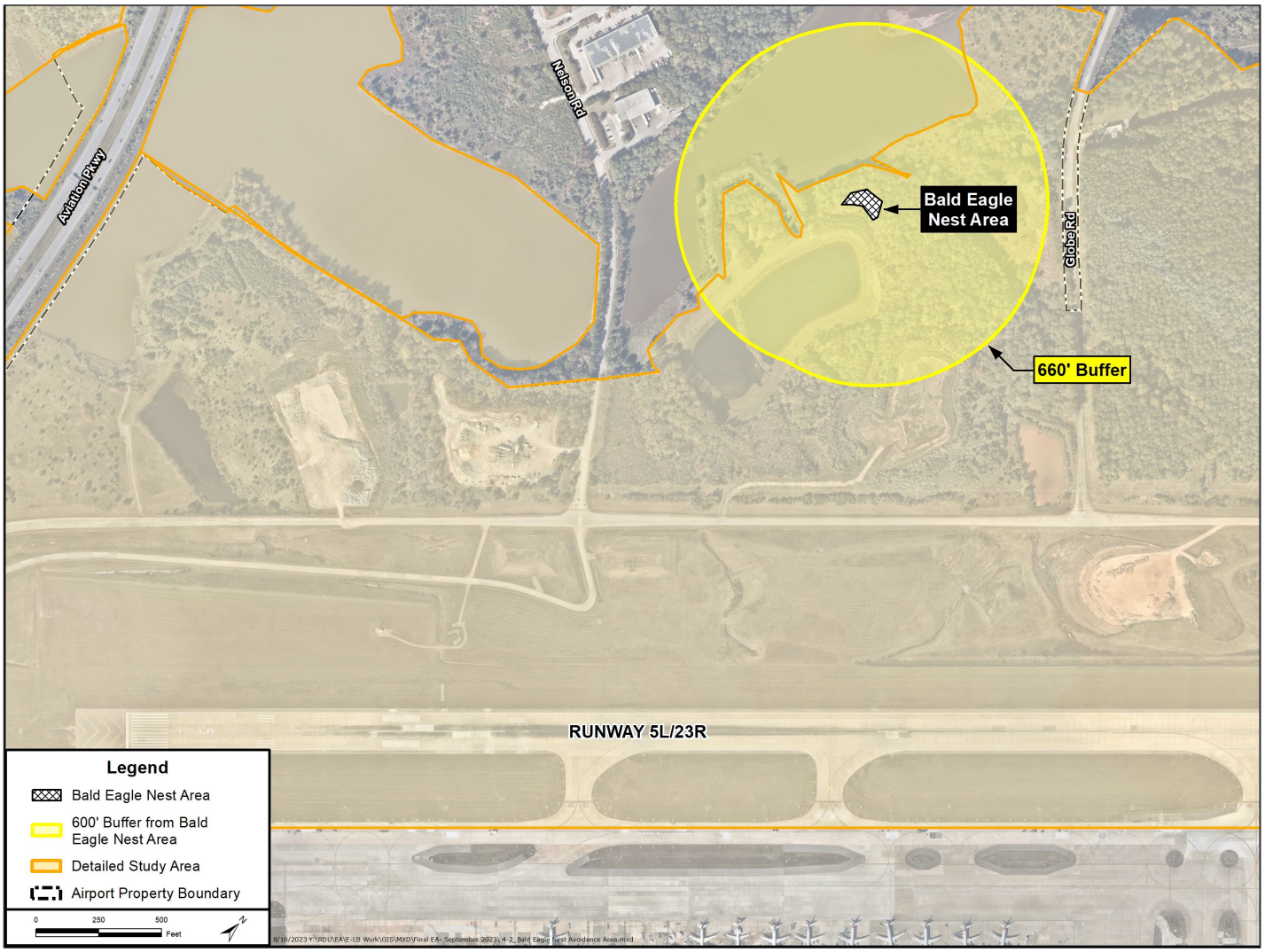
Certain birds are protected under the Migratory Bird Treaty Act. Bird species are listed as being of particular concern either because they occur on the USFWS Birds of Conservation Concern list or warrant special attention in the project location. The list of these bird species is provided in Appendix D Biological Resources. It is possible that removal of trees due to the Proposed Action may impact these bird species. To avoid impacts to migratory birds, a special condition requiring the Airport Authority to only perform tree clearing when species are not nesting (October to February) or after the area has been surveyed to ensure no nesting is occurring in the area of tree removal.

Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act is enforced by the USFWS. Golden Eagles do not nest in North Carolina. Habitat for the bald eagle primarily consists of mature forests in proximity to large bodies of open water for foraging. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water. One bald eagle nest was identified, approximately 1,900 feet north of the existing Runway 5L/23R, in a loblolly pine stand between the Brier Creek Reservoir and a large stormwater impoundment. The Proposed Action would not directly impact this bald eagle nest. At the request of the USFWS, the potential noise level at the bald eagle nest was assessed. (See also Appendix D Biological Resource Assessment Table 3 and Appendix F Noise for additional information). The existing noise at the bald eagle's nest was 63.81 Day-Night Average Sound Level (DNL), measured in decibel level (dBA), which is to approximate the way the human ear hears. In 2028 with the No Action Alternative the noise level at the bald eagle nest would increase to 64.4 DNL dBA. The Proposed Action would increase the noise level to 67.08 DNL dBA. In 2033 with the No Action Alternative, the noise level at the bald eagle nest would increase to 64.85 DNL dBA. The Proposed Action would increase the noise level to 67.5 DNL dBA.

Due to the presence of a bald eagle nest, a special condition requiring the Airport Authority to avoid the eagle nest during construction of the Proposed Action by maintaining a 660-foot construction-free buffer around the nest from December 1 to July 15 of any construction year will be required. In its letter dated November 15, 2022, USFWS agreed that the project is not likely to disturb nesting bald eagles if these measures are taken. The avoidance area for the bald eagle nest is shown in **Exhibit 4-2**.

EXHIBIT 4-2, BALD EAGLE NEST AVOIDANCE AREA



Source: Three Oaks Engineering, 2022.

Impacts due to Construction Blasting

Blasting would occur at the borrow sites to break up the rock and dirt material. After blasting and the fill material is excavated, the area would be graded and planted with appropriate ground cover vegetation approved by the NCDEQ to prevent erosion. It is anticipated the blasting would occur during daytime hours and be preceded by warning alarms. Most wildlife in the impact area would respond to the disturbance by relocating to other forested areas. The borrow area and the location of potential blasting would be more than 0.5 miles from the eagle's nest, which complies with the recommendations in the National Bald Eagle Management Guidelines to "avoid blasting and other activities that produce extremely loud noises within 1/2 mile of active nests". Final design for the Proposed Action is not yet complete; therefore, the exact number and location of blasting activities is not yet known, however the closest distance from the eagle's nest across the reservoir and Aviation Parkway to the borrow sites is approximately 0.60 miles.

Impacts due to Deforestation

The Proposed Action would remove up to 480 acres of forested area, which would result in additional forest fragmentation in the region. As stated by the USFWS, this area appears to provide a wildlife

corridor between the William B. Umstead State Park and other areas to the northwest. Loss of this forested area is likely to push wildlife onto adjacent areas that would remain forested. There would be mortality of non- or low-mobile species that are not able to relocate; however, these species are not endangered or threatened. These species have a robust population in the region and therefore, there would be no long-term or permanent loss of unlisted plant or wildlife species (i.e., extirpation of the species from a large project area);

In order to reduce the level of impact of fragmentation and in order to maintain a wildlife corridor, a special condition requiring the Airport Authority to leave 100 feet of the existing trees and vegetation along the perimeter of the borrow sites in place as a buffer with the exception of access for trucks. The areas of access will be replanted with trees of similar species to either side of the access, after removal of the borrow material is removed from the site. The planting plan must be approved by NCDEQ. This would help provide wildlife a remaining functional corridor to other forested areas. Most wildlife in the impact area would respond to the disturbance by relocating to other forested areas.

Total avoidance of potential environmental impacts is not practicable due to the purpose and need of the project. However, with the implementation of the special conditions and mitigation measures, no environmental thresholds of significance were exceeded for the Proposed Action.

4.3.4 Future Conditions: 2033

4.3.4.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon biological resources as described for the Future (2028) No Action Alternative.

4.3.4.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon biological resources as described for the Future (2028) Proposed Action.

4.3.5 Mitigation, Avoidance, and Minimization Measures

The Proposed Action would require the following mitigation measures. With the mitigation measures, the Proposed Action would not result in significant impacts to biological resources.

- An Erosion and Sedimentation Control (ESC) Plan will be developed and approved by the NCDEQ prior to construction. Best management practices and erosion control measures will be identified to control and contain runoff that could make its way to navigable waterways to minimize the sediment impact. This ESC Plan would include access road locations to the borrow sites, monitoring and maintenance of control measures, and waste management plan.
- The Airport Authority shall leave 100 feet of the existing trees and vegetation in place along the perimeter of the borrow site as a buffer, with the exception of access for trucks. The areas within the 100-foot buffer for truck access will be replanted with trees of similar species to either side of the access, after removal of the borrow material from the borrow site. The planting plan must meet NCDEQ's standards of 320 native trees per acre and include three years of annual monitoring and reporting demonstrating survival of species and vegetative coverage.
- To comply with the Bald and Golden Eagle Protection Act, the Airport Authority shall avoid the eagle nest during construction of the Proposed Action by maintaining a 660-foot construction-free buffer around the nest from December 1 to July 15 of any construction year.
- To avoid impacts to migratory birds, a special condition requiring the Airport Authority to only perform tree clearing when species are not nesting (October to February) or after the area has been surveyed to ensure no nesting is occurring in the area of tree removal.

- In order to comply with the Endangered Species Act, the Airport Authority shall cease all tree clearing activities/building demolitions if the USFWS lists the tricolored bat as either threatened or endangered and if the FAA has not completed consultation or formal conferencing. The Airport Authority shall not commence tree clearing/building demolitions until the FAA has notified the Airport Authority that all consultation requirements are completed.

4.4 Climate

This section provides the estimate of greenhouse gas (GHG) emissions attributable to aircraft operations, motor vehicles, and construction-related emissions as a result of the Future No Action Alternative and the Proposed Action and a discussion of climate adaptation. The existing conditions for climate are discussed in Section 3.4.

4.4.1 Significance Threshold

The FAA has not identified specific factors to consider in making a significance determination for GHG emissions.

4.4.2 Methodology

Appendix C Air Quality and Climate presents the methodology and inputs used to prepare the GHG emissions inventories. The analysis of GHG emissions was prepared in accordance with the guidelines provided in the FAA's *Aviation Emissions and Air Quality Handbook Version 3, Update 1*,[91] FAA Order 5050.4B, *NEPA Implementing Instructions for Airport Actions*, and FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*.

Final design for the Proposed Action is not yet complete. As part of the potential grading activities at the borrow sites, there is still a possibility to use a conveyor belt system to transport the fill material. However, for this analysis, diesel trucks were assumed to be used to present a conservative approach in estimating GHG emissions. GHG emissions from diesel trucks transporting the fill would be greater than GHG emissions using an electric conveyor belt system.

4.4.3 Future Conditions: 2028

4.4.3.1 No Action Alternative

Table 4-8 provides the GHG carbon dioxide equivalent (CO_2e) for the Future (2028) No Action Alternative.

TABLE 4-8, FUTURE (2028) NO ACTION ALTERNATIVE GHG EMISSIONS INVENTORY

EMISSION SOURCE	CO_2e (METRIC TONS/YEAR)
Aircraft Taxiing	64,837
Aircraft Landing and Takeoff	101,910
Motor Vehicles	1,263
Total:	**168,010**

Note: Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.4.3.2 Proposed Action

Table 4-9 provides the GHG CO_2e for the Future (2028) Proposed Action.

[91] FAA, Aviation Emissions and Air Quality Handbook Version 3, Update 1, January 2015.

TABLE 4-9, FUTURE (2028) PROPOSED ACTION GHG EMISSIONS INVENTORY

EMISSION SOURCE	CO_2e (METRIC TONS/YEAR)
Aircraft Taxiing	67,142
Aircraft Landing and Takeoff	101,908
Motor Vehicles	1,419
Total:	**176,974**

Note: Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.4.4 Future Conditions: 2033

4.4.4.1 No Action Alternative

Table 4-10 provides the GHG CO_2e for the Future (2033) No Action Alternative.

TABLE 4-10, FUTURE (2033) NO ACTION ALTERNATIVE GHG EMISSIONS INVENTORY

EMISSION SOURCE	CO_2e (METRIC TONS/YEAR)
Aircraft Taxiing	73,871
Aircraft Landing and Takeoff	115,885
Motor Vehicles	1,291
Total:	**191,047**

Note: Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.4.4.2 Proposed Action

Table 4-11 provides the GHG CO_2e for the Future (2033) Proposed Action.

TABLE 4-11, FUTURE (2033) PROPOSED ACTION GHG EMISSIONS INVENTORY

EMISSIONS SOURCE	CO_2e (METRIC TONS/YEAR)
Aircraft Taxiing	76,497
Aircraft Landing and Takeoff	115,880
Motor Vehicles	1,451
Total:	**193,828**

Note: Numbers may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.4.5 Construction

The GHG construction emissions inventories were prepared using the same data and assumptions as developed for the air quality criteria pollutant construction emissions inventories. The construction emissions inventory for the Proposed Action is shown in **Table 4-12**. As the table shows, peak construction GHG emissions are expected to occur in 2024 and produce 57,182 metric tons of CO_2e.

TABLE 4-12, GHG CONSTRUCTION EMISSIONS INVENTORY – PROPOSED ACTION

YEAR	SOURCE	ANNUAL GHG EMISSIONS (CO_2e METRIC TONS / YEAR)
2023	Construction Only	30,472
2024	Construction Only	57,182
2025	Construction Only	38,544
2026	Construction Only	12,053
2027	Construction Only	6,505
2028	Construction Only	6,505
2029	Construction Only	6,505
2030	Construction Only	5,910

Note: Numbers may not sum due to rounding.
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

4.4.6 Summary

The GHG emissions inventories prepared for the Proposed Action are compared to those prepared for the No Action Alternative of the same future year to disclose the potential increase in GHG emissions. The results of the comparison between the Proposed Action and the No Action Alternative are shown in **Table 4-13**. This table includes a summary of both construction and operational emissions. Operational emissions are only provided for 2028 and 2033 because these are the operational analysis years, as identified in Section 4.1.

TABLE 4-13, GHG EMISSIONS SUMMARY, PROPOSED ACTION COMPARED TO NO ACTION ALTERNATIVE

YEAR	SOURCE	ANNUAL GHG EMISSIONS (CO_2e METRIC TONS PER YEAR)
2023	Proposed Action (Construction)	30,472
	2023 Increase in Emissions	**30,472**
2024	Proposed Action (Construction)	57,182
	2024 Increase in Emissions	**57,182**
2025	Proposed Action (Construction)	38,544
	2025 Increase in Emissions	**38,544**
2026	Proposed Action (Construction)	12,053
	2026 Increase in Emissions	**12,053**
2027	Proposed Action (Construction)	6,505
	2027 Increase in Emissions	**6,505**
2028	No Action Alternative (Operation)	168,010
2028	Proposed Action (Construction and Operation)	176,974
	2028 Increase in Emissions	**8,965**
2029	Proposed Action (Construction)	6,505
	2029 Increase in Emissions	**6,505**
2030	Proposed Action (Construction)	5,910
	2030 Increase in Emissions	**5,910**
2033	No Action Alternative	191,047
2033	Proposed Action (Operation)	193,828
	2033 Increase in Emissions	**2,780**

Note: Totals may not sum due to rounding
Source: Landrum & Brown analysis, 2022. See Appendix C Air Quality and Climate for additional information.

The Proposed Action would increase GHG emissions as compared to the No Action Alternative. The Proposed Action would increase GHG emissions by 8,965 CO_2e metric tons over the No Action Alternative in 2028 and by 2,780 CO_2e metric tons over the No Action Alternative in 2033. Peak construction GHG emissions are expected to occur in 2024 and produce 57,182 metric tons of CO_2e.

Per FAA Order 1050.1F Desk Reference, there are no federal significance thresholds for GHG emissions, nor has the FAA identified specific factors to consider in making a significance determination for GHG emissions. There is a considerable amount of ongoing scientific research to improve understanding of global climate change and FAA guidance will evolve as the science matures or if new federal requirements are established.

4.4.7 Climate Adaptation

The environmental consequences section for climate also includes a discussion of the extent to which the Proposed Action and No Action Alternative could be affected by future climate conditions. The potential impacts of climate change to the Airport may include increased rainfall intensity, higher summer temperatures and humidity, and increased storms, including hurricanes and Nor'easters, with high winds and rain. Severe thunderstorms can cause flash flooding, especially in urban areas. Rising temperatures may also lead to more intense and frequent droughts, like those in North Carolina in 2007

and 2016.[92] These risks would be present regardless of the alternative selected and would not be exacerbated by the Proposed Action. The Proposed Action includes constructing drainage improvements to accommodate the increase in impervious surfaces. The Airport Authority is undergoing an Envision Sustainability Rating for the Proposed Action that would address climate adaptation and resiliency.

Urban Heat Islands

According to U.S. Environmental Protection Agency (USEPA), heat islands are urbanized areas that experience higher temperatures than outlying areas. Structures such as buildings, roads, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. An increase in impervious surface and decrease in tree canopy can contribute to the urban heat island effect. Urban heat islands may contribute to local climate change. The impacts from urban heat islands and global climate change are often similar. While there is an increase in concrete with the Proposed Action that could increase the retention of heat and urban heat island effects, the area surrounding the Airport is protected and will remain undeveloped and would thus ameliorate any potential increase in temperatures. There are no thresholds for climate in general and none relating to heat islands. However, any temperature increases related to the replacement runway would be expected to be limited to the Airport boundary and not affect local residences because of the distance between the runway and nearest residence and the intervening vegetated buffer.

4.4.8 Mitigation, Avoidance, and Minimization Measures

As discussed in Chapter 2, there are no alternatives other than the Proposed Action that meet the purpose and need. The Airport Authority and the FAA have shown in their alternatives analysis that there were no practicable alternatives that would reduce potential GHG emissions. The Proposed Action includes the use of construction equipment, increased aircraft taxi times, and increased motor vehicle operations from the relocated Lumley Road. Due to the nature of the Proposed Action, there are no avoidance, minimization, or mitigation measures that would reduce GHG emissions.

While not a part of the Proposed Action, the Airport Authority has stated that they will continue to encourage the Airport and its tenants to operate in an environmentally responsible and sustainable way. In addition, the Airport Authority would look to utilize alternatively fueled equipment and reduce the idling time on equipment to minimize potential air quality and climate impacts. When considering the potential increase in GHG emissions due to the Proposed Action, in context with the Airport Authority's sustainability commitment and goals, the Proposed Action would not have an adverse significant impact on climate.

4.5 Department of Transportation Act, Section 4(f)

This section presents the analysis of potential impacts to Section 4(f) resources as a result of the Future No Action Alternative and the Proposed Action. Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 is currently codified as 49 U.S. Code (U.S.C.) Section 303. However, this section will refer to 49 U.S.C. Section 303 as Section 4(f). The existing conditions for Section 4(f) are discussed in Chapter 3, Section 3.5.

4.5.1 Significance Threshold

Two types of impacts to a Section 4(f) resource, physical or constructive use, can occur from a Proposed Action. A physical use would occur if the Proposed Action or alternative(s) would involve an

[92] North Carolina Institute for Climate Studies, North Carolina Climate Science Report. Accessed November 2022 at https://ncics.org/programs/nccsr/

actual physical taking of Section 4(f) property through purchase of land or a permanent easement, physical occupation of a portion or all of the property, or alteration/demolition of structures or facilities on the property. Constructive use occurs when there is no physical impact to a Section 4(f) property, but that the proximity impacts to that property are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired.

Exhibit 4-1 of FAA Order 1050.1F provides the significance threshold for Section 4(f) properties as when the FAA determines that the Proposed Action would substantially impair the Section 4(f) resource. A significant impact under NEPA would not occur if mitigation measures eliminate or reduce the effects of the use below the threshold of significance.

Section 6(f) of the Land and Water Conservation Fund Act (LWCF) is also pertinent to Section 4(f) lands. A project that would use Section 4(f) parks or recreation areas must also comply with Section 6(f) of the Land and Water Conservation Fund, 16 U.S.C. § 4601-8(f), if the property was acquired or developed with financial assistance under the Land and Water Conservation Fund State Assistance Program.

4.5.2 Future Conditions: 2028

4.5.2.1 No Action Alternative

No physical changes to the Airport would occur under this alternative. Therefore, there would be no change to Section 4(f) resources or Section 6(f) resources for the No Action Alternative in 2028.

4.5.2.2 Proposed Action

Physical Use

The Proposed Action includes demolition of four buildings that are vacant on Airport property. As discussed in Section 3.5 and **Appendix E Section 106 Consultation**, the State Historic Preservation Office (SHPO) concurred with FAA's conclusion by letter dated December 1, 2022 that none of the structures being impacted by the Proposed Action are eligible for listing in the National Register of Historic Places.

In addition, there are no physical changes to William B. Umstead State Park or Lake Crabtree County Park with the Proposed Action. Therefore, the Proposed Action would not result in the physical use of any Section 4(f) resources. According to information from the Land and Water Conservation Fund, LWCF funding was used for William B. Umstead State Park, meaning the land is protected under LWCF Section 6(f). However, the Proposed Action does not include the conversion of lands purchased or developed in association with Section 6(f) LWCF to non-recreational uses.

Constructive Use

The Crabtree Creek Recreational Demonstration Area, now named the William B. Umstead State Park, is listed on the NRHP. A portion of William B. Umstead State Park and a portion of Lake Crabtree County Park were identified within the GSA. A review of impact categories, including air quality, water resources, compatible land use, light emissions and visual impacts, and socioeconomic impacts, was conducted to determine if any constructive uses would occur to this Section 4(f) resource. For noise, the land use compatibility guidelines in 14 Code of Federal Regulations (CFR) Part 150 may be relied upon by the FAA to determine whether there is a constructive use under Section 4(f). This is relevant to the value, significance, and enjoyment of the Section 4(f) lands in question.

The Proposed Action would move the primary runway further away from William B. Umstead State Park and Lake Crabtree County Park. As discussed in Section 4.10 and **Appendix F Noise**, the Proposed Action would not have a significant noise impact to William B. Umstead State Park. In addition, there

would be no other constructive uses of these parks. See Section 4.10 for potential Noise and Noise-Compatible Land Use impacts. In addition, according to the applicable sections in this EA, there are no significant impacts to any of the impact categories listed above. Therefore, it can be concluded that the Proposed Action would not result in a constructive use of any Section 4(f) resource.

4.5.3 Future Conditions: 2033

4.5.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon Section 4(f) and 6(f) resources as described for the Future (2028) No Action Alternative.

4.5.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon Section 4(f) and 6(f) resources as described for the Future (2028) Proposed Action.

4.5.4 Mitigation, Avoidance, and Minimization Measures

No USDOT Act Section 4(f) resources would experience a physical or constructive use resulting from implementation of the Proposed Action for the future years 2028 or 2033. In addition, there would be no impact to Section 6(f) resources. Therefore, no mitigation measures are required.

4.6 Hazardous Materials, Solid Waste, and Pollution Prevention

This section presents the analysis of potential impacts to hazardous materials, solid waste, and pollution prevention as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for hazardous materials, solid waste, and pollution prevention are discussed in Chapter 3, Section 3.6.

4.6.1 Significance Threshold

The FAA has not established a significance threshold for hazardous materials, solid waste, or pollution prevention in FAA Order 1050.1F; however, the FAA has identified factors to consider in evaluating the context and intensity of potential environmental impacts for hazardous materials, solid waste, or pollution prevention (see Exhibit 4-1 of FAA Order 1050.1F). These factors are not intended to be thresholds. If these factors exist, there is not necessarily a significant impact; rather, the FAA must evaluate these factors in light of context and intensity to determine if there are significant impacts. Factors to consider that may be applicable to hazardous materials, solid waste, and pollution prevention include, but are not limited to, situations in which the Proposed Action or alternative(s) would have the potential to:

- Violate applicable federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management;
- Involve a contaminated site (including, but not limited to, a site listed on the National Priorities List [NPL]). Contaminated sites may encompass relatively large areas. However, not all of the grounds within the boundaries of a contaminated site are contaminated, which leaves space for siting a facility on non-contaminated land within the boundaries of a contaminated site. An Environmental Impact Statement (EIS) is not necessarily required. Paragraph 6-2.3.a of FAA Order 1050.1F allows for mitigating impacts below significant levels (e.g., modifying an action to site it on non-contaminated grounds within a contaminated site). Therefore, if appropriately mitigated, actions within the boundaries of a contaminated site would not have significant impacts;
- Produce an appreciably different quantity or type of hazardous waste;

- Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or
- Adversely affect human health and the environment.

4.6.2 Future Conditions: 2028

4.6.2.1 No Action Alternative

Hazardous Materials and Pollution Prevention

No physical changes to the Airport would occur under this alternative. There would be no change to hazardous materials for the No Action Alternative in 2028. Furthermore, there would be no change to existing pollution prevention measures for the No Action Alternative.

Solid Waste and Recycling

No physical changes to the Airport would occur under No Action Alternative. It is anticipated that the forecast increase in aircraft operations would similarly increase passengers and the volume of solid waste generated at the Airport. The estimated volume of solid waste generated from the Airport in 2028 would be approximately 3,200 tons with approximately 300 tons recycled. This volume of solid waste can be accommodated at the existing landfill facilities without substantially compromising capacity.[93] Therefore, the level of solid waste produced under the No Action Alternative in 2028 would not significantly impact the capacity of the solid waste systems.

4.6.2.2 Proposed Action

Hazardous Materials and Pollution Prevention

Management of Uncontaminated Sediment

The replacement of Runway 5L/23R and the conversion of the existing Runway 5L/23R to a taxiway would not increase the generation of hazardous materials compared to existing conditions or the Future (2028) No Action Alternative. Soil excavated and graded from the specific location of the replacement runway directly on the airfield is considered uncontaminated and may be reused onsite as necessary.

Due to the proximity of the H-6 historical jet fuel release site to the runway/taxiway as described in Chapter 3, the following actions are included as part of the project: flag the outer boundary of the known contamination area, install borings at the planned boundary of construction in the area adjacent to the H-6 area, analyze the soil and groundwater samples from the borings to verify soils and groundwater in the construction zone are not hazardous, and include requirements in the construction document technical specifications (earthwork specification) identifying contractor requirements for the testing, handling, transport, and disposal of soils determined to be contaminated. In addition, the groundwater remediation system will be maintained and all construction contractors would be made aware of its existence. In order to ensure that contamination from the H-6 site does not spread, the FAA will include a special condition stating that if testing of the borings shows contamination, the Airport Authority will cease operations in the area and notify the FAA. The Airport Authority will provide a plan to handle any contaminated material associated with this site to both agencies and will wait for agency approval prior to disturbing the site. In addition, prior to commencing operations in the area, the Airport Authority and the contractor will comply with any resulting USEPA requirements for transport and disposal of contaminated materials.

[93] NCDEQ, Division of Waste Management Site Locator Tool. On-line https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=7dd59be2750b40bebebfa49fc383f688, Accessed April 14, 2022; NCDEQ: Waste Management Solid Waste Section, Landfill Capacity for Fiscal Year 2019-2020. On-line: https://files.nc.gov/ncdeq/Waste%20Management/DWM/SW/Annual%20Reports/FY-19-20-Landfill-Capacity-Reports.pdf, Accessed April 14, 2022.

The Airport Authority would require the construction contractor to develop an Erosion and Sedimentation Control (ESC) Plan per the North Carolina Department of Environmental Quality (NCDEQ) Construction Stormwater requirements. BMPs and the erosion control measures would be taken to control and contain sediment runoff that could make its way to navigable waterways to minimize the sediment impact on surface waters including Brier Creek Reservoir and Brier Creek. BMPs may include, but are not limited to, dust control measures, matting and netting measures, temporary slope drains, sediment screens, sedimentation basin, etc. The specific BMPs will be determined and described in the ESC Plan developed by the Airport Authority through its design engineer or construction contractor. The ESC Plan would then be approved by the NCDEQ. In order to ensure contaminated material does not spread, the FAA will require a special condition that no construction will occur until the Airport Authority obtains NCDEQ approval of the Erosion and Sedimentation Control Plan.

Management of Oil and Petroleum Spills During Construction

During construction activities onsite, there would be the potential for oil and petroleum spills to occur because of construction equipment operation. The use of trucking to transport fill material as opposed to the conveyor system would have a higher potential for oil and petroleum spills. However, the implementation of the existing Spill Prevention, Control, and Countermeasure (SPCC) plan would prevent the impact of spills on the soil and surrounding environment. Any spills that may occur would be cleaned up per applicable federal, state, and local requirements. Construction contractors would be required to train their employees in spill prevention and control measures and provide the necessary response materials.

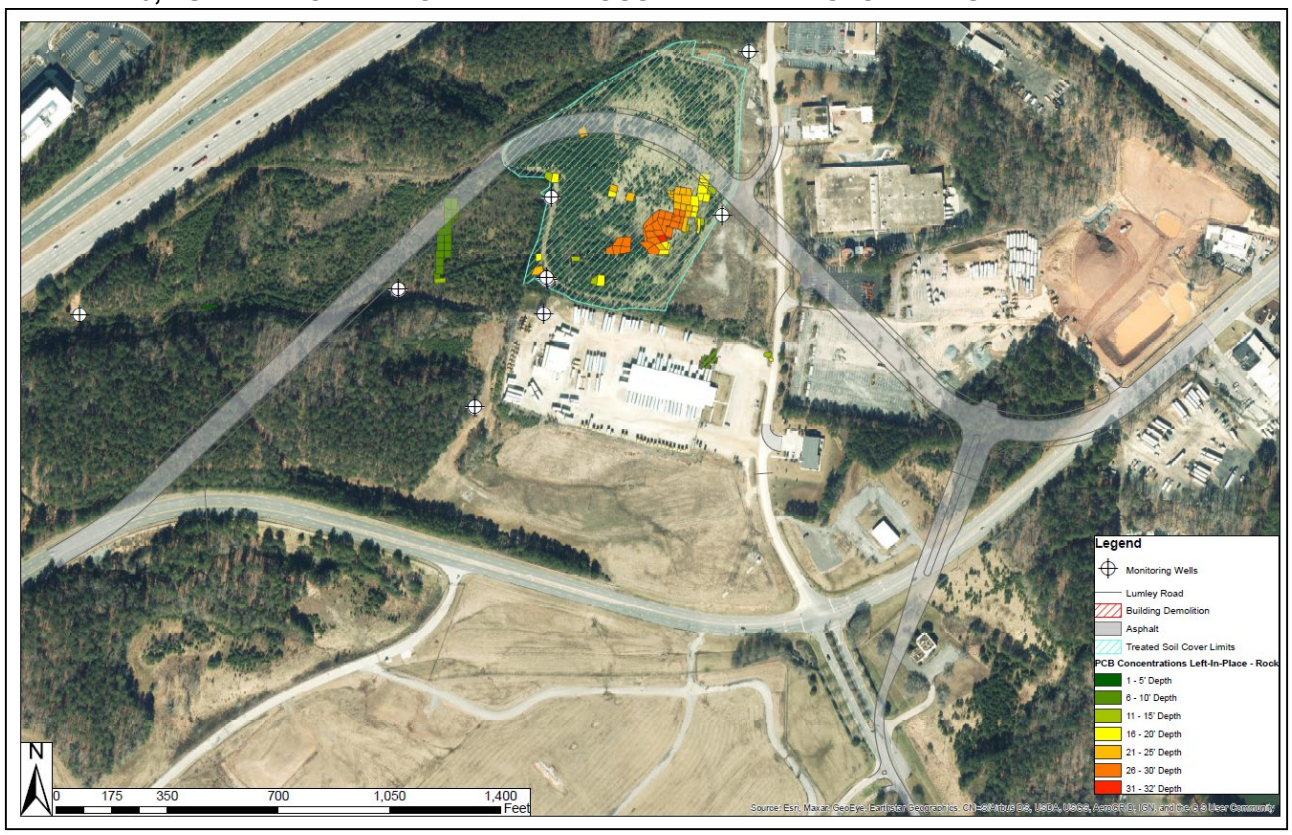
Equipment containing oil will be inspected regularly and prior to beginning work every day. Spill response materials will be kept on hand and stocked at all times. In the event of a spill, the contractors will assess the area for safety and notify the relevant parties. Proper personal protection equipment and response materials would be used to safely contain the spill and to stop the source of the leak. Once the spill is properly contained, it will be cleaned up and waste material will be properly disposed.

Management of Contaminated Materials from Lumley Road Relocation

The relocation of Lumley Road would result in the roadway crossing the contaminated Ward Transformer Superfund Site (the Site), which has undergone remediation and is undergoing a Remedial Investigation/Feasibility Study overseen by the USEPA. A segment of the proposed relocated roadway would cross an area of the Site where polychlorinated biphenyl (PCB)-impacted soil and debris, Site buildings, and other structures were removed and then backfilled with treated soil containing PCBs at concentrations below 10 parts per million (ppm).[94] The backfill was covered with a geotextile fabric barrier and approximately one foot of clean soil. **Exhibit 4-3** depicts where Lumley Road is planned to be relocated through this previously remediated and capped area and the residual PCB concentrations remaining onsite.

[94] Golder Associates Inc., March 2018, Final Supplemental Remedial Investigation Report, Revision 1, Ward Transformer Superfund Site, Operable Unit 2, Supplemental Remedial Investigation/Focused Feasibility Study

EXHIBIT 4-3, LUMLEY ROAD ALIGNMENT ACROSS WARD TRANSFORMER SITE



Source: Golder Associates, Final Supplemental Remedial Investigation Report, 2017 and the Airport Authority, 2022.

Final design of the roadway is not complete and is being coordinated with the North Carolina Department of Transportation (NCDOT); however, the roadway relocation may involve excavation up to approximately 13 feet of soil below ground surface in this area to create the roadway. The soil cap and geotextile fabric barrier would be removed within the area of construction. Based on the proposed roadway alignment, preliminary road profile, proposed roadway configuration and dimensions, using an assumed 18-inch roadway pavement thickness with a two-foot rock subbase, and an assumed installation of a 30-inch stormwater trunk line to drain the roadway, the total excavated volume of PCB-contaminated soil is estimated to be approximately 23,200 cubic yards.[95,96] The Airport Authority is a designated RCRA hazardous waste generator (ID NCD986232692). In-situ PCB-contaminated soil and bedrock within the relocated Lumley Road alignment to the west of the backfilled area with the geotextile fabric barrier is anticipated to be at sufficient depth as to not be encountered during roadway construction. Excavated PCB-contaminated soil would be transported by a certified hauler to an appropriately permitted disposal facility in accordance with applicable regulations or kept on-site. There is sufficient certified disposal facility capacity for PCB-contaminated materials within 50 miles of the Site.[97,98]

95 WK Dickson, May 2021, Overall Plan View – 40 MPH Design Radii, Revised Per June 2, 2022, NCDOT Comments. Date Stamped 8/11/2022, Time Stamped 3:07:13 PM

96 WK Dickson, November 2021, -L- Lumley Road Profile - 40 MPH Design Radii. Date Stamped 5/13/2022, Time Stamped 3:45:14 PM

97 NCDEQ, Division of Waste management Site Locator Tool. https://ncdenr.maps.arcgis.com/apps/webappviewer/index.html?id=7dd59be2750b40bebebfa49fc383f688

98 Hazardous Materials disposal sites RCRA Info Search. https://enviro.epa.gov/facts/rcrainfo/search.html

For the portions of the capped area at the Site where excavation is anticipated for the installation of the relocated Lumley Road, the new asphalt roadway would serve as an engineering barrier equivalent to the existing geotextile barrier. Asphalt is a USEPA-approved engineering control for preventing exposure to contamination on a property.[99] Therefore, the design of the relocated Lumley Road incorporates minimizing impacts to the Site and would address the potential release of, or exposure to, hazardous materials. Pervious roadway shoulders or areas where the existing geotextile barrier was removed but not covered with asphalt would require replacement of the geotextile barrier cap. Groundwater is not expected to be encountered during this Proposed Action; however, there are groundwater monitoring wells located on the Site, two of which are in relatively close proximity to the proposed Lumley Road relocation.[7] Final design of the relocated roadway is not yet complete. If these monitoring wells require removal or abandonment during roadway excavation or construction on the Site, the Airport Authority and their contractor would coordinate the decommissioning of them with the USEPA and in accordance with state requirements.[100] Reinstallation and relocation may be required to allow for continued groundwater monitoring onsite.

The Proposed Action would include demolishing the former Estes Truck Terminal and Office building and the Truck Maintenance Shop. As shown on Exhibit 4-6 provided in Section 4.10, the Lumley Road relocation does not go through the former Estes Truck Terminal, but the buildings are being demolished as to remove them from the replacement runway safety areas. Due to the age of these buildings, some material may contain lead-based paint (LBP) or asbestos containing material (ACM). An LBP survey and an ACM survey would need to be conducted prior to demolition. Any LBP or suspected ACM will be properly disposed of at a certified landfill location. PCB concentrations in soil that were left in place at the former Estes property have been detected as high as 200 ppm, with the highest concentration detected in soil from one to five feet below ground surface being 31 ppm.[101] Should excavation or soil disturbance occur onsite, excavated material would either be evaluated through analytical testing or disposed of as PCB-contaminated soil, as previously described.

Coordination with USEPA Concerning the Lumley Road Relocation and Use of Brier Creek Reservoir

The relocation of Lumley Road would result in the roadway crossing the contaminated Site. The Site is currently undergoing a Remedial Investigation/Feasibility Study overseen by the USEPA. The FAA has coordinated with the USEPA for this project. In a meeting on June 28, 2022, the USEPA stated that it is acceptable to go below the existing geotextile barrier cap and to change the shape of the soil pile in the potential road relocation area and this was confirmed in an email from USEPA dated November 1, 2022.[102] The soil in this area is not highly contaminated and the anticipated impacts due to the road relocation would be minor. In addition, USEPA stated there was no major concern with the use of water from Brier Creek for hydrocompression of the fill dirt material needed for project construction. Drawing of the water from the reservoir is not expected to have significant impacts to the sediment since the intake will be floating above the sediment. The USEPA recommended that potential testing of the sediment in the reservoir may be needed in the specific areas of disturbance such as the location of the relocated navigation lights. In addition, the use of a conveyor system to transport fill material may

99 USEPA Fact Sheet - EPA-560-F-10-005; Engineering Controls on Brownfields Information Guide: How They Work with Institutional Controls; the Most Common Types Used; and an Introduction to Costs. https://www.epa.gov/sites/default/files/2015-09/documents/ec_information_guide.pdf

100 15A NCAC 02C0113(d)

101 Golder Associates Inc., March 2018, Final Supplemental Remedial Investigation Report, Revision 1, Ward Transformer Superfund Site, Operable Unit 2, Supplemental Remedial Investigation/Focused Feasibility Study

102 Email from Hilary Thornton, USEPA Region 4 to Jackie Sweatt-Essick, FAA RE: Raleigh Durham EA Follow-up, November, 1, 2022.

disturb sediment in Brier Creek Reservoir. The conveyor system would require placing temporary support structures in the Brier Creek Reservoir.

In order to ensure that any PCB disturbance is handled in accordance with USEPA requirements, the Airport Authority will ensure the final design of the relocated roadway, the excavation of any contaminated material on the former Estes site (Ward Transformer site) and the disturbance of sediment in Brier Creek Reservoir for the conveyer belt system or the relocation of navigation lights is approved by USEPA prior to commencing these activities.

Solid Waste and Recycling

The Proposed Action would create a temporary increase in solid waste generated during construction activities. Solid waste would be comprised of construction debris such as concrete and asphalt. Construction and demolition waste not recycled for Airport uses would be sent to an appropriate certified landfill, of which there is sufficient capacity.[103]

Therefore, the Proposed Action would neither generate an unmanageable volume of solid waste nor affect the Airport's existing solid waste management program. The Airport Authority is strongly committed to sustainability practices and would seek to recycle as much material as practicable. Material that is not suitable for recycling would be disposed of using existing disposal measures, including sending solid and semi-solid waste to a permitted landfill or a stockpile on Airport property. The increase in solid waste produced by the Proposed Action would not exceed the capability of the waste management system currently in place.

4.6.3 Future Conditions: 2033

4.6.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon hazardous materials, solid waste, or pollution prevention as described for the Future (2028) No Action Alternative.

4.6.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon hazardous materials, solid waste, or pollution prevention as described for the Future (2028) Proposed Action.

4.6.4 Mitigation, Avoidance, and Minimization Measures

The Proposed Action would require the following described mitigation measures. With the mitigation measures, the Proposed Action would not result in significant impacts from hazardous materials and would not adversely affect human health and the environment.

- The Airport Authority would require, when applicable, all contractors as part of the Proposed Action to provide proof of proper disposal for all generated waste to permitted facilities.
- To further minimize the potential spread of environmental contamination and worker exposure during construction, a Materials Management Plan (MMP) would be required for construction activities at the NPL Site. The MMP would include procedures for construction worker health and safety, cuts and excavation, erosion and sediment control, soil management, fill and reconstruction, site security, traffic control, contact water, dust mitigation, and equipment decontamination.[104] Per the restrictive covenants filed with the Wake County Register of Deeds, the MMP must be approved by the USEPA prior to beginning work onsite.

[103] NCDEQ, Solid Waste On-line: https://deq.nc.gov/about/divisions/waste-management/sw/data, Accessed August 11, 2021.
[104] Lumley Road Relocation Project – Environmental Compliance Discussion; July 28, 2021 (Lumley Road Environmental Challenges_07-28-2021_FINAL.pdf (global.gsp))

- An ESC Plan will be developed prior to construction, approved by the NCDEQ and implemented. BMPs and erosion control measures will be identified in the ESC Plan to control and contain runoff that could make its way to navigable waterways to minimize the sediment impact.
- The Airport Authority shall notify the FAA and NCDEQ if testing of the borings adjacent to the H-6 area shows contamination. The Airport Authority will provide a plan to handle any contaminated material associated with this site to both agencies and will wait for agency approval prior to disturbing the site. In addition, prior to commencing operations in the H-6 area, the Airport Authority and the contractor will comply with any resulting NCDEQ and or USEPA requirements for transport and disposal of contaminated materials.
- Before construction commences in each of these areas, coordination will be conducted and final plans will be reviewed and approved by USEPA's Superfund Division, and applicable permits and/or approvals received from State and Federal agencies, for the following activities:
    - Lumley Road relocation
    - Disposal of any contaminated material encountered on the Estes Trucking Site
    - Conveyor system support structures within Brier Creek Reservoir
    - Placement and/or removal of navigational aids and fill within Brier Creek Reservoir
    - Placement of fill in the 100-year floodplain
- If during Final Design of the Lumley Road relocation it is determined that existing monitoring wells would need to be removed, the Airport Authority would be responsible for coordinating the decommissioning of them with the USEPA and in accordance with state requirements and relocation if required by USEPA.

The following minimization measures and BMPs are incorporated to further minimize hazardous material impacts from the Proposed Action.

- Equipment containing oil will be inspected regularly and prior to beginning work every day. Spill response materials will be kept on hand and stocked at all times. In the event of a spill, the contractors will assess the area for safety and notify the relevant parties.
- All activities that involve disturbing or excavating soils will be performed in accordance with applicable federal, state, and local regulations. Unanticipated contaminated materials may be encountered during construction activities. These materials would be characterized, segregated from uncontaminated soils, and disposed of by a certified hauler at an appropriate permitted disposal facility or kept on-site.
- Prior to demolition of the structures associated with the Proposed Action, an LBP survey will be performed for any painted or similarly coated surfaces and an ACM survey would be performed to identify potential asbestos inside each structure.

- Unknown, abandoned, or out-of-use petroleum underground storage tanks (USTs) or aboveground storage tanks (ASTs) encountered during construction will be removed. Additionally, all construction contractors will be required to abide by the Airport's SPCC that satisfies USEPA oil pollution prevention regulations. Should any materials contaminated with petroleum (including stained soil, odors, or free product) be encountered during construction, the finding will be reported immediately to the Airport's Fire Department to determine whether explosion or inhalation hazards exist, and the material excavated and stored on site for testing in accordance with applicable regulations. Any petroleum spills will be contained, and the area of impact will be properly restored. The NCDEQ Division of Waste Management UST Section will be notified in the event any material contaminated with petroleum is encountered, a petroleum spill of significant quality takes place, an "orphaned" UST is discovered during any excavation, and regarding the use of any proposed or on-site petroleum USTs or ASTs.
- If any potentially contaminated groundwater were encountered during dewatering, the Airport Authority would properly test and treat the water prior to discharge in accordance with the NPDES permit and local dewatering and groundwater discharge approval and permit requirements. Compliance with regulatory requirements would ensure dewatering activities, if required, would not violate discharge requirements or degrade groundwater quality.

4.7 Historical, Architectural, Archaeological, and Cultural Resources

This section presents the analysis of potential impacts to Historical, Architectural, Archaeological, and Cultural Resources as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for Historical, Architectural, Archaeological, and Cultural Resources are discussed in Chapter 3, Section 3.7.

4.7.1 Significance Threshold

The FAA has not established a significance threshold for the full range of historical, architectural, archaeological, and cultural resources in FAA Order 1050.1F; however, the FAA has identified a factor to consider when evaluating the context and intensity of potential environmental impacts for historical, architectural, archaeological, and cultural resources (see Exhibit 4-1 of FAA Order 1050.1F). This factor includes, but is not limited to, situations in which the Proposed Action would result in a finding of adverse effect through the Section 106 process. Mitigation of adverse effects may be considered sufficient to keep impacts below levels of significance.

4.7.2 Future Conditions: 2028

4.7.2.1 No Action Alternative

No physical changes to the Airport would occur under this alternative. Therefore, there would be no change to historic properties for the No Action Alternative in 2028.

4.7.2.2 Proposed Action

Direct Effects

The Proposed Action includes the use of fill material for the replacement runway. The Airport Authority has identified potential borrow sites to obtain the fill material on existing Airport property. As discussed in Section 3.7 and Appendix E Section 106 Consultation, the FAA has determined none of the archaeological sites located during the pedestrian archaeological field surveys are listed or considered eligible for listing in the NRHP. Two recorded cemeteries and one previously undocumented cemetery

were identified in the potential borrow sites. The Proposed Action does not include relocation of any cemeteries or burial remains because those areas will be avoided.

There are two options for moving the borrow material to the runway site: trucking and conveyor belt. Both options are not expected to have any additional impact on historic properties. In addition, the Proposed Action includes demolition of four buildings that are vacant on Airport property. The SHPO concurred with FAA's conclusion by letter dated December 1, 2022 that none of the four buildings are eligible for listing in the NRHP. Therefore, there would be no historic properties affected by the Proposed Action within the Direct APE.

Indirect Effects

There were no historic properties identified in the Indirect APE. Therefore, there would be no historic properties affected by the Proposed Undertaking within the Indirect APE.

FAA Finding

The FAA found the proposed undertaking would not affect any historic properties listed or eligible for listing on the NRHP under 36 CFR Part 800.4(d)(1) within the Direct APE and the Indirect APE. The FAA initiated consultation under Section 106 with SHPO on November 1, 2022. On December 1, 2022, the SHPO responded with a letter concurring with FAA's determination that there were no historic buildings that were eligible for listing, and as such there would be no adverse impacts to any historical buildings. On January 9, 2023, SHPO responded with a letter concurring with FAA's determination that there are no historic sites eligible for listing in the NRHP. (See Appendix E Section 106 Consultation for FAA's coordination with SHPO). There is always potential for an inadvertent discovery. Therefore, special conditions will be required to ensure that in the event of an historical resource being encountered, Section 106 of the National Historical Preservation Act would be complied with.

4.7.3 Future Conditions: 2033

4.7.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon historic properties as described for the Future (2028) No Action Alternative.

4.7.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon historic properties as described for the Future (2028) Proposed Action.

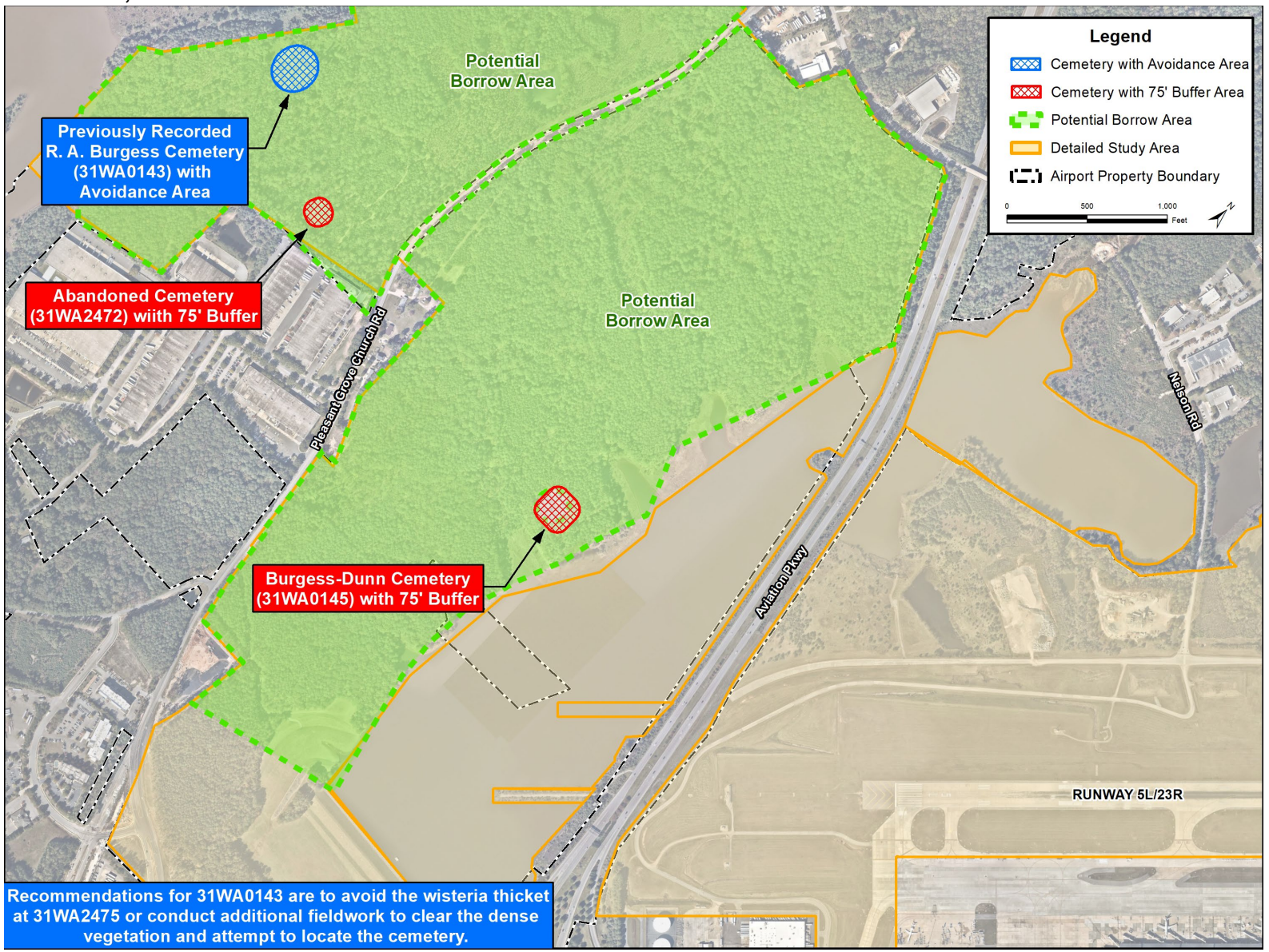
4.7.4 Mitigation, Avoidance, and Minimization Measures

The Proposed Action includes the following mitigation measures.

- If previously undocumented cemeteries, buried resources, or human remains are discovered or identified by contractors during construction activities, the Airport Authority shall cease all work in the immediate vicinity of the discovery. A buffer zone identified as a 100-meter radius around the discovery shall be established. Construction may continue outside the buffer zone. The Airport Authority, by and through its construction contractor, shall implement interim measures to protect the discovery from looting and vandalism, including, but not limited to, flagging or fencing the area, and providing additional security.

- Upon discovery, the Airport Authority shall notify the FAA and the SHPO of the discovery and the project archaeologist shall investigate the discovery and report to the FAA, SHPO and the Airport Authority its conclusions if the discovery is eligible for listing. The Airport Authority shall wait for conclusion of coordination between the SHPO and the FAA prior to commencing operations in the area of the discovery.
- If human remains are found the provisions of North Carolina General Statute Chapter 70, Article 3 would apply. The construction contractor would immediately notify the Airport Authority and the Airport Authority would notify local law enforcement / the county or state medical examiner. After preliminary review by local law enforcement and the medical examiner, if needed, the state archaeologist would then evaluate the remains for its significance and jurisdiction.
- One previously recorded cemetery (R. A. Burgess Cemetery 31WA0143) is likely within a dense wisteria thicket at 31WA2475 that is recommended as not eligible for the NRHP. The dense wisteria thicket will be avoided or additional fieldwork will be conducted to clear the vegetation and attempt to locate the cemetery. Due to the presence of two cemeteries (Burgess-Dunn Family Cemetery 31WA0145 and Abandoned Cemetery 31WA2472) in the proposed borrow site areas, avoidance will be required during construction of the Proposed Action. A 75-foot buffer zone has been established around the furthest extent of the boundaries of each cemetery. The boundaries of each cemetery and of the buffer zone will be flagged in the field and will be recorded with Global Positioning System (GPS) with sub-meter accuracy. The buffer zone will be fenced prior to the initiation of construction activities to provide protection from inadvertent damage by heavy machinery and to ensure that the immediate surroundings of the burial areas are maintained. No equipment staging or hauling roads will be permitted within the buffer zone. Following construction activities, graded and excavated areas adjacent to the cemeteries will be stabilized to prevent erosion or undermining of the cemetery and a cleared access route to the cemeteries will be established so family members can visit the burial areas after construction activities have ceased. The avoidance areas are shown in Exhibit 4-4. There are no current access routes to these cemeteries which are located entirely on Airport property. Family members who wish to visit these locations prior to, during, and after construction must give notification to the Airport Authority, as currently required.

EXHIBIT 4-4, AVOIDANCE AREA FOR CEMETERIES



Source: Legacy Research, 2022.

4.8 Land Use

This section presents the analysis of potential land use compatibility of the Future No Action Alternative and the Proposed Action, including potential conflicts with surrounding land uses and zoning. The existing conditions for land use are discussed in Chapter 3, Section 3.8. According to FAA AC 15/5190-4B, *Airport Land Use Compatibility Planning*, airport-compatible land uses are those that can coexist with a nearby airport without constraining the safe and efficient operation of the airport or expose people living or working nearby to significant environmental impacts.

4.8.1 Significance Threshold

The FAA has not established a significance threshold for land use, and the FAA has not provided specific factors to consider in making a significance determination for land use. An inconsistency with surrounding land uses and zoning by itself does not automatically result in a significant impact. The determination that significant impacts exist in the land use impact category is normally dependent on the significance of other impacts. The compatibility of existing and planned land uses of an airport Proposed Action is usually associated with noise impacts. In addition to the impacts of noise on land use compatibility, other potential impacts of FAA actions may also affect land use compatibility (such as disruption or relocation of communities, induced socioeconomic impacts, or land uses protected under Section 4(f) of the USDOT Act).

Therefore, potential impacts in other environmental resource categories are cross-referenced in this section but are described in detail under the appropriate impact category to avoid duplication. Potential impacts to Section 4(f) resources are discussed in Section 4.5. Potential impacts on noise compatible land use are discussed in Section 4.10. Potential impacts related to potential disruptions to communities or relocation of residences or businesses is discussed in Section 4.11.

4.8.2 Future Conditions: 2028

4.8.2.1 No Action Alternative

Potential Land Use Changes Due to Noise Impacts

As disclosed in Section 4.10 and Appendix F Noise, the 65 Day-Night Average Sound Level (DNL) Future (2028) No Action Alternative noise exposure contour is considerably larger than the Existing (2019) Conditions exposure contour due to the potential overall increase of aircraft operations. There were 17 housing units with an estimated population of 45 people within the 65+ DNL for the Existing (2019) Conditions noise exposure contour. There would be a total of 126 housing units with an estimated population of 329 people within the 65+ DNL Future (2028) No Action Alternative noise exposure contour. This would be an increase of 109 housing units within the 65+ DNL.

Other Potential Land Use Changes

There would be no other potential land use changes from the existing conditions to the No Action Alternative in 2028. Therefore, the No Action Alternative would not cause any land use incompatibilities or inconsistencies with local land use plans that are not already occurring or planned to occur.

4.8.2.2 Proposed Action

Potential Land Use Changes / Impacts to Section 4(f) Resources

As described in Section 4.5, the Proposed Action would not result in the physical or constructive use of any Section 4(f) resources and therefore would not have any land use impacts on any Section 4(f) resources.

Potential Land Use Changes Due to Noise Impacts

As disclosed in Section 4.10 and Appendix F Noise, the Proposed Action would decrease the total number of housing units and population within the 65+ DNL as compared to the No Action Alternative in 2028. There would be a total of 45 housing units with an estimated population of 118 people within the 65+ DNL Future (2028) Proposed Action noise exposure contour. This would be a decrease of 81 housing units within the 65+ DNL as compared to the Future (2028) No Action Alternative. However, one church (the Sorrell Grove Baptist Church) and one fire station (Raleigh Fire Station #29) would be newly impacted due to the Proposed Action. Of these homes, 36 will be exposed to noise increases of 1.5 dB or more within the 65 DNL noise contour. These homes and the church and fire station would be offered noise insulation to make the structures compatible if appropriate. See Section 4.10 for noise mitigation requirements.

Potential Land Use Changes Due to Socioeconomic Impacts

As disclosed in Section 4.11, the Proposed Action would not result in significant relocation or disruption of established communities or impacts to businesses located on or off-Airport. While four buildings would be demolished as part of the Lumley Road relocation, these buildings are vacant, and no business relocation would be required. The Proposed Action would acquire a portion of several properties to accommodate the relocated Lumley roadway and utility rights of way. Final design of Lumley Road relocation is not yet complete. Negotiations are ongoing related to this property acquisition and would not be completed until after FAA has made a decision on this EA. Because the property acquisition is only for a portion of the property, the existing businesses could continue to operate after the Proposed Action is implemented and would not have to relocate.

There is one mobile home that will be within the future 65 DNL noise contour. The mobile home will not be able to be compatible with the future noise level. An offer to relocate the mobile home or purchase of the property would have to be made to comply with FAA noise policy. Please see Section 4.10 noise mitigation requirements.

Consistency with Local Land Use Plans / Policies

A review of existing plans that may concern development in the GSA was conducted, including the City of Raleigh System Plan,[105] and the Wake County Park Facility Master Plan.[106] The Proposed Action would not result in the use of any parks including the acquisition of park property and therefore would be consistent with these existing plans.

The Proposed Action does include placing fill into the Brier Creek Reservoir to accommodate the relocated runway navigational lights. Wake County is obligated to perform maintenance on the Brier Creek Reservoir, perform annual inspections, and prohibit the development, encroachment or installation of any improvements that interfere with their operation or modify their original design. With mitigation, the Proposed Action would be consistent with the Crabtree Creek Watershed Policy. See Section 4.13 for a detailed discussion of the consistency with the Crabtree Creek Watershed Policy.

The portion of the potential parcels to be acquired as part of the Proposed Action are currently considered commercial/manufacturing land use. The Proposed Action would change this commercial/manufacturing land use to airport property. As disclosed in Section 4.10 and Appendix F Noise, the Airport Authority would offer to acquire one residential property (the mobile home). If accepted by the property owner, the Proposed Action would change this residential land use to airport property. The Proposed Action (including the mobile home) would still be consistent with the Unified

[105] City of Raleigh Parks, Recreation Cultural Resources Department, System Plan, 2014
[106] Wake County, Parks Facility Master Plan Updates, Final Report, February 2017.

Development Ordinances (UDO) of the local governments surrounding RDU and the existing airport overlay districts as described in Chapter 3, Section 3.8.

The Proposed Action would be consistent with future plans and would not cause any land use incompatibilities or inconsistencies with local land use plans. Therefore, the Proposed Action would not result in significant land use impacts.

Land Use Assurance

The FAA has received the required Land Use Assurance letter that the Airport Authority would continue to work closely with the local municipalities to ensure appropriate land use regulations are adopted and enforced in accordance with 49 U.S.C. § 47107(a)(10) to ensure land uses are compatible with airport operations. A copy of the land use assurance letter dated June 27, 2022, is included in **Appendix I Land Use Assurance.**

Potential Land Use Changes Due to Transportation of Fill Material

The Proposed Action includes the use of fill from borrow site areas, which would be transported through trucking or a conveyor system. Neither the trucking nor the conveyor system would have a land use change because trucking would occur on existing roadways and the conveyor system would be temporary.

4.8.3 Future Conditions: 2033

4.8.3.1 No Action Alternative

Potential Land Use Changes Due to Noise Impacts

As disclosed in Section 4.10 and Appendix F Noise, the Future (2033) No Action Alternative would increase the total number of housing units and population within the 65+ DNL as compared to Future (2028) No Action Alternative due to the potential overall increase of aircraft operations. There would be 248 total housing units within the 65+ DNL for the No Action Alternative in 2033. This would be an increase of 122 housing units within the 65+ DNL as compared to the Future (2028) No Action Alternative.

4.8.3.2 Proposed Action

Potential Land Use Changes Due to Noise Impacts

As disclosed in Section 4.10 and Appendix F Noise, the Proposed Action would decrease the total number of housing units and population within the 65+ DNL as compared to the No Action Alternative in 2033. There would be 248 total housing units within the 65+ DNL for the No Action Alternative in 2033. There would be 134 total housing units within the 65+ DNL for the Proposed Action in 2033. Overall, the Proposed Action would result in 114 fewer housing units and one additional noise-sensitive facility within the 65+ DNL as compared to the No Action Alternative.

However, the analysis concluded that the Future (2033) Proposed Action would result in new noise-sensitive areas experiencing an increase in noise of DNL 1.5 dB or more, at or above 65 DNL noise exposure when compared to the No Action Alternative in 2033. There would be 36 single family housing units, one mobile home, one church (Sorrell Grove Baptist Church), and one fire station (Raleigh Fire Station #29) located within the DNL 1.5 dB increase area. Mitigation for the 36 single family housing units, the church, and the fire station would include an offer of sound insulation. Sound insulation involves reducing aircraft noise levels inside noise-sensitive structures by decreasing the paths by which sound enters a building. Sound insulation methods typically include window and door replacement, caulking, weather-stripping, and installing central air ventilation so that the windows can be kept closed to maintain the noise reduction capability of the structure. With the Proposed Action, the

residential land use would remain the same and with mitigation non-compatible land use of noise sensitive facilities (single family housing units or churches within the DNL 1.5 dB increase area) would be compatible and would result in no land use impacts to these structures.

A single mobile home unit is located within the future DNL 65 and within the area of significant noise increase. Since mobile homes cannot be effectively sound insulated due to the type of construction, the Airport Authority would offer to acquire the mobile home and the property on which it sits. Residents of the mobile home would also be offered relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. With the mitigation, the Proposed Action would possibly convert one residential property to airport property but would result in no significant land use impacts.

Other Potential Land Use Changes
Aside from noise, the Future (2033) Proposed Action would have the same effects upon land uses as described for the Future (2028) Proposed Action.

4.8.4 Mitigation, Avoidance, and Minimization Measures

As stated in FAA's 1050.1F Desk Reference, mitigation activities proposed to address land use impacts would normally be discussed under the appropriate impact category and cross-referenced to the Land Use section. Therefore, the following describes the special conditions that would be required by the FAA to mitigate potential impacts. These mitigation measures can also be found in the Noise Section, Section 4.10:

- Offer to sound insulate 36 single-family housing units,[107] the Raleigh Fire Station #29, and the Sorrell Grove Baptist Church (if the buildings are eligible and the owners agree) under FAA Order 5100.38D.[108] If the housing units, fire station, and the church are eligible and cannot be sound insulated to the internal required noise level per current FAA Order 5100.38, the Airport Authority would offer to acquire the property and offer relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 as amended.
- Offer to buy one mobile home and/or the property it's located on. Since mobile homes cannot be effectively sound insulated due to the type of construction, the owner of the property would be given an offer from the Airport Authority to acquire the property and/or the mobile home. Residents of the mobile home would also be offered relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 as amended.[109]

[107] It should be noted that an avigation easement already is attached to some of the properties located within the 2033 Proposed Action 65 DNL noise contour and also within the area of a 1.5 dB increase within the 65 DNL noise contour. The terms of the avigation easement on these properties will need to be evaluated prior to implementation of the mitigation for the Proposed Action. According to existing Airport Authority data, it is estimated that seven of the 37 total single family housing units within the 1.5 dB or greater increase within the 65 DNL currently have an avigation easement on the property. The mobile home is not within the existing avigation easement area.

[108] FAA Order 5100.38D, Change 1, effective February 26, 2019, *Airport Improvement Program Handbook*, Appendix R. Noise Compatibility Planning/Projects, Section R-8. Interior Noise Level

[109] FAA grant agreements require that the sponsor will: 1. Comply with the land acquisition policies in Subpart B of 49 CFR Part 24 (described in Chapters 2 and 3), to the greatest extent practicable under State law, in acquiring real property. 2. Pay or reimburse property owners for necessary expenses, as specified in 49 CFR 24.10. 3. Provide a relocation assistance program offering the services described in Subpart C of 49 CFR Part 24 and provide fair and reasonable relocation payments and assistance to displaced persons, as required in Subparts D and E of 49 CFR Part 24. (See Chapters 4, 5, and 6) 4. Make comparable replacement dwellings available to displaced persons within a reasonable period prior to displacement, in accordance with Subpart E of 49 CFR Part 24.

4.9 Natural Resources and Energy Supply

This section presents the potential impacts to natural resources and energy supply resulting from the Future No Action Alternative and the Proposed Action. The existing conditions for natural resources and energy supply are discussed in Chapter 3, Section 3.9.

4.9.1 Significance Threshold

The FAA has not established a significance threshold for natural resources and energy supply in FAA Order 1050.1F; however, the FAA has identified a factor to consider when evaluating the context and intensity of potential environmental impacts for natural resources and energy supply (see Exhibit 4-1 of FAA Order 1050.1F). This factor is not intended to be a threshold. If this factor exists, there is not necessarily a significant impact. This factor includes, but is not limited to, situations in which the Proposed Action would have the potential to cause demand to exceed available or future supplies of these resources. For most actions, changes in energy demands or other natural resource consumption for FAA projects will not result in significant impacts.

4.9.2 Future Conditions: 2028

4.9.2.1 No Action Alternative

Natural Resources

Resources such as sand, gravel, stone, concrete, asphalt, water, wood, metals, plastic, and other resources would continue to be used for normal airport construction and maintenance. It is expected that these materials would be used for general maintenance activities and for normal airport operations.

Electricity

No buildings or facilities would be constructed due to this alternative. Electricity usage would continue to power the existing facilities. Current forecasts project growth in passengers at RDU as compared to the existing conditions. Additional passengers would likely increase electricity consumption. However, it is anticipated that this potential increase in electricity could be met by existing and future supplies.

Natural Gas

No new buildings or facilities would be constructed that would require natural gas. Natural gas would continue to power the existing facilities. Current forecasts project growth in passengers at RDU as compared to the existing conditions. Additional passengers would likely increase natural gas consumption. However, it is anticipated that this potential increase in natural gas could be met by existing and future supplies.

Fuel Consumption

Aviation fuel demand is a function of the number of operations at the Airport and how they operate. This includes the length of time the aircraft are operating while on the ground and during takeoff and climb out, and the fuel required for the aircraft to reach the flight destination. Aircraft fuel, typically Jet-A for jet engines or AvGas for piston engines, is provided to airport users by various mobile refuelers that obtain and sell fuel through existing contracts and on an as-needed basis. Current forecasts project growth in aircraft operations at RDU as compared to the existing conditions. Additional aircraft operations would likely increase fuel consumption. However, it is anticipated that this potential increase in fuel demand could be met by existing and future supplies.

4.9.2.2 Proposed Action

Natural Resources

For operational purposes, there would be no increased demand for natural resources due to the Proposed Action as compared to the No Action Alternative. However, as a result of implementing the Proposed Action, proposed construction activities would require the use of typical paving and construction materials such as sand, gravel, wood, and other similar materials such as metal wiring and plastic insulation for new lighting. These materials are not in short supply and construction of the Proposed Action would not exceed the available supply of these materials.

Construction activities would require natural resources such as dirt for fill material, concrete, asphalt, and water. Up to five million cubic yards of earthen fill would be required for the relocated runway. This fill would come from Airport property. Based on drilling analysis performed by the Airport, there is adequate fill located in Borrow Site 1 to supply the material needed for the Proposed Action. Borrow Site 1 is located distant from William B. Umstead State Park on the opposite side of the Airport.

Approximately 150 million gallons of water would also be required from Brier Creek Reservoir for hydrocompression of fill material and mixing of concrete. The water would be used gradually over time so as not to deplete the reservoir. The FAA has coordinated with the USEPA for this project. In a meeting on June 28, 2022, the USEPA stated there was no major concern with the use of water from Brier Creek Reservoir for hydrocompression of the fill dirt material needed for project construction. This was confirmed in an email from USEPA dated November 1, 2022.[110] The Town of Cary indicated they have water capacity to support the RDU Airport.[111] Coordination with Wake County is ongoing to confirm the use of water from Brier Creek Reservoir for the project.

Electricity

As part of the potential grading activities at the borrow site, there is still a possibility to use a conveyor belt to transport the fill material. The conveyor belt would result in a temporary increase in electricity usage. This increase would be minor in comparison to the overall Airport's usage of electricity.

Additional airfield lighting would be installed for the proposed replacement Runway 5L/23R, and for taxiways as required for safe operations as a result of implementing the Proposed Action. This additional lighting would cause an increase in demand for electricity. Airfield lighting typically accounts for only a fraction of the total electricity consumption at a commercial airport. For this analysis it was conservatively assumed that airfield lighting accounted for a maximum of ten percent of the total electrical demand at the Airport, or approximately 6,022,510 kWh.[112] With the addition of the new relocated Runway 5L/23R, additional taxiway connectors, and the conversion of existing Runway 5L/23R to taxiway, the total airfield pavement would increase by approximately 91 acres, representing a 39.7 percent increase from the existing condition. With the additional lighting requirements for the new airfield pavement, the electrical demand associated with the Proposed Action would increase accordingly. Assuming the same ratio of electricity demand to area of airfield pavement, the total annual electricity demand would increase to 8,413,447 kWh, a difference of 2,390,937 kWh or a four percent increase from the existing total airport demand of approximately 60,225,100 kWh per year.

[110] Email from Hilary Thornton, USEPA Region 4 to Jackie Sweatt-Essick, FAA RE: Raleigh Durham EA Follow-up, November 1, 2022.

[111] Email from Jamie Revels, P.E. Utilities Director Cary, to Delia Chi, Raleigh Durham Airport Authority, RE: RDU EA – Water Capabilities, December 5, 2022.

[112] This is a conservative estimate based on other airports, and research presented in "*An integrated research for architecture-based energy management in sustainable airports (2017)*" by Murat Pasa Uysala and M. Ziya Sogutb.

The FAA and the Airport Authority consulted with the local energy provider to understand the energy and resource constraints of the area. The electric utility, Duke-Progress Energy, was contacted to determine if the utility has the capacity to meet the estimated increase in demand. Duke-Progress Energy confirmed they have sufficient capacity to supply the potential increase in electricity demand due to implementing the Proposed Action.[113] While implementing the Proposed Action would increase the demand for electricity, the potential demand would not exceed the existing and future supplies.

Natural Gas

The Proposed Action does not include any new buildings or facilities that would require natural gas. There would be no increase in demand for natural gas for the Proposed Action as compared to the No Action Alternative in 2028.

Fuel Consumption

There would be no change to the number of aircraft operations or fleet mix as a result of the Proposed Action as compared to the No Action Alternative. However, as a result of implementing the Proposed Action, proposed airfield improvements would be constructed that would cause a portion of aircraft operations to taxi further than they would with the No Action Alternative. The proposed replacement Runway 5L/23R would be constructed approximately 537 feet further from the existing terminal facilities, which would cause a slight overall increase in average aircraft taxi distance. Due to the small increase in average taxi distance, there would be a corresponding small increase in average aircraft fuel consumption.

Additionally, a temporary increase in demand for diesel fuel and unleaded gasoline is anticipated for construction vehicles. This includes the trucking of the fill material from the borrow site area using diesel trucks. While the construction and operation of the Proposed Action would potentially increase the demand for Jet-A, AvGas, unleaded gasoline, and diesel fuel, any increase in demand for fuel is expected to be small and would not exceed the existing and future supplies.

4.9.3 Future Conditions: 2033

4.9.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon natural resources and energy supply as described for the Future (2028) No Action Alternative Action except for minor increases for those resources affected by a small increase in operations.

4.9.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon natural resources and energy supply as described for the Future (2028) Proposed Action except for minor increases for those resources affected by a small increase in operations.

4.9.4 Mitigation, Avoidance, and Minimization Measures

The Proposed Action's projected demand for energy or natural resources would not exceed current or future supplies in the Research Triangle Region. Therefore, no mitigation measures are required.

4.10 Noise and Noise-Compatible Land Use

This section presents the analysis of aircraft noise exposure to surrounding communities as a result of the Future No Action Alternative and the Proposed Action. Additional information on the background

[113] Adrianne Elder, Duke Energy email to Delia Chi, Raleigh Durham Airport Authority, RE: Runway 5L/23R Replacement Project Environmental Assessment – Electrical Demand Inquiry, November 21, 2022.

and characteristics of noise as well as the noise modeling and inputs to the model are provided in Appendix F Noise. The existing conditions for noise and noise-compatible land use are discussed in Chapter 3, Section 3.10 and Appendix F Noise.

4.10.1 Significance Threshold

According to FAA Order 1050.1F, the FAA's significance threshold for noise is if the Proposed Action would increase noise by DNL 1.5 decibels (dB) or more for a noise sensitive area that is exposed to noise at or above the 65 DNL noise exposure level, or that will be exposed at or above the 65 DNL noise exposure due to a DNL 1.5 dB or greater increase, when compared to the No Action Alternative for the same timeframe. For example, an increase from 65.5 DNL to 67 DNL is considered a significant impact, as is an increase from 63.5 DNL to 65 DNL.

4.10.2 Methodology

The Proposed Action would result in construction and operational noise impacts. Both noise categories were included in the noise analysis (see Appendix F Noise). The construction noise analysis was based on the use of construction equipment, including the trucking of fill material. For this analysis, trucking of the fill material was used as a conservative approach in estimating potential noise impacts, which was assumed to be greater than using a conveyor belt system. In addition, the location of the drive systems for the conveyor system would be generally isolated within the borrow site and not adjacent to residences whereas the trucks would use public thoroughfares, exposing the public to engine noise.

Blasting would likely occur at the borrow sites to break up rock material. There are residences that are directly adjacent to Airport property and the proposed borrow sites. The Airport Authority would leave 100 feet of the existing trees and vegetation in place around the perimeter of the borrow sites as a buffer area which would also buffer these homes. However there still may be noise and vibrations from the blasting activity. A-weighted decibel (dBA) is an expression of the relative loudness of sounds as perceived by the human ear. The Federal Highway Administration identifies a value of 94 dBA for blasting noise at a reference distance of 50 feet.[114,] It is anticipated the blasting noise at a reference distance of 100 feet, including the 100 feet of vegetation buffer, would be less than 94 dBA (blasting noise at a reference distance of 50 feet). However, the environmental effects of noise from blasting activities vary depending on the size, frequency, and location of the blast and on atmospheric conditions such as wind and humidity. Final design for the Proposed Action is not yet complete; therefore, the exact number and location of blasting activities is not yet known. However, blasting could occur on any day that borrow material would be taken from the site. The expected duration of borrow sourcing is expected to last approximately 16 months during which periodic blasting could occur.

The Airport Authority will prepare and implement a Blasting Plan to ensure not only the safety of people in the area, but also to manage noise and prevent property damage from the activity. The Blasting Plan would be in compliance with all applicable federal, state, and local laws and regulations and the Airport Authority would obtain all required federal, state, and local blasting-related permits. No blasting operations will be undertaken until such permits have been obtained. In addition, all operations in connection with the transportation, storage, and use of explosives shall conform to all federal, state and local regulations and explosive manufacturers' instructions. Blasting will be permitted only when proper precautions are taken for the safety of all persons, work, and property.

[114] Federal Highway Administration, Construction Noise Handbook, 9.0 Construction Equipment Noise Levels and Ranges. Online at http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm. Accessed January 2023.

The Blasting Plan would include, but not be limited to, community notification protocols such as providing written notice in advance of blasting to nearby residents and safety procedures. The blasting would only occur during daytime hours. Appropriate flags, barricades, and warning signals will be used to ensure safety during blasting operations. As part of the Blasting Plan, the Airport Authority would utilize a vibration consultant to advise on the explosive charge weights. This Blasting Plan must consist of hole size, depth, spacing, burden, type of explosives, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock, and depth of overburden if any.

Operational impacts of airport-related noise levels upon the surrounding area are presented in terms of the number and type of noise-sensitive land uses located within the noise contours for the No Action Alternative and the Proposed Action. The analysis of noise exposure around RDU was prepared using AEDT, Version 3d. Inputs to the AEDT include number of aircraft operations during the time period evaluated, the types of aircraft flown, time of day aircraft operations occur, runway definition, how frequently each runway is used for arriving and departing aircraft, the flight routes used when arriving to and departing from the runways, the proportional use of those flight routes, and the length of the trips. The forecast of aircraft activity is provided in **Table 4-14**. The Proposed Action's purpose is not to increase the capacity of the Airport but to provide a structurally sound primary runway at RDU that maintains its current runway capabilities. Therefore, there would be the same number of aircraft operations with the Proposed Action as with the No Action Alternative.

TABLE 4-14, AIRCRAFT ACTIVITY FORECAST

YEAR	DOMESTIC	INTERNATIONAL	TOTAL	FREIGHTER	AIR TAXI/ GENERAL AVIATION	MILITARY	GRAND TOTAL
2019	139,632	4,466	**144,098**	6,110	68,837	2,581	**221,626**
2020	65,278	1,038	**66,316**	6,362	54,742	2,990	**130,410**
2021	101,296	2,010	**103,306**	6,430	61,790	2,990	**174,516**
2022	123,200	3,580	**126,780**	6,660	63,120	2,990	**199,550**
2023	137,260	4,120	**141,380**	6,890	64,450	2,990	**215,710**
2024	149,280	4,640	**153,920**	7,120	65,780	2,990	**229,810**
2025	157,720	4,980	**162,700**	7,350	67,110	2,990	**240,150**
2026	161,800	5,140	**166,940**	7,580	68,440	2,990	**245,950**
2027	165,880	5,320	**171,200**	7,810	69,770	2,990	**251,770**
2028	169,940	5,540	**175,480**	8,040	71,100	2,990	**257,610**
2029	172,880	6,680	**179,560**	8,260	72,430	2,990	**263,240**
2030	177,300	6,840	**184,140**	8,490	73,760	2,990	**269,380**
2031	181,720	7,000	**188,720**	8,720	75,090	2,990	**275,520**
2032	186,160	7,140	**193,300**	8,940	76,420	2,990	**281,650**
2033	190,640	7,300	**197,940**	9,170	77,750	2,990	**287,850**

Note: Forecast based on calendar year.
Sources: Raleigh-Durham Airport Authority, Raleigh-Durham International Airport: Activity Statistics. Landrum & Brown Analysis. See also Appendix B Purpose and Need and Alternatives.

The AEDT model calculates noise exposure for the area around the airport and results in noise contour maps of equal noise exposure using the DNL metric. Maps containing the noise contours of 65, 70, and 75 DNL were produced for the Future No Action Alternative and the Proposed Action for 2028 and 2033. The contours represent average-annual day conditions. The FAA and the Airport Authority are utilizing the existing arrival and departure procedures for the proposed runway to approximate the

potential environmental impacts evaluated in this EA. If different arrival and departure procedures are needed based on final design and updated obstructions, the FAA will reevaluate this EA to determine if any additional NEPA review is required.

4.10.3 Future Conditions: 2028

4.10.3.1 No Action Alternative

Based on the aircraft activity forecast, there would be an increase in aircraft operations from the existing conditions to the Future (2028) No Action Alternative. There is a total of 257,610 annual aircraft operations forecast for 2028 at RDU. The Noise Exposure Contour for the Future (2028) No Action Alternative is presented in **Exhibit 4-5**.

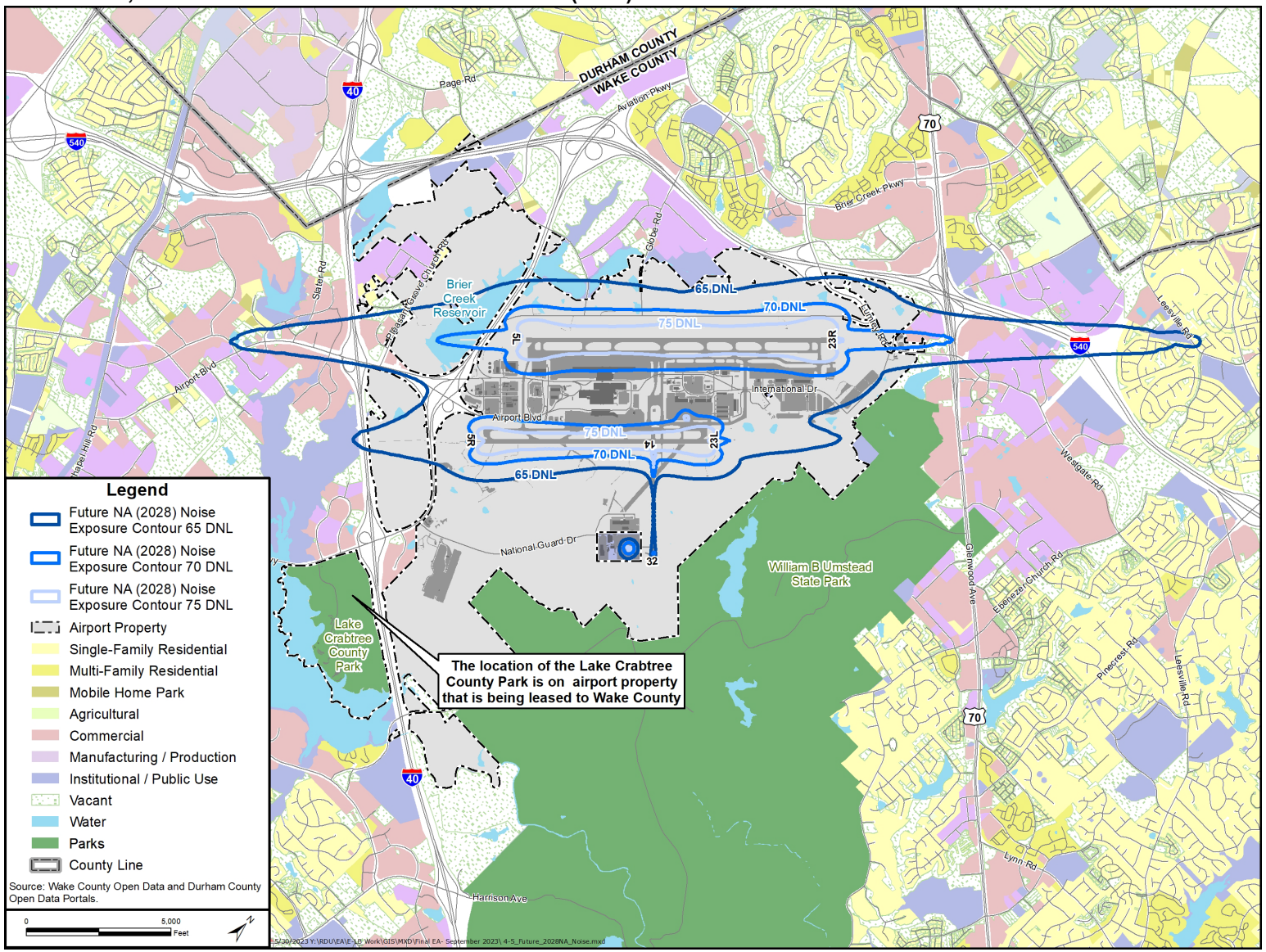
The 65+ DNL of the Future (2028) No Action Alternative Noise Exposure Contour encompasses 4.39 square miles. The noise exposure contour extends outward from the parallel runway ends. The noise exposure contour extends further out from the future Runway 5L/23R due to the greater usage of this runway compared to the existing use of Runway 5L/23R. There would be a total of 126 housing units with an estimated population of 329 people within the 65+DNL. There are no public schools, churches/places of worship, nursing homes, hospitals, or libraries within any of the Future (2028) No Action Alternative contours.

4.10.3.2 Proposed Action

There would be no change to the forecasted number of aircraft operations or fleet mix as a result of implementing the Proposed Action. However, as a result of implementing the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R which would influence the noise contours. The Noise Exposure Contour for the Future (2028) Proposed Action is presented in **Exhibit 4-6.** The 65+ DNL of the Future (2028) Proposed Action Noise Exposure Contour encompasses 4.23 square miles. The noise exposure contour extends outward from the parallel runway ends. There would be a total of 45 housing units with an estimated population of 118 people within the 65+DNL. One church (the Sorrell Grove Baptist Church) and one public fire station (Raleigh Fire Station #29) are located within the 65 DNL contour. There are no houses, churches or public fire stations within the 70 DNL. There are no public schools, nursing homes, hospitals, or libraries within any of the Future (2028) Proposed Action contours.

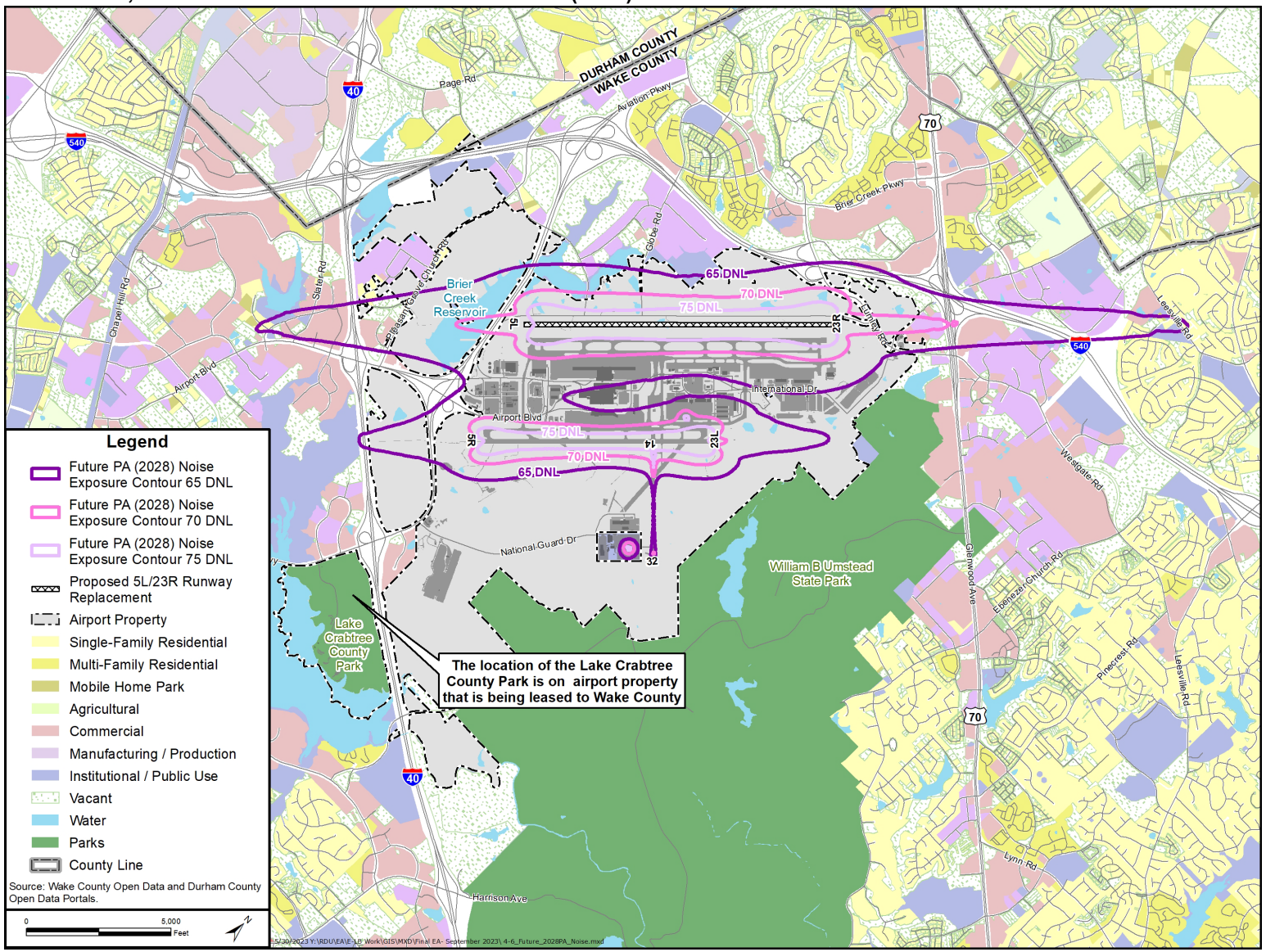
Exhibit 4-7 reflects the comparison of the Future (2028) No Action Alternative Noise Exposure Contours and the Future (2028) Proposed Action Noise Exposure Contours. The comparison shows the shift westward of the contours compared to the No Action Alternative. This directly corresponds to the potential shift of the replacement runway 537 feet northwest of the existing runway. In 2028, the Proposed Action would decrease the land areas within each contour as compared to the No Action Alternative. With the Proposed Action, shifting the replacement runway 537 feet northwest creates a larger gap between the two parallel runways. The larger gap results in less noise influence of one runway on the other, reducing the additive effects on the noise contours. This effect also causes the tip of the Proposed Action contour to be shorter than the No Action Alternative even though it has a slightly longer pavement length. Therefore, the Future (2028) Proposed Action contour area is smaller than the Future (2028) No Action Alternative contour area.

EXHIBIT 4-5, NOISE EXPOSURE CONTOUR – FUTURE (2028) NO ACTION ALTERNATIVE



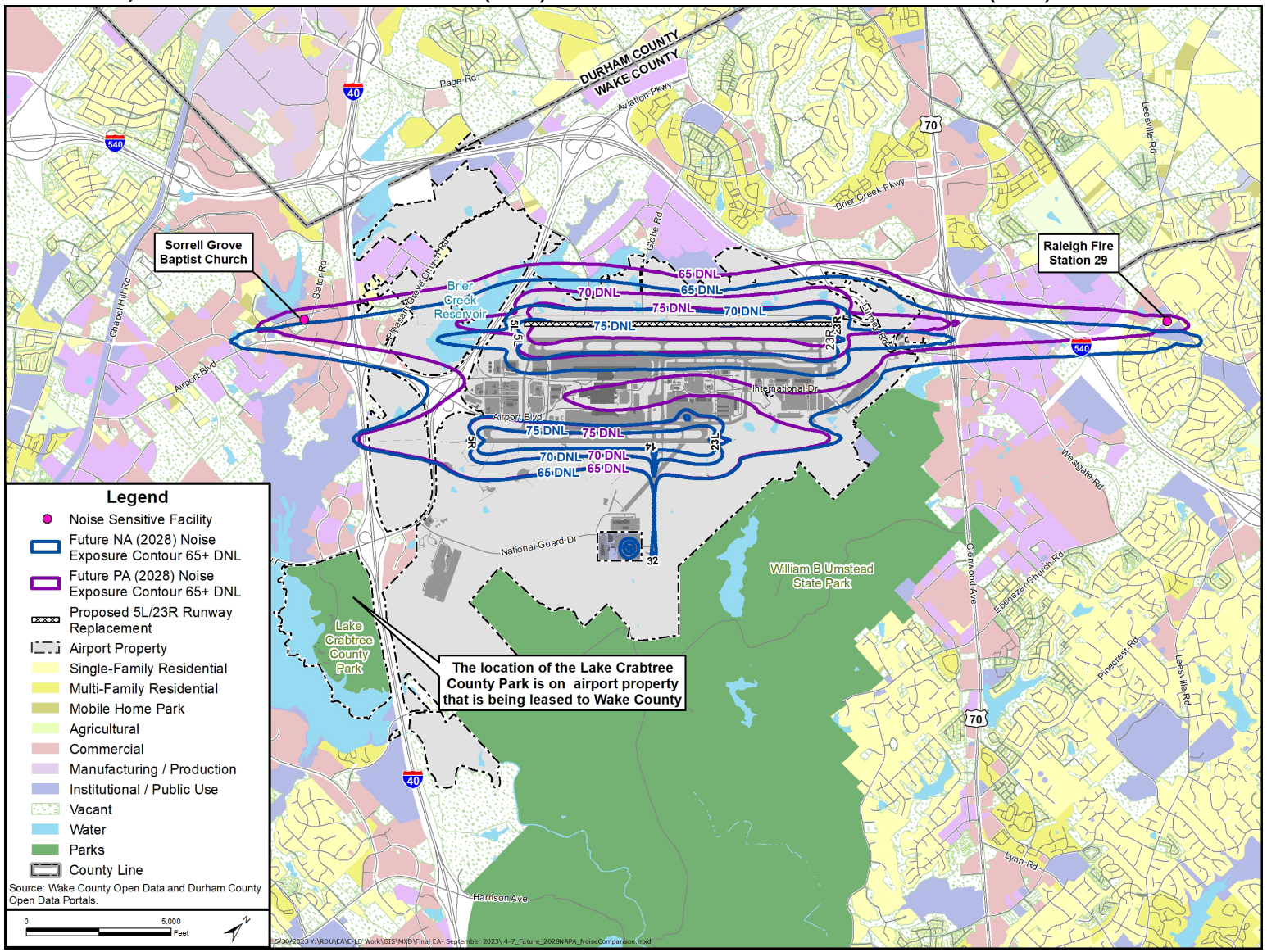
Source: Landrum & Brown, 2021. See also Appendix F Noise.

EXHIBIT 4-6, NOISE EXPOSURE CONTOUR – FUTURE (2028) PROPOSED ACTION



Source: Landrum & Brown, 2021. See also Appendix F Noise.

EXHIBIT 4-7, COMPARISION OF THE FUTURE (2028) NO ACTION ALTERNATIVE AND FUTURE (2028) PROPOSED ACTION



Source: Landrum & Brown, 2021. See also Appendix F Noise.

Table 4-15 summarizes the comparison of housing units, estimated population, and other noise sensitive facilities for 2028. The Proposed Action would decrease the total number of housing units and population within the 65+ DNL as compared to the No Action Alternative. One church (the Sorrell Grove Baptist Church) and one fire station (Raleigh Fire Station #29) would be newly impacted due to the Proposed Action. The decrease in residences and population is attributed to the change in the shape and size of the Proposed Action noise exposure contour as compared to the No Action Alternative noise exposure contour as well as a change in land use where the new contour resides.

TABLE 4-15, NOISE SENSITIVE FACILITIES COMPARISON (2028)

CATEGORY	FUTURE (2028) NO ACTION ALTERNATIVE	FUTURE (2028) PROPOSED ACTION	DIFFERENCE
Total Housing Units	126	45	**-81**
Total Estimated Population	329	118	**-211**
Other Noise Sensitive Facilities	0	2	**+2**

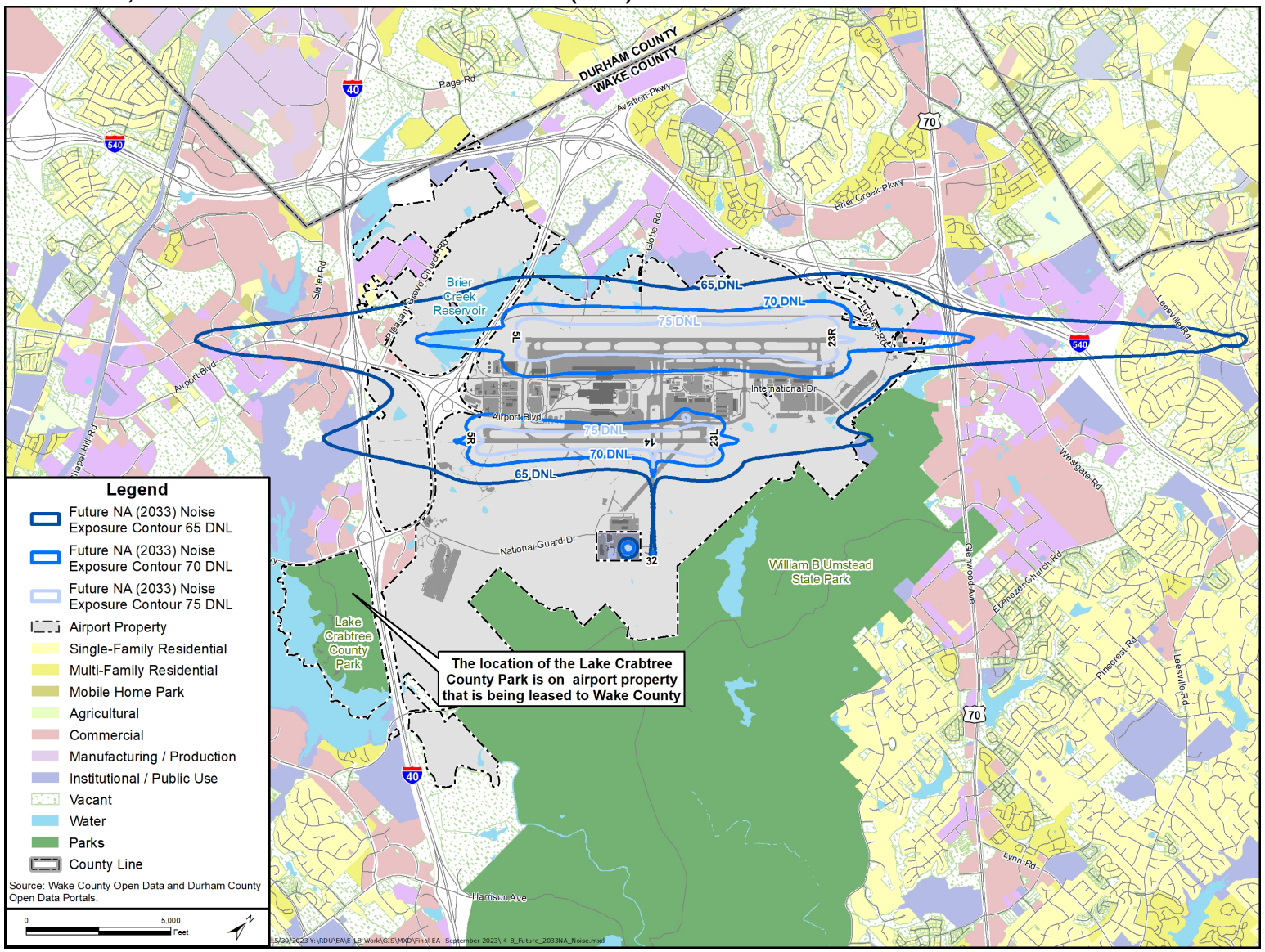
Source: Landrum & Brown analysis, 2022. See also Appendix F Noise.

4.10.4 Future Conditions: 2033

4.10.4.1 No Action Alternative

Based on the aircraft activity forecast, there would be an increase in aircraft operations from the Future (2028) No Action Alternative to the Future (2033) No Action Alternative. There is a total of 287,850 annual aircraft operations forecast for 2033 at RDU compared to 257,610 annual aircraft operations forecast for 2028. The Noise Exposure Contour for the Future (2033) No Action Alternative is presented in **Exhibit 4-8**. The 65+ DNL of the Future (2033) No Action Alternative Noise Exposure Contour encompasses 4.97 square miles and is larger than the Future (2028) No Action Alternative due to the overall increase of aircraft operations. There would be a total of 248 housing units with an estimated population of 647 people within the 65+DNL. One noise sensitive facility (the Sorrell Grove Baptist Church) is located inside the 65 DNL contour. There are no public schools, nursing homes, hospitals, or libraries within the 65 DNL contour.

EXHIBIT 4-8, NOISE EXPOSURE CONTOUR – FUTURE (2033) NO ACTION ALTERNATIVE



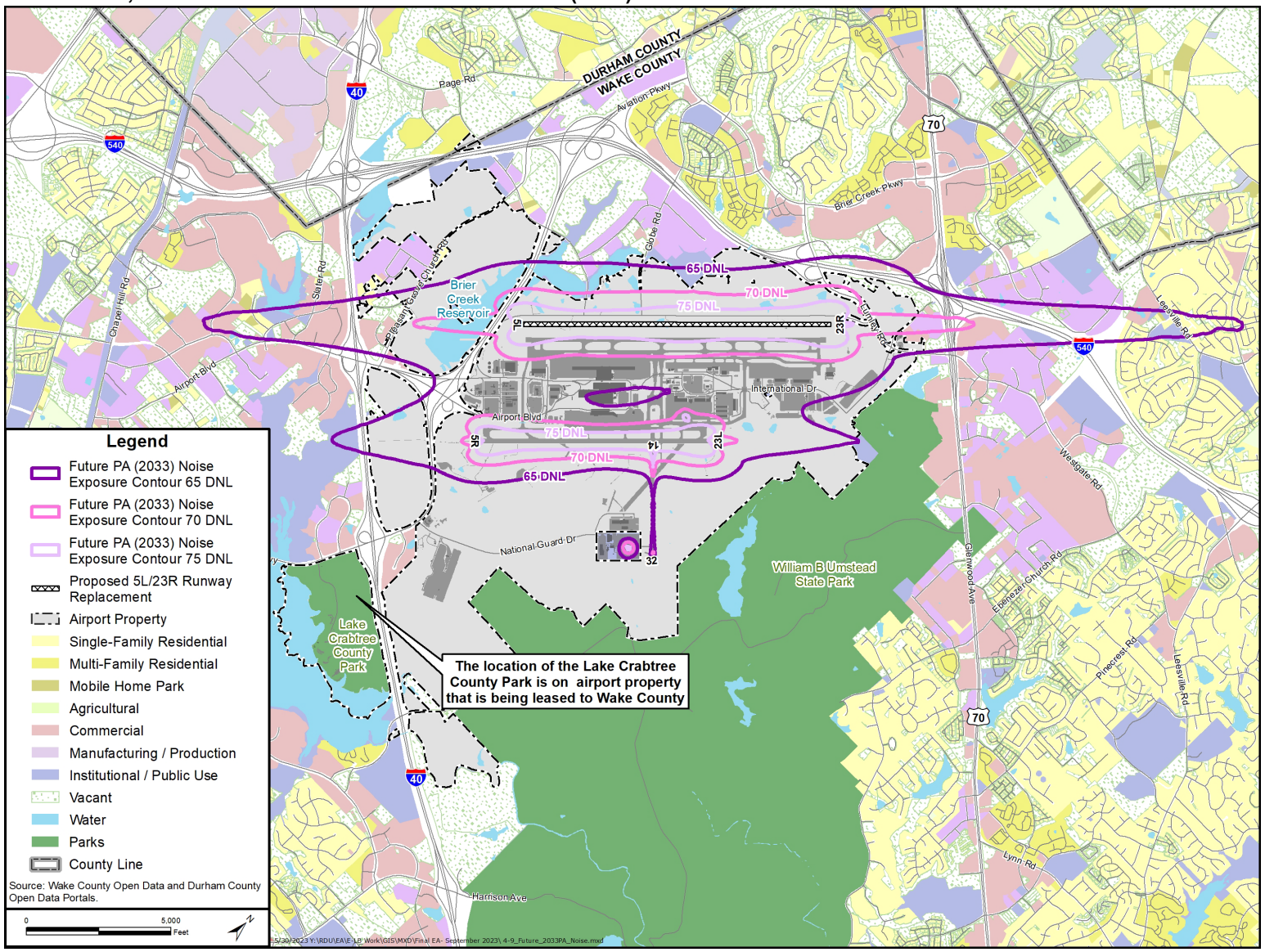
Source: Landrum & Brown, 2021. See also Appendix F Noise.

4.10.4.2 Proposed Action

There would be no change to the forecasted number of aircraft operations or fleet mix as a result of implementing the Proposed Action. However, as a result of implementing the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R, which would influence the noise contours as discussed in the Future 2028 Proposed Action. The Noise Exposure Contour for the Future (2033) Proposed Action is presented in **Exhibit 4-9**. The 65+ DNL of the Future (2033) Proposed Action Noise Exposure Contour encompasses 5.00 square miles. The noise exposure contour extends outward from the parallel runway ends. There would be a total of 134 housing units with an estimated population of 351 people within the 65+DNL. One church (the Sorrell Grove Baptist Church) and one fire station (Raleigh Fire Station #29) are located within the 65 DNL contour. There are no public schools, nursing homes, hospitals, or libraries within the 65 DNL contour.

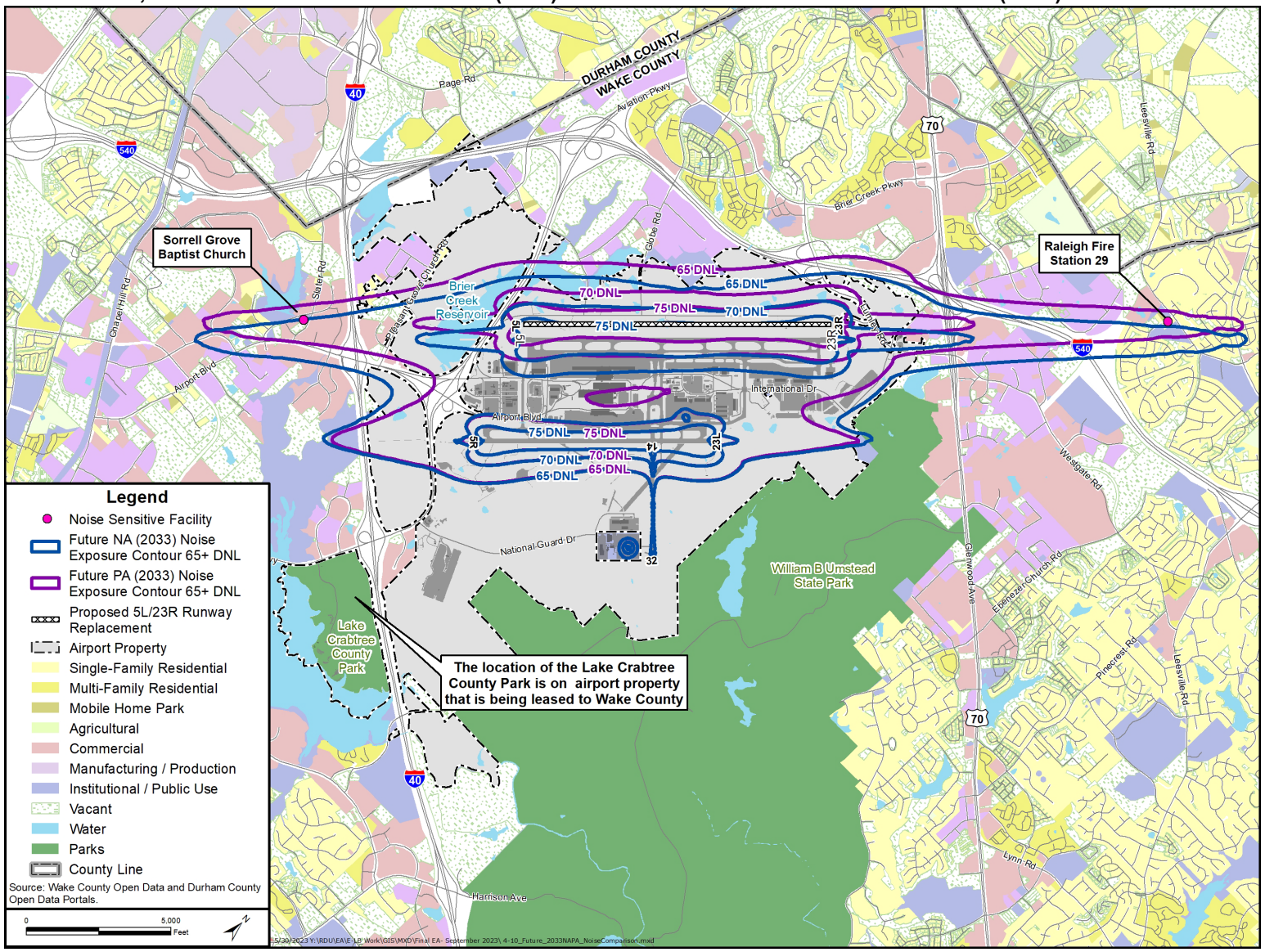
Exhibit 4-10 reflects the comparison of the Future (2033) No Action Alternative Noise Exposure Contours and the Future (2033) Proposed Action Noise Exposure Contours. Again, the comparison shows the shift westward of the contours compared to the No Action Alternative, which directly corresponds to the shift of the replacement runway 537 feet northwest of the existing runway. In 2033, the Proposed Action would increase the land areas within each contour as compared to the No Action Alternative. In 2033 with the larger forecast increase in aircraft operations, the gap of the contour between the two runways becomes smaller as the contours blend back together, and the tips of the contours are more similar. Therefore, the Future (2033) Proposed Action contour area is slightly larger than the Future (2033) No Action Alternative contour area.

EXHIBIT 4-9, NOISE EXPOSURE CONTOUR – FUTURE (2033) PROPOSED ACTION



Source: Landrum & Brown, 2021. See also Appendix F Noise.

EXHIBIT 4-10, COMPARISION OF THE FUTURE (2033) NO ACTION ALTERNATIVE AND FUTURE (2033) PROPOSED ACTION



Source: Landrum & Brown, 2021. See also Appendix F Noise.

Table 4-16 summarizes the comparison of housing units, estimated population, and other noise sensitive facilities for 2033. The Proposed Action would decrease the total number of housing units and population within the 65+ DNL as compared to the No Action Alternative. In 2033, the Sorrell Grove Baptist Church is within the No Action Alternative and Proposed Action contours. However, one fire station (Raleigh Fire Station #29) would be newly impacted due to the Proposed Action. The decrease in residences and population is attributed to the change in the shape and size of the Proposed Action noise exposure contour as compared to the No Action Alternative noise exposure contour.

TABLE 4-16, NOISE SENSITIVE FACILITIES COMPARISON (2033)

CATEGORY	FUTURE (2033) NO ACTION ALTERNATIVE	FUTURE (2033) PROPOSED ACTION	DIFFERENCE
Total Housing Units	248	134	**-114**
Total Estimated Population	647	351	**-296**
Other Noise Sensitive Facilities	1	2	**+1**

Source: Landrum & Brown analysis, 2022. See also Appendix F Noise.

4.10.4.3 Summary

Based on the analysis, there would be 248 total housing units within the 65+DNL for the No Action Alternative in 2033. There would be 134 total housing units within the 65+DNL for the Proposed Action in 2033. Overall, the Proposed Action would result in 114 fewer housing units and 296 fewer estimated people within the 65+DNL as compared to the No Action Alternative. With the shift in the noise contour westward, the Proposed Action would result in 72 housing units experiencing an increase in noise and 186 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour when compared to the No Action Alternative in 2033. The significant noise impact determination is if the analysis shows that the Proposed Action would result in noise-sensitive areas experiencing an increase in noise of DNL 1.5 dB or more, at or above 65 DNL noise exposure when compared to the No Action Alternative for the same timeframe. The analysis concluded that the Future (2028) Proposed Action would result in noise-sensitive areas experiencing an increase in noise of DNL 1.5 dB or more, at or above 65 DNL noise exposure when compared to the No Action Alternative in 2028. Similarly, as shown in **Exhibit 4-11**, the analysis concluded that the Future (2033) Proposed Action would result in noise-sensitive areas experiencing an increase in noise of DNL 1.5 dB or more, at or above 65 DNL noise exposure when compared to the No Action Alternative in 2033.

The year 2033 was used as the year for determination of significant impacts because the potential impacts would be greater in 2033 than those in 2028. There would be 37 total housing units (36 standard homes and one mobile home) containing an estimated 97 people located within the DNL 1.5 dB increase area. One church (Sorrell Grove Baptist Church) and one fire station (Raleigh Fire Station #29 which also contains sleeping and living areas) would also be located within the DNL 1.5 dB increase area. No public schools, nursing homes, hospitals, or libraries would be located in the DNL 1.5 dB increase area. A letter was sent to the residences identified within the DNL 1.5 dB increase area to ensure that they were aware of the project and that they would have an opportunity to participate in the EA process if they wanted to do so. The notification letter and additional informational maps concerning the noise analysis are provided in Appendix F Noise.

Noise in William B. Umstead State Park

The William B. Umstead State Park would be subject to land use compatibility guidelines within 14 CFR Part 150, Appendix A, Table 1. This table states that parks, including state parks and Section 4(f)

properties are compatible with noise levels below 65 DNL. As a result of implementing the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R which would influence the noise contours. Therefore, William B. Umstead State Park would experience a net reduction in noise exposure due to the Proposed Action as compared to the future No Action Alternative. Based on these findings, William B. Umstead State Park would not be considered impacted from noise by the Proposed Action and would not require special consideration.

4.10.5 Mitigation, Avoidance, and Minimization Measures

For the purposes of mitigating the significant noise impacts (>1.5 dB increase within the DNL 65), the following mitigation actions would be required to be implemented as part of the Proposed Action:

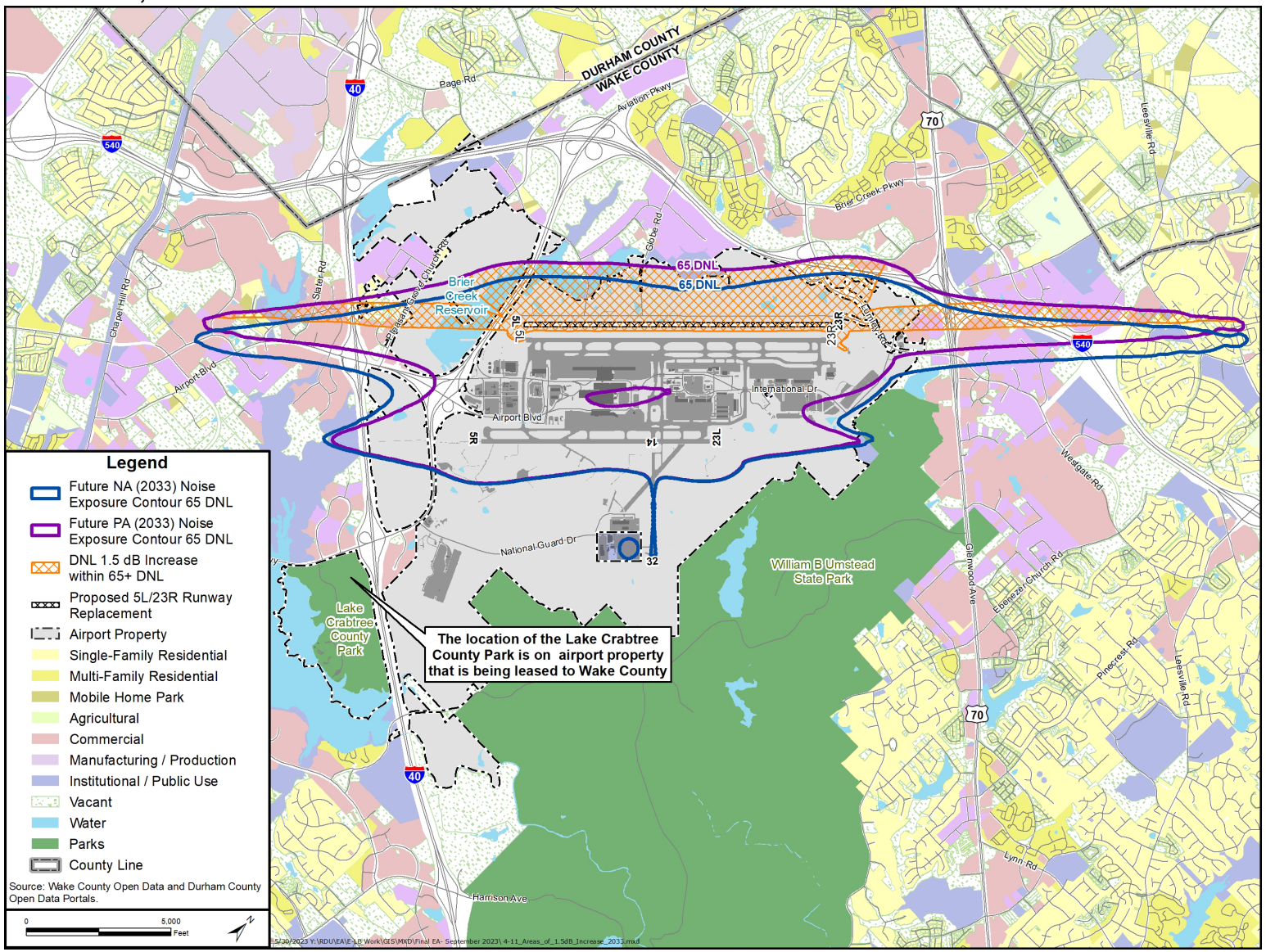
- Offer to sound insulate 36 single-family housing units,[115] the Raleigh Fire Station #29, and the Sorrell Grove Baptist Church (if the buildings are eligible and the owners agree) under FAA Order 5100.38D.[116] If the housing units, fire station, and the church are eligible and cannot be sound insulated to the internal required noise level per current FAA Order 5100.38, the Airport Authority would offer to acquire the property and offer relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 as amended.
- Offer to buy one mobile home and/or the property it's located on. Since mobile homes cannot be effectively sound insulated due to the type of construction, the owner of the property would be given an offer from the Airport Authority to acquire the property and/or the mobile home. Residents of the mobile home would also be offered relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 as amended.[117]
- The Airport Authority will prepare and implement a Blasting Plan to ensure not only the safety of people in the area, but also to manage noise and prevent property damage from the activity, and limit dust disturbance. Blasting operations would be conducted per the Blasting Plan and all applicable federal, state, and local laws and regulations.

[115] It should be noted that an avigation easement already is attached to some of the properties located within the 2033 Proposed Action 65 DNL noise contour and also within the area of a 1.5 dB increase within the 65 DNL noise contour. The terms of the avigation easement on these properties will need to be evaluated prior to implementation of the mitigation for the Proposed Action. According to existing Airport Authority data, it is estimated that seven of the 37 total single family housing units within the 1.5 dB or greater increase within the 65 DNL currently have an avigation easement on the property. The mobile home is not within the existing avigation easement area.

[116] FAA Order 5100.38D, Change 1, effective February 26, 2019, *Airport Improvement Program Handbook*, Appendix R. Noise Compatibility Planning/Projects, Section R-8. Interior Noise Level

[117] FAA grant agreements require that the sponsor will: 1. Comply with the land acquisition policies in Subpart B of 49 CFR Part 24 (described in Chapters 2 and 3), to the greatest extent practicable under State law, in acquiring real property. 2. Pay or reimburse property owners for necessary expenses, as specified in 49 CFR 24.10. 3. Provide a relocation assistance program offering the services described in Subpart C of 49 CFR Part 24 and provide fair and reasonable relocation payments and assistance to displaced persons, as required in Subparts D and E of 49 CFR Part 24. (See Chapters 4, 5, and 6) 4. Make comparable replacement dwellings available to displaced persons within a reasonable period prior to displacement, in accordance with Subpart E of 49 CFR Part 24.

EXHIBIT 4-11, 2033 AREAS OF 1.5 DB INCREASE



Source: Landrum & Brown, 2021. See also Appendix F Noise.

4.11 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks

This section presents the analysis of potential socioeconomic impacts, environmental justice (EJ) impacts, and children's environmental health and safety risks that would occur as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for socioeconomics, EJ, and children's environmental health and safety risks are discussed in Chapter 3, Section 3.11.

4.11.1 Significance Threshold

Socioeconomic Impacts

The FAA has not established a significance threshold for socioeconomics; however, in general, the significance of socioeconomic impacts is determined by the magnitude and duration of the impacts, whether beneficial or adverse. According to FAA Order 1050.1F, potential impacts to consider include:

- Inducing substantial economic growth;
- Dividing or disrupting an established community;
- Causing extensive relocation of housing when sufficient replacement housing is unavailable;
- Causing extensive relocation of businesses that would cause economic hardship;
- Disrupting local traffic patterns and substantially reducing the levels of service of roads serving an airport and its surrounding communities; or
- Producing a substantial loss of the community tax base.

Environmental Justice

Potential impacts would occur if disproportionately high and adverse environmental impacts in one or more environmental categories were to occur to EJ populations (also referred to as minority or low-income populations). In addition, unique impacts to a minority or low-income population should also be considered even if there is no significant impact from other environmental categories.

FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, provides guidance for the preparation of EJ analysis. The action would have the potential to lead to a disproportionately high and adverse impact to an EJ population due to:

- Significant impacts in other environmental impact categories; or
- Impacts on the physical or natural environment that affect an environmental justice population in a way that the FAA determines are unique to the environmental justice population and significant to that population.

Disproportionately high and adverse effect on minority and low-income populations means an adverse effect that:

- Is predominately borne by a minority population and/or a low-income population; or
- Will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

Children's Environmental Health and Safety Risks

Executive Order (EO) 13045 directs federal agencies to analyze their policies, programs, activities, and standards for any environmental health or safety risks that may disproportionately affect children. The FAA has not established a significance threshold for children's environmental health and safety risks. However, according to FAA Order 1050.1F, potential impacts from other environmental categories

should be assessed to determine if they have the potential to lead to a disproportionate health or safety risk to children.

4.11.2 Future Conditions: 2028

4.11.2.1 No Action Alternative

Socioeconomic Impacts

Induced Growth: The No Action Alternative would not result in economic growth beyond what is currently expected for the area near the Airport because no construction activity would occur. Therefore, impacts from the Future (2028) No Action Alternative to socioeconomic resources would not be significant.

Disrupting Communities: The No Action Alternative is not expected to divide established communities near the Airport. Therefore, no impacts to socioeconomic resources from the Future (2028) No Action Alternative is anticipated to occur.

Relocation of Residences: The No Action Alternative is not expected to acquire or convert residential properties to Airport property. Therefore, no impacts to socioeconomic resources from the Future (2028) No Action Alternative is anticipated.

Relocation of Businesses: The No Action Alternative would not impact businesses located on or off-Airport. Therefore, no impacts to socioeconomic resources from the Future (2028) No Action Alternative would occur.

Disruptions of Local Traffic Patterns: The No Action Alternative is not expected to modify off-Airport roadways or increase surface traffic. Therefore, no impacts to socioeconomic resources from the Future (2028) No Action Alternative is anticipated.

Substantial Loss in Community Tax Base: There would be no significant change from the existing conditions to the Future (2028) No Action Alternative and no substantial loss or change in the community tax base. Therefore, no impacts to socioeconomic resources from the Future (2028) No Action Alternative is anticipated to occur.

Environmental Justice

The methodology for determining the potential impacts to EJ populations and specific EJ outreach efforts for the EA is provided in **Appendix G Environmental Justice**. As defined in the FAA 1050.1F Desk Reference, “environmental justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.” Fair treatment means “no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.”

As described in Section 3.11, EJ populations (both low-income and minority) are located southwest of the Airport within the GSA. The EJ populations for the existing conditions would remain the same for the Future (2028) No Action Alternative. With the Future (2028) No Action Alternative, the Airport would continue to operate as it does today. As discussed in Chapter 1, aviation activity would continue to increase and there would be more aircraft operations in the future compared to the existing conditions with or without the Proposed Action. **Table 4-17** presents the EJ analysis for the Future (2028) No Action Alternative.

TABLE 4-17, EJ ANALYSIS FUTURE (2028) NO ACTION ALTERNATIVE

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
Air Quality	The NCDEQ Division of Air Quality has established an air monitoring network around the state that measures air pollution. The air quality monitoring station closest to the Airport is the Triple Oak monitor. The Triple Oak monitor collects CO, NO_2, and $PM_{2.5}$ ambient air data. The most recent publicly available data from this monitor indicates that concentrations of these pollutants are below the NAAQS.[118] In addition, the emissions inventory for the Future (2028) No Action Alternative shows the pollutants with the greatest anticipated emissions related to the Airport are CO and NOx. The emissions inventory estimated 827 tons of CO and 729 tons of NOx for the Future (2028) No Action Alternative. Therefore, there is no indication of a potential significant air quality impact with the Future (2028) No Action Alternative.	There are no air quality impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater air quality impacts than the non-EJ population.
Biological	The No Action Alternative includes no new construction or changes in operating procedures in 2028. Therefore, the implementation of the No Action Alternative would have no effect on any federal or state threatened or endangered species, no effect on any biotic or critical habitat supporting a federal or state endangered or threatened species, and would not result in the development, conversion, or removal of any existing habitat.	There are no biological resource impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater biological resource impacts than the non-EJ population.
Climate	There are no federal significance thresholds for GHG emissions, nor has the FAA identified specific factors to consider in making a significance determination for GHG emissions. The GHG emissions inventory estimated approximately 197,000 metric tons of CO_2e for the Future (2028) No Action Alternative.	There are no climate impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater climate impacts than the non-EJ population.

[118] Data available on-line at https://xapps.ncdenr.org/aq/ambient/AmbtSiteEnvista.jsp?site=371830021

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
USDOT Section (4f)	The No Action Alternative includes no new construction or changes in operating procedures in 2028. There would be no change to Section 4(f) resources or Section 6(f) resources for the No Action Alternative in 2028.	There are no Section 4(f) or Section 6(f) resource impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater Section 4(f) or Section 6(f) resource impacts than the non-EJ population.
Hazardous Materials, Solid Waste, and Pollution Prevention	The No Action Alternative includes no new construction or changes in operating procedures in 2028; as such, there would be no change to hazardous materials for this alternative. There would be an increase in the future as compared to existing conditions in the level of solid waste produced under the No Action Alternative in 2028 due to the increased number of forecasted passengers and aircraft operations. However, this increase is not anticipated to significantly impact the capacity of the solid waste systems.	There are no hazardous materials or solid waste impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater hazardous materials or solid waste impacts than the non-EJ population.
Historical, Architectural, Archeological, Cultural	The No Action Alternative includes no new construction or changes in operating procedures in 2028; as such, there would be no change to historical, architectural, archeological, or cultural resources for this alternative.	There are no historical, architectural, archeological, or cultural impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater historical, architectural, archeological, or cultural impacts than the non-EJ population.
Land Use	The No Action Alternative includes no new construction or changes in operating procedures in 2028. There would be an increase in the total number of homes in the 65+DNL future as compared to existing conditions. However, the No Action Alternative would not cause any inconsistencies with local land use plans.	There are no land use impacts attributed to the Airport that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater land use impacts than the non-EJ population.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
Natural Resources and Energy Supply	While the No Action Alternative includes no new construction or changes in operating procedures in 2028, there would be an increase in the future as compared to existing conditions in the level of usage/demand under the No Action Alternative in 2028 due to the increased number of forecasted passengers and aircraft operations. However, there would be no significant increase in demand for natural resources, electricity, natural gas, fuel consumption or water usage in 2028 for the No Action Alternative.	There are no natural resources or energy supply impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater natural resources or energy supply impacts than the non-EJ population.
Noise and Noise Compatible Land Use	There would be a total of 126 housing units with an estimated population of 329 people within the 65+DNL for the No Action Alternative. Of that total, two housing units with an estimated population of six people are within the EJ population area.	Noise and noise compatible land use impacts would not be predominately borne by the EJ population. The EJ population would not suffer more severe or greater noise and noise compatible land use impacts than the non-EJ population.
Socioeconomic (including surface transportation) and Children's Heath	The No Action Alternative includes no new construction or changes in operating procedures in 2028; as such, there are no significant impacts to socioeconomics, surface transportation, or children's environmental health and safety risks for this alternative.	There are no socioeconomics or children's environmental health and safety risk impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater socioeconomics or children's environmental health and safety risk impacts than the non-EJ population.
Visual	The No Action Alternative includes no new construction or changes in operating procedures in 2028; as such, there would be no change from the existing conditions to light emissions, visual resources, or visual character for this alternative. See Section 4.12 later in this EA for additional information.	There are no visual impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater visual impacts than the non-EJ population.
Water Resources	The No Action Alternative includes no new construction or changes in operating procedures in 2028; as such, there would be no change to water resources for this alternative. See Section 4.13 later in this EA for additional information.	There are no water resource impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater water resource impacts than the non-EJ population.

Children's Environmental Health and Safety Risks

No physical development would occur for the No Action Alternative in 2028. Therefore, no impacts to children's environmental health and safety risks are expected to occur.

4.11.2.2 Proposed Action

Socioeconomic Impacts

Induced Growth: The Proposed Action would result in temporary growth in economic activity from the creation of construction jobs. The surrounding area has a pool of available workers that can supply the necessary workforce. There is no indication that the increase in economic activity will cause a shortage of housing or strain the local communities. There would be no expected adverse impacts to economic growth as a result of the Future (2028) Proposed Action.

Disrupting Communities: The Proposed Action would not result in the division of established communities near the Airport. Therefore, no impacts to socioeconomic resources from the Future (2028) Proposed Action would occur.

Relocation of Residences: As disclosed in Section 4.10, one mobile home unit is located within the future DNL 65 and within the area of significant noise increase. Since mobile homes cannot be effectively sound insulated due to the type of construction, the Airport Authority would offer to acquire the owner's mobile home and/or property. Residents of the mobile home would also be offered relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970. The relocation would be up to the mobile home property owner and not mandatory as part of the Proposed Action.

Relocation of Businesses: The Proposed Action would not cause businesses to relocate, on or off-Airport. While four buildings would be demolished as part of the Lumley Road relocation, these buildings are vacant, the property is owned by the Airport and no business relocation would be required. The Proposed Action would also acquire a portion of several properties to accommodate the relocated Lumley roadway and utility rights of way. Final design of the Lumley Road relocation is not yet complete. Negotiations are ongoing related to this property acquisition and would not be completed until after FAA has made a decision on this EA. Because the property acquisition is only for a portion of the property, the Airport Authority has confirmed the existing businesses could continue to operate after the Proposed Action is implemented and would not be required to relocate. Therefore, the Proposed Action would not result in relocation of businesses. Therefore, no impacts to socioeconomic resources from the Future (2028) Proposed Action would occur.

Disruptions of Local Traffic Patterns: The construction and implementation of the Proposed Action would require the relocation of a portion of Lumley Road. Coordination regarding the proposed relocation of Lumley Road was conducted between the NCDOT and the Airport Authority. Coordination with the NCDOT would continue through the design and implementation of the proposed relocation. In addition, if trucking is used to transport fill material as part of the Proposed Action, a temporary increase in surface traffic is anticipated during construction. It is assumed construction dump trucks would utilize a portion of Pleasant Grove Church Road and Nelson Road to transport fill material (dirt) from borrow sites located on Airport property to the area of the new proposed runway. However, if the conveyor system is used to transport fill material, there would be no apparent increase in surface traffic for this construction activity. Given the capacity of the roadways surrounding the Airport, the surrounding roadways are sufficient to handle the temporary increase during construction. Therefore, no permanent significant disruption of local traffic patterns would result from implementing the Proposed Action.

Substantial Loss in Community Tax Base: The Future (2028) Proposed Action would not result in a loss to the community tax base. Therefore, no adverse impacts to the community tax base would occur as a result of the Future (2028) Proposed Action would occur.

Environmental Justice

Table 4-18 presents the EJ analysis for the Future (2028) Proposed Action.

TABLE 4-18, EJ ANALYSIS FUTURE (2028) PROPOSED ACTION

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLEY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
Air Quality	As discussed in Section 4.2, the increase in overall emissions does not exceed the federal *de minimis* thresholds. Therefore, the air quality assessment indicates that there would be no significant impact on local or regional air quality with construction and operation of the Proposed Action.	While there is no significant impact to air quality, construction of the Proposed Action would result in a short-term increase of particulate matter (airborne fugitive dust) emissions from vehicle movement and soil excavation in and around the construction site and at the borrow site locations. The location of the borrow sites is adjacent to the EJ population areas. While fugitive dust does not usually travel far from the construction site, it is possible that the EJ population would be impacted more than the non-EJ population due to its proximity to the borrow sites. Therefore, the Airport Authority will ensure that measures are taken to reduce fugitive dust emissions at the construction site by adhering to guidelines included in FAA AC 150/5370-10H, *Standard Specifications for Construction of Airports*.
Biological	There is no significant impact to biological resources, as identified in Section 4.3. See Appendix D Biological Resources for FAA's consultation with the USFWS.	While the borrow sites are located adjacent to EJ populations, the borrow sites are entirely located on Airport property. In addition, there is a 100-foot vegetative buffer separating the borrow site area and the EJ population. As such, there are no biological resource impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater biological resource impacts than the non-EJ population.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLEY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
Climate	As stated in Section 4.4, the Proposed Action would not result in a significant impact to climate.	Potential climate impacts are not local to a specific area; therefore, there are no climate impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater climate impacts than the non-EJ population.
DOT Section (4f)	The Proposed Action would not result in a physical or constructive use of any Section 4(f) resources. In addition, the Proposed Action does not include the conversion of lands purchased or developed in association with the Section 6(f) Land and Water Conservation Fund Act to non-recreational uses.	There are no Section 4(f) or Section 6(f) resource impacts that would be predominately borne by the EJ population. The EJ population would not suffer more severe or greater Section 4(f) or Section 6(f) resource impacts than the non-EJ population.
Hazardous Materials, Solid Waste, and Pollution Prevention	As stated in Section 4.6, there would be no significant impact related to hazardous materials, solid waste, and pollution prevention.	The minimal impacts to hazardous materials, solid waste, and pollution prevention are primarily occurring in a non-EJ community on the northern side of the Airport. Hence, there would be no disproportionate impacts to the EJ populations which are located south and west of the Airport.
Historical, Architectural, Archeological, and Cultural Resources	As stated in Section 4.7, there would be no direct or indirect effects to any historical, architectural, archeological, or cultural resources.	There are no historical, architectural, archeological, or cultural impacts that would be predominately borne by the EJ population.
Land Use	As stated in Section 4.8, there are no significant impacts related to land use.	While there are disproportionate impacts to EJ populations related to noise compatibility, mitigation would be implemented, such as providing sound insulation to homes in the EJ population areas. With mitigation, there are no land use impacts that would be disproportionately high and adverse to the EJ population.
Natural Resources and Energy Supply	As stated in Section 4.9, there would be no significant impact related to natural resources and energy supply.	There are no natural resources or energy supply impacts that would be predominately borne by the EJ population.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	WILL THE IMPACT BE PREDOMINATLEY BORNE BY AN EJ POPULATION OR SUFFER MORE SEVERE OR GREATER ADVERSE EFFECTS THAN THE NON-EJ POPULATION?
Noise and Noise Compatible Land Use	As stated in Section 4.10, with mitigation, there is no significant impact related to noise and noise compatible land use.	The number of EJ homes within the 65+ DNL would be less than that of non-EJ homes. However, there would be an increase to EJ homes within the 65+ DNL for the Proposed Action. The total number of homes for non-EJ residents would decrease for the Proposed Action as compared to the No Action Alternative. The FAA has considered this a disproportionate effect. However, the mitigation for all homes affected would mitigate the impact to the EJ population. Therefore, the noise impact would not be disproportionately high and adverse. See Section 4.10 and Appendix F Noise for maps of these locations and more information.
Socioeconomic (including surface transportation) and Children's Heath	As stated in Section 4.11, there would not be a significant impact related to socioeconomics, surface transportation, or children's environmental health and safety risks.	While there would be an increase in surface transportation if trucking is used to transport fill material, this increase would be predominately borne by the EJ population; however, this impact would be temporary and only during construction.
Visual Effects	As stated in Section 4.12, there would not be a significant impact related to visual effects.	While the borrow site is located adjacent to an EJ population area, the Airport Authority would leave a 100-foot vegetative buffer. With this mitigation, there would be no expected disproportionately high and adverse visual impacts borne by the EJ population.
Water Resources	As stated in Section 4.13, with mitigation, there would not be a significant impact related to water resources.	The Proposed Action includes mitigation for the adverse impacts to wetlands and streams. While most of the impacts to waters are near EJ communities, they are on Airport property. In addition, the loss of wetlands and streams would be mitigated. There would be no disproportionately high and adverse water resource impacts borne by the EJ population.

Unique Impacts to an EJ Population

A review was conducted by the FAA to determine if impacts not otherwise rising to a level of significance for NEPA purposes nonetheless represent disproportionately high and adverse effects, and/or a significant impact for EJ purposes. To do this, the FAA also reviewed impacts on the physical and natural environment that may affect the EJ population in a way that is unique to the EJ population and significant to that population. To analyze potential unique impact, local outreach was conducted with specific EJ populations and the general EJ population during various stages of the EA.

During the scoping process, the Airport Authority advertised the notification of the public scoping meeting and the request for comments to determine the scope of issues to be addressed and identify the significant issues related to the Proposed Action in La Conexion, the local Spanish language publication. In addition, letters to adjoining property owners were sent out as part of notification of the public scoping. For additional information on scoping see Chapter 5 and Appendix A Agency and Public Involvement. No unique impacts to EJ populations were identified during scoping activities.

The FAA also conducted two separate efforts to obtain meaningful involvement with EJ communities in an effort to identify unique impacts. The Airport Authority and the FAA conducted one in-person small group meeting at the Airport (RDU Center Room 100) with a specific EJ population with identified environmental impacts before the Draft EA was published. The specific EJ population included residents from Marcom Drive, Sorrell Grove Church Road, Triple Oak Drive, Pleasant Grove Church Road, and Nelson Road who may be potentially impacted by the Proposed Action. The Airport Authority and the FAA provided the group an opportunity to learn more about the Proposed Action and potential environmental impacts and identified the best method to ensure participation by this group in the NEPA process, including the best way to communicate with this group, the best method for the EJ community group to respond with comments, and attend potential public meetings.

Outreach was also conducted to connect with the general EJ population that may potentially be impacted by the project via unintended impacts. This general EJ population may utilize resources or roadways that the Proposed Action may impact in a way that is unique to the community. Letters and emails were sent to community organizations such as churches and community centers as representatives of the general EJ population (See Appendix G Environmental Justice for the detailed list). No unique impacts to EJ populations were identified from these additional EJ outreach activities.

Children's Environmental Health and Safety Risks

Impacts to children are considered separately in NEPA reviews because children may experience a different intensity of impact as compared to an adult exposed to the same event. Environmental health risks and safety risks include risks to health or to safety that are attributable to products or substances that a child is likely to come in contact with or ingest, such as air, food, drinking water, recreational waters, soil, or products they might use or be exposed to. To determine whether the Proposed Action would result in an elevated risk related to health or safety concerns of children, Section 4.2, *Air Quality*, Section 4.6, *Hazardous Materials, Solid Waste, and Pollution Prevention*, Section 4.10, *Noise and Noise-Compatible Land Use*, and Section 4.13, *Water Resources* were examined.

According to the analysis in Section 4.2, the Proposed Action would not create air quality conditions that would worsen breathing conditions for children because the Proposed Action would not exceed the applicable thresholds and would not result in an adverse impact on local or regional air quality. According to the analysis in Section 4.6, the Proposed Action would not result in the release of harmful agents into surface or groundwater resources above levels permitted by the local, state, and/or federal regulations. The construction site would be on Airport property and signs would be posted to prevent access to the site by children or other unauthorized personnel. There would be no problems unique to

children due to the construction or implementation of the Proposed Action. Therefore, the Proposed Action would not result in the release of, or exposure to, significant levels of harmful agents in the water, air, or soil that would affect children's health or safety or result in an elevated risk related to health or safety concerns for children. According to the analysis in Section 4.10 for the Proposed Action, there are no schools within the 65+ DNL noise contour. In addition, there would be fewer homes impacted by noise with the Proposed Action as compared to the No Action Alternative.

Therefore, the Proposed Action would not have the potential to lead to a disproportionate health or safety risk to children.

4.11.3 Future Conditions: 2033

4.11.3.1 No Action Alternative

Socioeconomic Impacts and Children's Environmental Health and Safety Risks
The Future (2033) No Action Alternative would have the same effects upon socioeconomic impacts and children's environmental health and safety risks as described for the Future (2028) No Action Alternative.

Environmental Justice
The Future (2033) No Action Alternative would have the same effects upon all of the environmental resource categories as described for the Future (2028) No Action Alternative except for Noise and Noise-Compatible Land Use.

There would be a total of 248 housing units with an estimated population of 647 people within the 65+DNL. Of that total, two housing units with an estimated population of six people are within the EJ population area. This represents less than one percent of the housing units in the 65+DNL.

4.11.3.2 Proposed Action

Socioeconomic Impacts and Children's Environmental Health and Safety Risks
The Future (2033) Proposed Action would have the same effects upon socioeconomic impacts and children's environmental health and safety risks as described for the Future (2028) Proposed Action.

Environmental Justice
The Future (2033) Proposed Action would have the same effects upon all of the environmental resource categories as described for the Future (2028) Proposed Action except for Noise and Noise-Compatible Land Use. Based on the analysis presented in Section 4.10, the Future (2033) Proposed Action noise contours shifts to the northwest as compared to the Future (2033) No Action Alternative noise contours. However, the DNL 65 dB noise contour remains in the same EJ population areas.

The number of EJ homes within the 65+ DNL would be less than that of non-EJ homes. However, there would be an increase to EJ homes within the 65+ DNL for the Proposed Action. The total number of homes for non-EJ residents would decrease for the Proposed Action as compared to the No Action Alternative. The FAA has considered this a disproportionate effect. However, the mitigation for all homes affected would mitigate the impact to the EJ population. Therefore, the noise impact would not have a disproportionately high and adverse impact on the EJ population. See Section 4.10 and Appendix F Noise for maps of these locations and more information.

4.11.4 Mitigation, Avoidance, and Minimization Measures

The Proposed Action includes the following mitigation measures.

- Prior to initiating construction, the Airport Authority shall obtain approval of an ESC Plan from the NCDEQ. This ESC Plan would include:
    - Access road locations to the borrow sites
    - Monitoring and maintenance of control measures
    - Vegetative Restoration plan
    - Waste management plan
- The Airport Authority shall leave 100 feet of the existing trees and vegetation in place along the perimeter of the borrow site as a buffer, with the exception of access for trucks. The areas within the 100-foot buffer for truck access will be replanted with trees of similar species to either side of the access, after removal of the borrow material from the borrow site. The planting plan must meet NCDEQ's standards of 320 native trees per acre and include three years of annual monitoring and reporting demonstrating survival of species and vegetative coverage.
- For the purposes of mitigating the impact to the EJ homes, two homes in the EJ area that are exposed to the significant noise impacts (>1.5 dB increase within the DNL 65), would be offered sound insulation if the buildings are eligible under FAA Order 5100.38D [119] and the owners agree. See Section 4.10 and Appendix F Noise for additional information on mitigating significant noise impacts. If the housing units and the church are eligible and cannot be sound insulated to the internal required noise level per current FAA Order 5100.38, the Airport Authority would offer to acquire the property and offer relocation assistance under the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 as amended.
- To ensure that the borrow site activities do not adversely affect the EJ community, the Airport Authority, through its construction contractor, will ensure that measures are taken to reduce fugitive dust emissions by adhering to guidelines included in FAA Advisory Circular (AC) 150/5370-10H, *Standard Specifications for Construction of Airports*.

4.12 Visual Effects (including light emissions)

This section presents the analysis of potential visual effects, including impacts related to light emissions and visual resources and visual character, as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for visual effects are discussed in Chapter 3, Section 3.12.

4.12.1 Significance Threshold

The FAA has not established a significance threshold for visual effects in FAA Order 1050.1F; however, the FAA has identified factors to consider when evaluating the context and intensity of potential environmental impacts for visual effects. These factors are not intended to be thresholds. If these factors exist, there is not necessarily a significant impact; rather, the FAA must evaluate these factors in light of context and intensity to determine if there are significant impacts.

Light Emissions Factors

According to the FAA Order 1050.1F Desk Reference, light emissions "include any light that emanates from a light source into the surrounding environment. Examples of sources of light emissions include airfield and apron flood lighting, navigational aids, terminal lighting, parking facility lighting, roadway

[119] FAA Order 5100.38D, Change 1, effective February 26, 2019, *Airport Improvement Program Handbook*, Appendix R. Noise Compatibility Planning/Projects, Section R-8. Interior Noise Level

lighting, safety lighting on launch pads, additional lighting to support nighttime commercial space launches, and light generated from such launches." Light effects factors to consider are:

- The degree to which the Proposed Action would have the potential to create annoyance or interfere with normal activities from light emissions; and
- The degree to which the Proposed Action would have the potential to affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources.

Visual Resources and Visual Character Factors

According to the FAA Order 1050.1F Desk Reference, visual resources include "buildings, sites, traditional cultural properties, and other natural or manmade landscape features that are visually important or have unique characteristics" and "visual characters refers to the overall visual makeup of the existing environment where the Proposed Action and alternative(s) would be located." Visual resources and visual character effects factors to consider are:

- The degree to which the Proposed Action would have the potential to affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources;
- The degree to which the Proposed Action would have the potential to contrast with the visual resources and/or visual character in the study area(s); and
- The degree to which the Proposed Action would have the potential to block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

4.12.2 Future Conditions: 2028

4.12.2.1 No Action Alternative

Light Emissions

There would be no change from the existing conditions to light emissions for the Future (2028) No Action Alternative.

Visual Resources and Visual Character

There would be no change from the existing conditions to visual resources or visual character for the Future (2028) No Action Alternative.

4.12.2.2 Proposed Action

Light Emissions

As a result of the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R. The replacement Runway 5L/23R medium intensity approach lights with runway alignment indicator lights (MALSR) would need to be reconfigured by relocating the light stations to correspond to the new runway thresholds and installing in-pavement approach lights. The existing precision approach path indicator (PAPI) would also be relocated to accommodate the replacement Runway 5L/23R threshold relocations. After the replacement runway is completed, the existing Runway 5L/23R would be converted to a full-length parallel and connecting taxiway. Therefore, the Proposed Acton would require relocation of existing runway centerline lighting and runway end lighting, runway end identifier lights (REILS), and installation of new lighting on the proposed new taxiway.

Land to the north of the Airport is largely commercial and manufacturing/production land uses with some single family and multifamily residential uses north of Interstate 540. Land use to the west and

southwest in the immediate vicinity of the Airport includes the Brier Creek Reservoir, commercial and manufacturing/production land uses, some forested land owned by the airport and some residential land uses. Land to the east and southeast is largely undeveloped natural areas including William B. Umstead State Park. The closest residential neighborhoods to the Airport are located approximately 4,600 feet west of the Runway 23R threshold, 10,200 feet northeast of the Runway 23R threshold, and 4,200 feet west of the Runway 5L threshold.

The relocation of the lights associated with the replacement Runway 5L/23R would cause light emissions similar to the existing lights, which are currently used to conduct safe airport operations. The closest residential neighborhoods would not be able to see the relocated airfield lights because of the existing terrain (including vegetation and topography), the distance from the light emission occurring as a result of the Proposed Action, and the existing light coming from commercial and manufacturing uses in the area.

The light emissions due to the replacement Runway 5L/23R would be moved farther away from William B. Umstead State Park than they are today, and therefore, the proposed change in lighting for Runway 5L/23R from the Proposed Action when compared to the No Action Alternative would not significantly increase the overall light emissions to William B. Umstead State Park.

As a result of implementing the Proposed Action, the replacement Runway 5L/23R would be 537 feet northwest of the existing Runway 5L/23R. It is anticipated that the flight tracks for the replacement Runway 5L/23R would also be 537 feet northwest of the existing Runway 5L/23R. Light emissions from aircraft above the ground for the Proposed Action would be similar to the No Action Alternative although slightly shifted to the northwest. Light emissions from aircraft above the ground are used for safe operations and should not create noticeable additional glare or nuisance to residences beyond the No Action Alternative.

During construction, additional lighting may be used within the construction site, which would be pointed away from residential land uses. The Airport Authority would leave 100 feet of the existing trees and vegetation in place as a buffer to prevent any significant change to the visual character for residential homes west of the Brier Creek Reservoir on Pleasant Grove Church Road. Temporary construction lights would not interfere with the residents' regular activities, including work and recreation. The use of the trucks to transport fill material would not result in additional lighting impacts and would be located on existing roadways. The use of the conveyor system may include lights for safety; however, these lights would not be located near or directed at residences and would abide by FAA air navigation and safety regulations.

The new or relocated lighting from the Proposed Action would not produce light emissions that are noticeably different from the Airport's existing lighting and should not cause annoyance or disrupt normal activities of the surrounding community because of the distance between housing and the airport. Therefore, light emissions from the Proposed Action when compared to the No Action Alternative would not significantly increase the overall light emissions due to their type, intensity, and distance from residential areas.

Visual Resources and Visual Character

The Proposed Action would not include any vertical development, such as new tall buildings, when compared to the No Action Alternative and would not obstruct any views. The Proposed Action would not interfere with the line of sight between the Airport Traffic Control Tower (ATCT) and aircraft movement areas.

The closest residential neighborhoods to the Airport (west of the Runway 23R threshold and northeast of the Runway 23R threshold) would not see a change to their views because of the distance from these residences to the Proposed Action, the varied topography, heavy vegetation, and existing roadways and other commercial properties in the area. These residences do not have a direct line of sight to runways, taxiways, terminals, or other airport facilities.

The Proposed Action includes the use of Airport property for potential borrow sites to obtain fill material for use during construction activities. In order to get the fill material, the proposed borrow sites would be cleared of vegetation and trees. After the fill material is excavated, the area would be graded and planted with appropriate ground cover approved by the NCDEQ to prevent erosion. There are several single-family residential homes west of the Brier Creek Reservoir on Pleasant Grove Church Road that directly border Airport property and the potential borrow areas. As part of the Proposed Action, the Airport Authority would leave 100 feet of the existing trees and vegetation as a visual buffer to prevent any significant change of their visual character.

Therefore, the Proposed Action would not significantly alter, contrast, or obstruct the existing views due to the distance from residential areas, the obstacles in the way, and the use of buffer areas because the replacement runway is similar in character to the existing airfield. Therefore, no noticeable change to the visual resources and visual character would occur from the Proposed Action when compared to the No Action Alternative.

4.12.3 Future Conditions: 2033

4.12.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon light emissions, visual resources, and visual character as described for the Future (2028) No Action Alternative.

4.12.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon light emissions, visual resources, and visual character as described for the Future (2028) Proposed Action.

4.12.4 Mitigation, Avoidance, and Minimization Measures

The following mitigation measures would be implemented to prevent a noticeable change to the visual resources and visual character from the Proposed Action:

- Prior to initiating construction, the Airport Authority shall obtain approval of an ESC Plan from the NCDEQ. This ESC Plan would include:
  - Access road locations to the borrow sites
  - Monitoring and maintenance of control measures
  - Vegetative Restoration plan
  - Waste management plan
- The Airport Authority shall leave 100 feet of the existing trees and vegetation in place along the perimeter of the borrow site as a buffer, with the exception of access for trucks. The areas within the 100-foot buffer for truck access will be replanted with trees of similar species to either side of the access, after removal of the borrow material from the borrow site. The planting plan must meet NCDEQ's standards of 320 native trees per acre and include three years of annual monitoring and reporting demonstrating survival of species and vegetative coverage.

4.13 Water Resources (including wetlands, surface open waters, floodplains, and groundwater)

This section presents the analysis of potential impacts to water resources as a result of the Future No Action Alternative and the Proposed Action. The existing conditions for water resources are discussed in Chapter 3, Section 3.13. Impacts to water resources are expected to include wetlands, streams, and other surface waters.

4.13.1 Significance Threshold

Wetlands

According to FAA Order 1050.1F, a significant impact would occur to wetlands when the action would:

- Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
- Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
- Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);
- Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
- Promote development of secondary activities or services that would cause the circumstances listed above to occur; or
- Be inconsistent with applicable state wetland strategies.

Surface Waters (including streams)

FAA's significance threshold for surface waters is when the action would:

- Exceed water quality standards established by federal, state, local, and tribal regulatory agencies; or
- Contaminate public drinking water supply such that public health may be adversely affected.

In addition to the threshold above, Exhibit 4-1 of FAA Order 1050.1F provides additional factors to consider when evaluating the context and intensity of potential environmental impacts for surface waters. If these factors exist, there is not necessarily a significant impact; rather, the FAA must evaluate these factors in light of context and intensity to determine if there are significant impacts. Factors to consider that may be applicable to surface waters include, but are not limited to, situations in which the proposed action or alternative(s) would have the potential to:

- Adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values;
- Adversely affect surface waters such that the beneficial uses and values of such waters are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or
- Present difficulties based on water quality impacts when obtaining a permit or authorization.

Floodplains

FAA's significance threshold for floodplains is if the action would cause notable adverse impacts on natural and beneficial floodplain values. Natural and beneficial floodplain values are defined in Paragraph 4.k of USDOT Order 5650.2, *Floodplain Management and Protection*.

Groundwater

FAA's significance threshold for a groundwater impact is if the action would:

- Exceed groundwater quality standards established by federal, state, local, and tribal regulatory agencies; or
- Contaminate an aquifer used for public water supply such that public health may be adversely affected.

In addition to the threshold above, Exhibit 4-1 of FAA Order 1050.1F provides additional factors to consider when evaluating the context and intensity of potential environmental impacts for groundwater. If these factors exist, there is not necessarily a significant impact; rather, the FAA must evaluate these factors in light of context and intensity to determine if there are significant impacts. Factors to consider that may be applicable to groundwater include, but are not limited to, situations in which the proposed action or alternative(s) would have the potential to:

- Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;
- Adversely affect groundwater quantities such that the beneficial uses and values of such groundwater are appreciably diminished or can no longer be maintained and such impairment cannot be avoided or satisfactorily mitigated; or
- Present difficulties based on water quality impacts when obtaining a permit or authorization.

4.13.2 Future Conditions: 2028

4.13.2.1 No Action Alternative

Wetlands

There would be no construction activity and no change from the existing conditions with the No Action Alternative. Therefore, no impacts to wetlands and streams would occur from the Future (2028) No Action Alternative.

Surface Waters (including streams)

There would be no construction activity and no change from the existing conditions with the No Action Alternative. Therefore, no impacts to surface open waters would occur from the Future (2028) No Action Alternative.

Floodplains

There would be no construction activity and no change from the existing conditions with the No Action Alternative. Therefore, no impacts to floodplains would occur from the Future (2028) No Action Alternative.

Groundwater

There would be no construction activity and no change from the existing conditions with the No Action Alternative. Therefore, no impacts to groundwater would occur from the Future (2028) No Action Alternative.

4.13.2.2 Proposed Action

Wetlands

This section provides a description of the wetlands potentially impacted by the Proposed Action. There would be no aircraft operational impacts to wetlands with the Proposed Action. However, the Proposed Action includes construction activities that would impact these resources. Fill material would be needed to level the area of the relocated runway prior to construction. The Airport Authority has identified

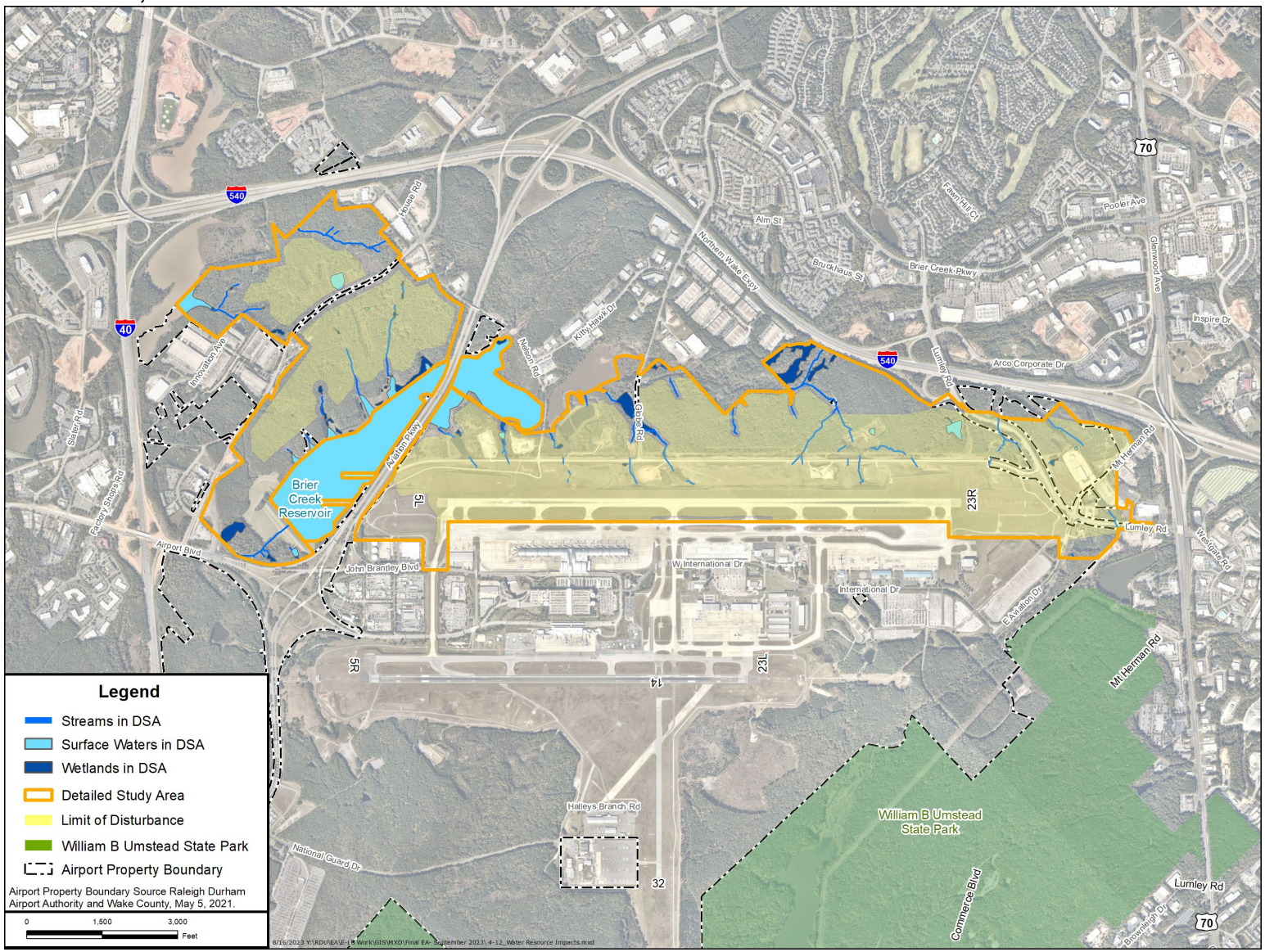
potential borrow sites to obtain the fill material on existing Airport property. In order to get the fill material, the proposed borrow sites would be cleared and excavated, impacting wetlands. In addition to the borrow site areas, there would also be wetland impacts to accommodate the proposed relocated runway, runway safety areas, the perimeter roadway, utility relocations, stormwater drainage facilities, and Lumley Road relocation and the installation of approach lighting systems for the new runway and removal of the approach lighting systems for the existing runway.

The Airport Authority and the FAA have shown in their alternatives analysis that there were no practicable alternatives that would meet the purpose and need which would avoid all adverse impacts to wetlands. See Chapter 2 for the discussion of alternatives.

The Airport Authority then evaluated the use of the borrow sites for fill material to minimize potential adverse impacts. Total avoidance of wetland impacts at the borrow site areas is not practicable due to the amount of fill needed for the project. Impacts to wetlands can be partly avoided and/or minimized by modifying the areas where proposed fill from the borrow sites was obtained and the potential depth of excavation. The Airport Authority and the FAA have consulted with the USACE as a cooperating agency on this EA regarding the avoidance and minimization measures that have been developed as part of the Proposed Action.

In order to determine the potential impacts to wetlands, an ArcView GIS program was used to calculate potential impacts based on the limits of disturbance. The limits of disturbance identify the footprint of the areas that would be disturbed during construction activities. The limits of disturbance are within the DSA but are smaller to only account for areas that would be impacted by construction activities. For example, the limits of disturbance do not include the 100 feet of the existing trees and vegetation that would be left in place as a buffer and areas that have been totally avoided. The limits of disturbance were then used to overlay against the water resources that had been identified and confirmed through field investigations as shown on **Exhibit 4-12**.

EXHIBIT 4-12, WATER RESOURCE IMPACTS



Source: Three Oaks Engineering and RS&H, 2023.

Impacts to Potentially Jurisdictional[120] Wetlands per Section 404

A total of 1.56 acres of potentially jurisdictional wetlands of the 20.93 acres present would be impacted with the Proposed Action as provided in **Table 4-19**. The impacts would be permanent due to the excavation and grading activities for the project.

TABLE 4-19, POTENTIALLY JURISDICTIONAL WETLAND IMPACTS

MAP ID	AREA (ACRES)	TYPE OF IMPACT	NATURE OF IMPACT
W11	0.07	Permanent	Excavation / Grading activities
W12	0.11	Permanent	Excavation / Grading activities
W13	0.17	Permanent	Excavation / Grading activities
W16	0.07	Permanent	Excavation / Grading activities
W36	0.12	Permanent	Excavation / Grading activities
W37	0.01	Permanent	Excavation / Grading activities
W38	0.02	Permanent	Excavation / Grading activities
W39	0.19	Permanent	Excavation / Grading activities
W41	0.20	Permanent	Excavation / Grading activities
W42	0.12	Permanent	Excavation / Grading activities
W49	0.03	Permanent	Excavation / Grading activities
W55	0.07	Permanent	Excavation / Grading activities
W57	0.26	Permanent	Excavation / Grading activities
W59	0.11	Permanent	Excavation / Grading activities
TOTAL	**1.56**	**Permanent**	**Excavation / Grading activities**

Note: Totals may not sum exactly due to rounding.
Source: Three Oaks Engineering and RS&H, 2022

Impacts to Wetlands Protected Under EO 11990

A total of 2.53 acres of non-jurisdictional wetlands of the 2.63 acres present protected under EO 11990 would be impacted with the Proposed Action as provided in **Table 4-20**. The impacts would be permanent due to the excavation and grading activities for the project.

TABLE 4-20, IMPACTS TO WETLANDS PROTECTED UNDER EXECUTIVE ORDER 11990

MAP ID	AREA (ACRES)	TYPE OF IMPACT	NATURE OF IMPACT
W61	1.00	Permanent	Excavation / Grading activities
W62	1.53	Permanent	Excavation / Grading activities
TOTAL	**2.53**	**Permanent**	**Excavation / Grading activities**

Note: Totals may not sum exactly due to rounding.
Source: Three Oaks Engineering, 2022

W61 and W62 are constructed stormwater basins that have, over time, developed conditions that now meet USACE wetland criteria. All features were deemed to be already permitted features per USACE; however, they are covered under EO 11990. Although these constructed features, based on their design, do provide stormwater retention and filtration similar to what a natural wetland offers, they are

[120] Potentially jurisdictional either exhibits an Ordinary High Water Mark (OHWM), or meets three wetland criteria including hydric soils, hydrophytic vegetation, and wetland hydrology.

degraded compared to a comparable natural undisturbed wetland. These wetlands have been built to encourage ponding, which affects the vegetation that can grow within the feature, leading to low plant diversity. Mechanical disturbance also occurs as part of airport maintenance, which significantly affects plant growth. There is also evidence of soil compaction due to these being constructed features, which increases hydrology from rain and run-off, but limits the potential for natural water table influence on the features. All wetlands scored as "low" quality using the North Carolina Wetland Assessment Method, indicating that these features are compromised compared to undisturbed wetlands.

In May 2023, the Supreme Court rendered a decision in the Sackett vs. USEPA case that may affect the jurisdictional status of wetlands listed in Table 4-19. If there is a change in the jurisdictional status of any of the potentially jurisdictional wetlands listed in Table 4-19 as a result of a court decision, then mitigation for these wetlands will occur under the non-jurisdiction special condition if they meet the criteria of a wetland.

Coordination and Conceptual Mitigation

Coordination with the USACE has determined that an individual permit under Section 404 of the Clean Water Act (CWA) would be required for construction of the Proposed Action. The Airport Authority will submit a permit application to obtain the required Section 404 Permit and Section 401 Water Quality Certification. Furthermore, coordination with the NCDEQ will be conducted by the Airport Authority in accordance with Section 401 of the Clean Water Act to ensure the NPDES permit is updated. A requirement of NPDES permits, for both operations and construction activities, is development or an update of a Storm Water Pollution Prevention Plan (SWPPP). A SWPPP outlines how stormwater run-off, erosion, and sediment would be controlled in order to minimize polluted stormwater run-off into nearby waters. The NPDES Construction General Permit is a type of general permit that is required if construction activities would disturb one acre or more of land. Under this permit, construction refers to any actions that result in disturbance of the land, including clearing, grading, and other similar activities. It also includes construction-related activities that occur in areas that support the construction project such as borrow areas.

Because there are potential and unavoidable impacts to wetlands, mitigation will be required for the Proposed Action to avoid significant impacts. The conceptual mitigation plan is to use wetland banking and/or in lieu fee programs offered by NCDEQ Division of Mitigation Services to mitigate for these identified impacts. The FAA allows wetland banking as a mitigation tool for projects that must occur in wetlands. Wetland banking allows the Airport Authority to purchase wetland bank credits from an approved wetland mitigation bank. The purchase of wetland bank credits serves as a payment to the wetland banker for the wetland mitigation services that the bank provides. The purchase of credits from an approved bank can also be used to satisfy the permit required mitigation. There are multiple mitigation banks in the Raleigh area that are approved by the State and that have available credits for sale that can be used for mitigation banking for this project.[121] A determination of the exact mitigation banks, the final required credits, and or the cost for in lieu fee programs will be determined in the permitting process for potentially jurisdictional wetlands. For non-jurisdictional wetlands, the Airport Authority shall replace the wetlands with equivalent acreage credit (a 1:1 ratio) from a mitigation bank or in-lieu-fee program that has been approved by the USACE and where the area of impact is within the service area of the bank/in-lieu fee program.

[121] A list of approved mitigation banks is provided by the North Carolina Division of Environmental Quality at the following website. https://deq.nc.gov/about/divisions/water-resources/water-quality-permitting/401-buffer-permitting/stream-wetland-mitigation-program

When reviewing potential mitigation plans, potential impacts to aviation must be considered. As provided in FAA Advisory Circular, 150/5200-33C *Hazardous Wildlife Attractants on or near Airports*, wetland and stream mitigation must be designed so it does not create a wildlife hazard. The FAA recommends a separation distance from wetland mitigation projects that may attract hazardous wildlife of 10,000 feet for airports serving turbine-powered aircraft up to a distance of five miles to protect approach and departure airspace. Therefore, there are no areas on Airport property that are appropriate for onsite mitigation for the number and type of impacts. A land swap, such as converting Airport property to State or County land, would not replace the loss of these potential streams and wetlands and would not be appropriate. Mitigation must comply with 33 CFR Part 332 and 40 CFR Part 230.

As previously stated, the FAA allows stream and wetland banking as a mitigation tool for projects that must occur in streams and wetlands. The environmentally preferable compensatory mitigation may be provided through mitigation banks or in-lieu fee programs because they usually involve consolidating compensatory mitigation projects where ecologically appropriate, consolidating resources, providing financial planning and scientific expertise (which often is not practical for permittee-responsible compensatory mitigation projects), reducing temporal losses of functions, and reducing uncertainty over project success.

According to the NCDEQ, the Proposed Action is within the boundaries of Mitigation Service Area 03020201. A Service Area is the geographic area for which a conservation bank's credits may be applied to offset debits associated with development activities.[122] Service Areas are defined by the area's 8-digit subbasin Hydrological Unit Code (HUC). HUC 03020201 is the Upper Neuse River subbasin and covers approximately 2,406 square miles.[123] The Service Area is larger than just Wake County. However, the use of any mitigation bank outside of the county but within the Service Area for impacts from the Proposed Action is appropriate per 33 CFR Part 332.8(d)(6)(ii)(A)[124]. There are 44 approved mitigation banks in the Service Area. A review of available wetland and stream credits was done through the U.S. Army Corps of Engineers' Regulatory In-lieu Fee and Bank Information Tracking System (RIBITS).[125] As of June 2023, there are no banks with sufficient credits for the entire project, so multiple banks would have to be used. In addition to jurisdictional wetlands and streams, impacts to buffer areas require mitigation. Buffer mitigation bank information is located in the North Carolina Department of Environmental Quality Nutrient Offset and Buffer Mitigation program information page.[126] The North Carolina Department of Environmental Quality Division of Mitigation Services (DMS) operates in-lieu fee (ILF) mitigation programs to mitigate unavoidable environmental damage from transportation-infrastructure improvements. In order to be approved for the In-Lieu Fee (ILF) Program, an applicant must submit a DMS ILF Mitigation Request Statement of Compliance form. This form requires project information, type and number of credits needed, and a map or site coordinates to verify project location. Applicants are required to evaluate bank credit availability prior to submitting this form. DMS then makes an acceptance decision and issues a response letter to be included in the permit

122 United States Department of the Interior Fish and Wildlife Service, "Guidance for the Establishment, Use, and Operation of Conservation Banks", 2003. https://ribits.ops.usace.army.mil/ords/f?p=107:150:10217246572766::NO::P150_DOCUMENT_ID:6994

123 North Carolina Department of Environment and Natural Resources, "Find Your HUC in North Carolina", 2022. https://ncdenr.maps.arcgis.com/apps/PublicInformation/index.html?appid=ad3a85a0c6d644a0b97cd069db238ac3, Accessed May 31, 2023.

124 33 CFR § 332.8, "Mitigation banks and in-lieu fee programs." https://www.law.cornell.edu/cfr/text/33/332.8

125 https://ribits.ops.usace.army.mil/ords/f?p=107:201:10217246572766::NO, Accessed May 31, 2023.

126 North Carolina Department of Environmental Quality, "Nutrient Offset & Buffer Mitigation Program". https://www.deq.nc.gov/about/divisions/water-resources/permitting/401-buffer-permitting/nutrient-offset-buffer-mitigation-program, Accessed May 31, 2023.

application. An invoice is issued after the applicant sends permits and the Mitigation Responsibility Transfer Form to the DMS ILF coordinator.[127] Mitigation bank credits available do not satisfy the credit needs for the jurisdictional stream buffers. Thus, the remaining mitigation required will be completed with in-lieu fees.

Due to the changing nature of mitigation banks that issue credits on projects, a determination of the exact mitigation banks, the final required credits, and or the costs will be determined in the permitting process. At the time of permitting, additional review of credits will be necessary to confirm availability. No construction for the Proposed Action shall occur in a jurisdictional water until the Airport Authority obtains the necessary Section 404 and Section 401 of the Clean Water Act permits/approvals from the USACE and NCDEQ respectively. In addition, no construction shall occur in a non-jurisdictional wetland until mitigation for that impact has been completed. Proof of pre-construction mitigation must be submitted to the FAA – Airports District Office prior to impacting said wetland.

Potential further avoidance and minimization opportunities would be identified during the permitting process for the Proposed Action. This includes potential access roads being designed with sufficient crossroad culverts to maintain, as much as possible, existing wetlands and streams. For unavoidable impacts to buffers, a buffer impact plan will be submitted to the State for authorization under the State's Neuse River Riparian Buffer Rules.

The Proposed Action would not substantially alter the hydrology of the area. The excavation for the Proposed Action at the borrow sites would not exceed a four to one slope. This means that for every four feet of horizontal change there is a one-foot vertical change. After the fill material is excavated, the area would be graded and planted with appropriate ground cover vegetation approved by the State to prevent erosion. Therefore, the Proposed Action would not adversely affect the non-impacted existing wetlands functions to protect the quality or quantity of municipal water supplies, including surface waters. The overall flow of water would still be directed downward toward Brier Creek Reservoir. The Proposed Action, including the stormwater improvements, would not substantially reduce the ability to retain floodwaters or storm runoff, thereby threatening public health, safety or welfare or adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding area.

Surface Waters (including streams)

The Proposed Action would potentially impact Surface Open Waters including streams. In order to get fill material, the proposed borrow sites would be cleared. In addition to the borrow site areas, there would also be potential impacts to accommodate the proposed relocated runway, runway safety areas, the perimeter roadway, utility relocations, stormwater drainage facilities, and Lumley Road relocation. In order to determine the potential impacts to surface open waters, an ArcView GIS program was used to calculate potential impacts based on the limits of disturbance.

Impacts to Potentially Jurisdictional Streams

A total of approximately 8,780 feet of streams of the 22,308 feet present would be impacted with the Proposed Action as provided in **Table 4-21**. In addition to direct impacts, streams may be subject to the State's Neuse River Riparian Buffer Rules. A riparian buffer is a vegetated area bordering a body of water, such as a stream, lake or pond. To be subject to Neuse River Riparian Buffer Rules, potential streams need to be present on either U.S. Geological Society topographic mapping or the Natural Resources Conservation Service soil survey mapping. See **Appendix H Water Resources** for the

[127] NCDEQ, "Stream, Wetland & Buffer ILF Programs", https://www.deq.nc.gov/about/divisions/mitigation-services/customers/stream-wetland-buffer-ilf-programs

stream areas subject to the Neuse River Riparian Buffer Rules. Per riparian buffer rules, there are two riparian buffer zones that apply to a buffered stream or open water, extending a total of 50 feet outward, perpendicularly from the edge of a feature. Zone One abuts the stream or open water and extends 30 feet perpendicularly from the top of bank (or edge of water) outward, on both sides of a feature. Zone Two starts at the outside edge of Zone One and extends an additional 20 feet perpendicularly from Zone One outward, on both sides of the feature. The specific zones for the applicable streams are provided in Appendix H Water Resources.

Riparian buffers of streams protected under the State's Neuse River Riparian Buffer Rules would be preserved to the greatest extent practicable. Stormwater runoff into the riparian buffer shall meet dispersed flow as defined in North Carolina rule 15A NCAC 02H.1002. Drainage features that can meet diffuse flow requirements include drainage ditches, roadside ditches, and stormwater conveyances. The Proposed Action would impact approximately 22.6 acres of riparian buffers as provided in Table 4-21. The impacts would be permanent due to the excavation and grading activities for the project.

TABLE 4-21, POTENTIALLY JURISDICTIONAL STREAM IMPACTS

MAP ID	LENGTH (FEET)	BUFFER AREA (ACRES)	TYPE OF IMPACT	NATURE OF IMPACT
S9	1,089	2.98	Permanent	Excavation / Grading activities
S12	593	1.51	Permanent	Excavation / Grading activities
S20	192	0.39	Permanent	Excavation / Grading activities
S21	370	0.79	Permanent	Excavation / Grading activities
S22	110	0.24	Permanent	Excavation / Grading activities
S23	172	0.56	Permanent	Excavation / Grading activities
S25	431	1.14	Permanent	Excavation / Grading activities
S26	536	1.66	Permanent	Excavation / Grading activities
S30	90	0.21	Permanent	Excavation / Grading activities
S33	70	0.25	Permanent	Excavation / Grading activities
S34	1,004	2.39	Permanent	Excavation / Grading activities
S35	187	0.61	Permanent	Excavation / Grading activities
S37	416	1.09	Permanent	Excavation / Grading activities
S39	1,455	3.47	Permanent	Excavation / Grading activities
S40	160	0.37	Permanent	Excavation / Grading activities
S41	661	1.74	Permanent	Excavation / Grading activities
S42	881	2.09	Permanent	Excavation / Grading activities
S43	267	0.76	Permanent	Excavation / Grading activities
S45	84	0.35	Permanent	Excavation / Grading activities
S46	14	NA	Permanent	Excavation / Grading activities
Total	**8,780**	**22.6**	**Permanent**	**Excavation / Grading activities**

Note: Impacts are provided to the closest linear foot. NA is not applicable. Totals may not sum exactly due to rounding.
Source: Three Oaks Engineering and RS&H, 2022

Impacts to Potentially Jurisdictional Non-Stream Surface Waters

A total of 3.48 acres of the 141.09 acres of potentially jurisdictional non-stream surface waters would be impacted with the Proposed Action as provided in **Table 4-22**. The impacts would be permanent due to the excavation and grading activities for the project. The Proposed Action also includes the placement of fill into Brier Creek Reservoir to accommodate the relocation of the FAA navigation aids. Wake County maintains Brier Creek Reservoir. Any addition of fill to accommodate the relocated runway navigational lights would need to be coordinated with Wake County. Mitigation could be by removing the existing island/fill for the existing navigation lights. However, this may cause additional disturbance of potentially contaminated sediment. Coordination is ongoing with USEPA and Wake County. The final resolution of this will be completed under the jurisdiction of the USACE and their 404 Permit Process.

TABLE 4-22, POTENTIALLY JURISDICTIONAL NON-STREAM SURFACE WATER IMPACTS

MAP ID	AREA (ACRES)	BUFFER AREA (ACRES)	TYPE OF IMPACT	NATURE OF IMPACT
P5	0.29	0.53	Permanent	Excavation / Grading activities
P10	1.70	1.64	Permanent	Excavation / Grading activities
Brier Creek Reservoir	1.49	0.00	Permanent	Placement of Fill to support Navigational Aid s
Total	**3.48**	**2.17**	**Permanent**	**Excavation / Grading / Placement of Fill activities**

Note: Totals may not sum exactly due to rounding. The area to support the proposed navigation aid light stations was assumed to be 700 feet long by 100 feet wide.
Source: Three Oaks Engineering and RS&H, 2022

As discussed in Section 3.6, Little Brier Creek, Brier Creek Reservoir, Brier Creek, Lake Crabtree, and Crabtree Creek were determined to have been impacted by PCBs originating from the former Ward Transformer facility. The North Carolina Department of Health and Human Services has issued a fish consumption advisory on Little Brier Creek, Brier Creek, Lake Crabtree, and Crabtree Creek, all of which are waters downstream of the Site. USEPA is working to clean up the PCB-contaminated sediments that led to these fish advisories, which should eventually lead to lower PCB levels in fish.

The Proposed Action may have impacts due to the placement of fill for the relocated runway navigational lights or from the potential use of a conveyor system to transport fill across Brier Creek Reservoir by potentially disturbing previously contaminated sediment in Brier Creek Reservoir. USEPA has indicated that sediment sampling done in Brier Creek Reservoir in August 2018 was well below one part per billion (ppb) total PCBs. However, USEPA did recommend that potential testing of the sediment in the reservoir may be needed in the specific area of the relocated navigation lights and conveyor system. In order to ensure no significant impacts will occur, a special condition requiring the Airport Authority to sample the proposed future lighting system and conveyer system areas in coordination with USEPA and develop an appropriate plan, approved by the FAA, for installation of lights and/or conveyer system. See special conditions under Hazardous Waste.

In addition, the Airport Authority would require the construction contractor to develop an ESC Plan per the NCDEQ Construction Stormwater requirements. BMPs and the erosion control measures would be taken to control and contain sediment runoff that could make its way to all waters to minimize the sediment impact on surface waters including Brier Creek Reservoir and Brier Creek. BMPs may include, but are not limited to, dust control measures, matting and netting measures, temporary slope drains, sediment screens, sedimentation basin, etc. The specific BMPs will be determined and described in the ESC Plan developed by the design engineer for implementation by the construction

contractor. The ESC Plan would then be approved by the NCDEQ. In order to ensure that water quality is maintained, the FAA will establish a special condition that states:

1. No construction shall occur in a jurisdictional water until the Airport Authority obtains the necessary Section 404 and Section 401 of the Clean Water Act permits/approvals from the USACE and NCDEQ respectively. The Airport Authority shall comply with all mitigation requirements as defined in the USACE and NCDEQ permits.
2. No construction shall occur in a non-jurisdictional wetland until mitigation for that impact has been completed. The Airport Authority will replace the non-jurisdictional wetlands with equivalent acreage credit (a 1:1 ratio) from a mitigation bank or in-lieu-fee program that has been approved by the USACE and NCDEQ, and where the area of impact is within the service area of the bank/in-lieu fee program. Proof of pre-construction mitigation must be submitted to the FAA – Airports District Office prior to impacting said wetland.
3. No construction shall occur until the Airport Authority submits a Sediment and Erosion Control Plan that is approved by the NCDEQ.

Therefore, the Proposed Action would not be expected to exceed water quality standards established by federal, state, and local agencies or contaminate any public drinking water supply such that public health may be adversely affected.

Because there are potential and unavoidable impacts to surface open waters including streams, mitigation will be required for the Proposed Action to avoid significant impacts. The conceptual mitigation plan is to use mitigation banking and/or in lieu fee programs offered by NCDEQ Division of Mitigation Services to mitigate for these identified impacts. There are stream mitigation banks in the Raleigh area that are approved by the State and that have available credits for sale that can be used for mitigation banking for this project.[128] A determination of the exact mitigation banks, the final required credits, and or the cost for in lieu fee programs will be determined in the permitting process. The special condition that would be imposed for jurisdictional waters above encompasses these waters. An additional special condition is not required.

Impacts to Non-Section 404 Ponds

As described in Section 3.13, surface open waters labeled P1, P2, P9, and P11 are not considered Waters of the U.S. A total of 1.95 acres of non-Section 404 ponds of the 2.01 acres present would be impacted with the Proposed Action as provided in **Table 4-23**.

TABLE 4-23, NON-SECTION 404 POND IMPACTS

MAP ID	AREA (ACRES)
P1	1.58
P2	0.08
P9	0.26
P11	0.03
Total	**1.95**

Note: Totals may not sum exactly due to rounding.
Source: Three Oaks Engineering and RS&H, 2022

[128] A list of approved mitigation banks is provided by the North Carolina Division of Environmental Quality at the following website. https://deq.nc.gov/about/divisions/water-resources/water-quality-permitting/401-buffer-permitting/stream-wetland-mitigation-program

While the FAA follows a no net loss policy according to EO 11990, this policy applies only to wetlands. Ponds are not covered by EO 11990, and since these are non-jurisdictional open waters, there would be no mitigation required by FAA for these impacts.

Erosion and Sedimentation Control

The Proposed Action will be required to adhere to the rules, regulations and design standards set forth in the North Carolina Erosion and Sediment Control Planning and Design Manual. Installation of erosion control measures would be installed at the borrow site areas, along the relocation areas of Lumley Road, and between the existing perimeter service road and the existing runway prior to and during construction activities. These measures will allow the contractor to begin the placement of the required fill material while maintaining the existing storm drainage system and existing points of discharge. Erosion control measures to be constructed on the outside of the perimeter service road would be installed and will protect the downstream areas as the fill slopes for both the perimeter road and runway are brought to final grades. Erosion control measures located between the existing perimeter road and runway would be de-watered, cleared of sediment, backfilled and compacted with clean fill material as the existing culverts are extended and fill is placed over the existing culverts.

The following erosion control measures will be utilized on the Proposed Action:

- Silt Fence (Sediment Fence) – A system to retain sediment during construction. The fence retains sediment primarily by retarding flow and promoting deposition.

- Silt Fence Stone Outlets – A gravel section approximately 6-8’ in width located at the lowest elevation along the silt fence line to allow the sediment laden water to settle out suspended particulates and drain away from the site.

- Diversion Ditch – A temporary ridge or excavated channel to divert sediment-laden stormwater into a sediment trap, rock dam or sediment basin. Typically, a diversion ditch is used in conjunction with silt fence downstream to direct sediment-laden water into an erosion control device.

- Clean Water Diversion Ditch – A temporary or permanent excavated channel to divert clean water runoff from entering the construction site. These ditches typically include matting to help provide a ground cover quickly. These devices also can be used to reduce the drainage area to a sediment basin to allow for smaller measures.

- Check Dams – A temporary washed stone and riprap dam constructed across a drainage swale, diversion ditch or clean water diversion ditch. The Ditch Check is placed so that the toe (downstream side) of the structure is equal to the elevation of the next downstream weir structure.

- Sediment Trap – A small, temporary ponding basin formed by an embankment or excavation to capture sediment. The purpose is to detain sediment-laden runoff and trap the sediment to protect receiving streams, lakes, drainage systems, and adjacent property. Sediment-laden water is filtered through a stone and riprap weir along with a skimmer to allow the water to be drained from the top of the water column.

- Rock Dam – A temporary rock embankment located to capture sediment in a naturally formed drainage feature. The purpose is to retain sediment on the construction site, and prevent sedimentation in off-site streams, lakes and drainageways. A rock dam is used in areas too large for a temporary sediment trap.

- Sediment Basin – A temporary earthen embankment suitably located to capture sediment with a primary spillway system consisting of a riser and barrel pipe. The purpose is to retain sediment on the construction site, and prevent sedimentation in off-site streams, lakes and drainageways. A skimmer is attached to outlet structures so that the water is drained from the top of the water column. This allows for more settling time of the sediment-laden water prior to discharge from the structure.

- Inlet Protection – A temporary measure consisting of washed stone, wire mesh hardware cloth around steel posts. This type of inlet protection will be used to filter the sediment-laden water prior to being released into a storm drainage system inlet structure.

- Culvert Inlet Protection – A temporary measure of stone and riprap designed to be placed at the upstream inlet of a culvert drainage pipe. This inlet protection will be used to filter sediment-laden water prior to entering the culvert.

- Riprap Outlet Protection – A permanent measure of Riprap designed to be placed at the outlet of a storm drainage pipe to control erosion. The riprap is placed downstream of the pipe outlet and is sized in accordance with the flow of the storm drainage system and the shear stress of the existing soil material.

- Construction Entrance – This measure is designed to be placed at all entrances to the construction site. The stone is to provide collection of sediment deposits by vehicles transiting between the construction site and existing public and private roads.

The erosion and sedimentation controls will be installed to provide protection for the existing reservoir downstream and existing outfalls as construction of the runway/taxiway progresses during all phases of construction. Final design for the Proposed Action is not yet complete. The location of these measures will be identified after design is complete and through the NCDEQ permitting process.

Floodplains

Flood Insurance Rate Maps (FIRM), produced by the Federal Emergency Management Agency (FEMA), were reviewed for the DSA. As described in Section 3.13, there are no areas of the 500-year floodplains within the DSA that extend beyond the 100-year floodplain. Therefore, existing and proposed catchments within the DSA designed for a 100-year event will also contain a 500-year event, so that there is no increase in flood risk within the DSA from either event. There are areas of the Flood Zone AE or 100-year floodplains within the DSA. The boundaries of the 100-year floodplains were compared in GIS against the limits of disturbance for the project to determine the potential impacts to floodplains. There would be approximately 5.9 acres of potential impacts to 100-year floodplains with the Proposed Action as shown on **Exhibit 4-13**. The construction activities in the 100-year floodplains would be for excavation of fill and then grading for proper slope and planting with appropriate ground cover vegetation approved by the State to prevent erosion. This also includes the potential impact to Brier Creek Reservoir with fill to support the proposed navigational aids light stations and access to them.

Complete avoidance and minimization of floodplain impacts is not practicable. However, these impacts would not be significant and would not result in: 1) a considerable probability of the loss of human life; 2) likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service or loss of vital transportation facility; or 3) a notable adverse impact on

natural and beneficial floodplain values. In addition, the lighting placed above Brier Creek Reservoir would be at an elevation that would not be adversely impacted should a 500-year event occur. In fact, none of the project facilities would be inundated by a 500-year event.

The Proposed Action does include placing fill into the Brier Creek Reservoir to accommodate the relocated runway navigational lights. The Airport Authority has modeled the potential change to the flood elevation due to the Proposed Action. The modeling indicated that the relocated runway navigational lights result in no increases in the base flood elevation or floodway elevation. The North Carolina Department of Public Safety Emergency Management has concurred with this finding in the No-Rise Certification.[129]

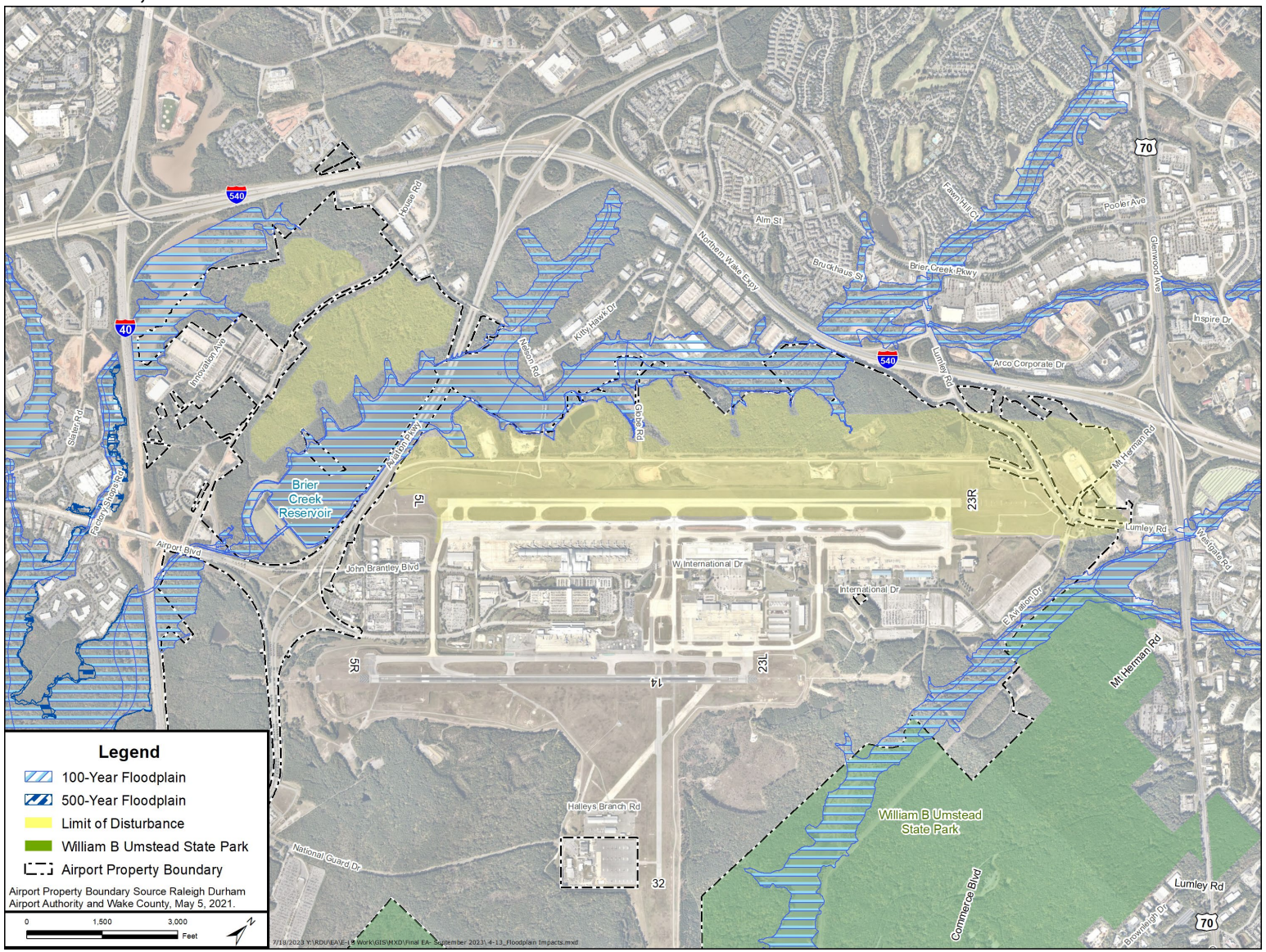
Wake County is obligated to perform maintenance on the Brier Creek Reservoir, perform annual inspections, and prohibit the development, encroachment or installation of any improvements that interfere with their operation or modify their original design. Wake County may approve a request to alter or modify a structure upon their review, review by NRCS, Wake County Board of Commissioner consideration, and construction consideration including providing final as-built surveys. Final design of the Proposed Action is not yet complete. The final design and any required mitigation would be handled in the USACE permit for impacts to Waters of the U.S. A special condition would be inserted that no work within Waters of the U.S. can occur until the Airport Authority has received approval from the USACE.

The Proposed Action will require the Airport Authority to obtain a permit for construction activities in the 100-year floodplain. The Airport Authority will coordinate getting approval of a floodplain permit for the Proposed Action with the State. During the permitting process and final design of the Proposed Action, measures may be considered to minimize floodplain encroachments including special flood related design criteria such as minimizing to the extent practicable minimizing fill placed in floodplains.

The Proposed Action includes modifications to the existing airport stormwater management system to account for the increase in impervious pavement. The modifications are being developed to increase the stormwater capacity to meet the additional demand. As a result, there would be no significant change in flood risk and there would not be a significant change in the potential for interruption or termination of emergency service or emergency evacuation routes. Therefore, the FAA has determined that this encroachment is not significant.

[129] Letter from Jintai Wen, Ph.D. P.E., North Carolina Emergency Management to Michael Landguth, RDU Airport, November 15, 2022. See Appendix H Water Resources.

EXHIBIT 4-13, FLOODPLAIN IMPACTS



Source: Three Oaks Engineering, 2023.

Groundwater

The Proposed Action can affect groundwater mainly through four avenues: the removal of water from Brier Creek Reservoir, the increase in impervious surfaces, pollutant exposure and spills, and by the removal of waterways (ponds, streams, wetlands) that would allow for ground water recharge.

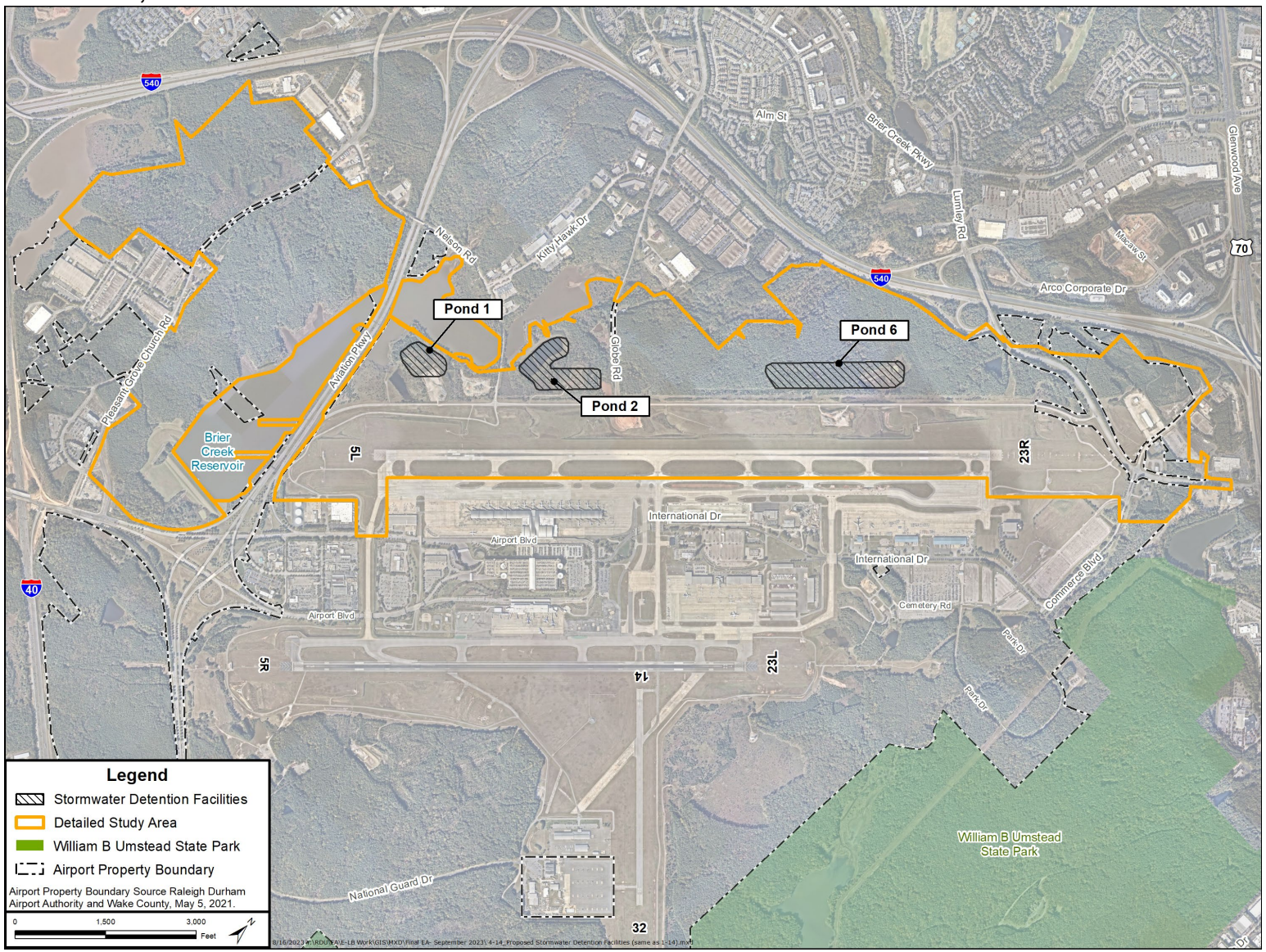
The Proposed Action includes withdrawing water from Brier Creek Reservoir for hydrocompression of the borrow material at the proposed runway location. Water would be removed from Brier Creek Reservoir and applied to the fill material over a period of approximately two years to compact the soil. The water used for hydrocompression would remain within the watershed, upstream of Brier Creek Reservoir, and eventually return to the reservoir via groundwater or by way of runoff, after processing through detention/retention basins. Consequently, there would be no reduction in groundwater levels with the use of the reservoir water for hydrocompression.

The Proposed Action would also increase the amount of impervious surface on airport. The runoff from these additional impervious surfaces would be collected by expanding the existing stormwater facilities as conceptually shown on **Exhibit 4-14**. These facilities would empty into newly created and/or expanded detention/retention facilities. The Airport Authority is designing the stormwater improvements to meet FAA guidance in AC 150/5320-5D Airport Drainage Design. These facilities would be allowed to store water for up to 48 hours (a limit to prevent attraction of wildlife hazardous to safe aviation) to allow groundwater recharge and release any additional flow to the tributary system, which would then reach Brier Creek Reservoir for further ground water recharge. The modifications are being developed to increase the stormwater capacity to meet the additional demand. Therefore, the increase in impervious surface would not result in significant adverse impacts to recharge of groundwater.

In addition, the Proposed Action includes construction and operational activities that may potentially impact groundwater. Construction of the Proposed Action would involve the use of heavy equipment and construction-related chemicals such as fuels, oils, and grease. As described in Section 4.6, an ESC Plan will be developed prior to construction. BMPs and erosion control measures will be identified to control and contain runoff that could make its way to Waters of the U.S. and to groundwater. In addition to BMPs, an MMP would be required for construction activities at the NPL Site. The MMP would include procedures for construction worker health and safety, cuts and excavation, erosion and sediment control, soil management, fill and reconstruction, site security, traffic control, contact water, dust mitigation, and equipment decontamination to reduce any accidental release into groundwater. Furthermore, the SWPPP for the Proposed Action would contain measures for handling construction-related chemicals and action protocols to implement in the event of a spill or release. These measures would minimize the potential for construction activities to adversely impact groundwater. Therefore, construction of the Proposed Action is not expected to result in significant adverse impacts on groundwater quality as a result of accidental spills or releases.

In addition, operation of the Proposed Action is not anticipated to result in significant impacts on water quality. The Airport Authority would maintain its Facility Response Plan and a SPCC plan that addresses the oils, containers, equipment, facilities, associated infrastructure, and operations at the facility that are regulated by or required under the SPCC rule and are owned by the Airport Authority. The SPCC plan details measures for preventing and responding to spills from regulated petroleum bulk storage containers or equipment and transfer operations. Tenants operating on Airport property are required to prepare and implement their own SPCC plan, if applicable. In addition, the Airport Authority maintains a Stormwater Pollution Prevention Plan that contains best management practices and Good Housekeeping requirements to prevent trash and other waste from entering the stormwater system.

EXHIBIT 4-14, PROPOSED STORMWATER DETENTION FACILITIES



Source: Airport Authority, 2023.

Excavation activities during construction of the Proposed Action are expected to occur below the groundwater table, which is estimated between 11 and 15 feet below ground level in the DSA.[130] The Airport Authority would handle any groundwater encountered by installing appropriate dewatering features on-site, as needed. If any potentially contaminated groundwater were encountered during dewatering, the Airport Authority would properly test and treat the water prior to discharge in accordance with the NPDES permit and local dewatering and groundwater discharge approval and permit requirements. Compliance with regulatory requirements would ensure dewatering activities, if required, would not violate discharge requirements or degrade groundwater quality. Therefore, construction of the Proposed Action would not result in significant impacts on groundwater if groundwater is encountered or dewatering is required.

Finally, the Proposed Action would have unavoidable impacts by removing wetlands and surface open waters including streams. After the fill material is excavated, the area would be graded and planted with appropriate ground cover vegetation approved by the State to prevent erosion. The overall flow of water would still be directed downward toward Brier Creek Reservoir with appropriate erosion control measures included so that the Proposed Action would not result in significant impacts to surface water hydrology.

There are no sole source aquifers in Wake County, as designated by USEPA. As provided in Section 3.13, based on a review of the City of Raleigh and Wake County online GIS “iMAPS” system, there is one well located within the DSA. The well is located northwest of Runway 5L/23R adjacent to Globe Road. This well is on Airport property and is not used by the public as a drinking water source. The Proposed Action would not impact this well.

While there are changes to the groundwater system because of the impacts to the flow of water on site and from water consumption for project construction, these changes include methods to ensure the impacts to the ground water system are minor. There would be no significant impacts to groundwater from construction or operation of the Proposed Action.

4.13.3 Future Conditions: 2033

4.13.3.1 No Action Alternative

The Future (2033) No Action Alternative would have the same effects upon water resources, including wetlands, floodplains, surface waters, and groundwater resources as described for the Future (2028) No Action Alternative.

4.13.3.2 Proposed Action

The Future (2033) Proposed Action would have the same effects upon water resources, including wetlands, floodplains, surface waters, and groundwater resources as described for the Future (2028) Proposed Action.

4.13.4 Mitigation, Avoidance, and Minimization Measures

It will be the Airport Authority’s responsibility to apply for and obtain permits required by the USACE and the State for the Proposed Action. The Proposed Action would require the following described mitigation measures. With the mitigation measures, the Proposed Action would not result in significant impacts to wetlands, streams, and surface open waters.

[130] NCDEQ Division of Water Resources. www.ncwater.org Accessed January 2023.

- The Airport Authority shall conduct sediment sampling in ppb for PCBs in Brier Creek Reservoir in the areas of the relocated navigation lights and conveyor system in coordination with USEPA. The Airport Authority shall develop an appropriate plan, approved by the FAA, USACE, and USEPA, for installation of lights and/or conveyer system.
- No work within Waters of the U.S. can occur until the Airport Authority has received approval from the USACE.
- If any potentially contaminated groundwater were encountered during dewatering, the Airport Authority would properly test and treat the water prior to discharge in accordance with the NPDES permit and local dewatering and groundwater discharge approval and permit requirements. Compliance with regulatory requirements would ensure dewatering activities, if required, would not violate discharge requirements or degrade groundwater quality.
- No construction shall occur until the Airport Authority submits an Erosion and Sediment and Control (ESC) Plan that is approved by the NCDEQ.
- No construction shall occur in a potentially jurisdictional water until the Airport Authority obtains the necessary Section 404 and Section 401 of the Clean Water Act permits/approvals from the USACE and NCDEQ respectively. The Airport Authority shall comply with all mitigation requirements as defined in the USACE and NCDEQ permits. For potentially jurisdictional impacts, the Airport Authority would use wetland banking and/or in lieu fee programs offered by NCDEQ Division of Mitigation Services to mitigate for the 1.56 acres of impacted wetlands, approximate 8,780 feet of impacted streams, and 3.48 acres of impacted non-stream surface open waters. Exact mitigation for the buffers (stream buffer areas of 22.6 acres and non-stream surface open waters buffers of 2.17 acres) will be identified depending on the final impact sizes and types determined in the permitting process. It is anticipated mitigation would be required at a 2:1 ratio unless otherwise justified due to reduced function determined by North Carolina Stream Assessment Method (NCSAM) and North Carolina Wetland Assessment Method (NCWAM). No construction shall occur in a non-jurisdictional wetland until mitigation for that impact has been completed. The Airport Authority will replace the wetlands with equivalent acreage credit (a 1:1 ratio) from a mitigation bank or in-lieu-fee program that has been approved by the USACE and NCDEQ, and where the area of impact is within the service area of the bank/in-lieu fee program. Proof of pre-construction mitigation must be submitted to the FAA – Airports District Office prior to impacting said wetland.

The following minimization measures and BMPs are incorporated to further minimize water resource impacts from the Proposed Action.

- Best management practices and erosion control measures will be identified in the ESC Plan to control and contain runoff that could make its way to navigable waterways to minimize the sediment impact.
- Included in the ESC Plan will be BMPs to prevent, to the maximum extent possible, dirt and gravel from leaving the construction site and being deposited on public roadways such as Pleasant Grove Church Road. The BMPs include providing a temporary gravel construction entrance and exit. Driving over the gravel removes dirt and sediment from truck wheels. It is possible that the use of gravel alone would not sufficiently contain mud and sediment from vehicles and additional BMPs would be utilized to the extent necessary to wash off dirt covered trucks before exiting the construction site. It is anticipated that a wheel wash system will be utilized. This would wash mud and sediment from the vehicles before they leave the construction site.

- NCDWR Permitting Branch comments will be considered in the final design.
- Erosion control measures will be identified to control and contain runoff that could make its way to navigable waterways to minimize the sediment impact.
- BMPs to be implemented in accordance with Design Standards in Sensitive Watersheds (15A NCAC 04B .0124).
- BMPs from the North Carolina Department of Transportation Stormwater Best Management Practices Toolbox manual would be identified during the permitting process for the Proposed Action.
- BMP measures from the most current version of the NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
- Erosion control measures will not be placed in wetlands or streams.
- Concrete will be handled in accordance with the NPDES Construction General Permit NCG010000.
- Sediment and erosion control measures sufficient to protect water resources must be implemented and maintained in accordance with the most recent version of North Carolina Sediment and Erosion Control Planning and Design Manual and the most recent version of NCS000250.
- Riparian vegetation (native trees and shrubs) shall be preserved to the maximum extent possible. Riparian vegetation must be reestablished within the construction limits of the project by the end of the growing season following completion of construction.

4.14 Cumulative Impacts

Cumulative impacts are impacts on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions. The analysis of cumulative impacts recognizes that while the impacts of individual actions may be small, when combined with the impacts of past, present, and reasonably foreseeable future actions on populations or resources in and around RDU, the impacts could be potentially significant.

Defining the Cumulative Impact Study Area

The FAA 1050.1F Desk Reference Section 15.2 states “[t]he study area for cumulative impacts analysis is the same area defined for a project’s direct and indirect impact analysis. Thus, the study area will be different for each impact category.” Therefore, for this EA, the Cumulative Impact Study Area is defined as the same boundary as the Proposed Action’s GSA. The GSA is shown on Exhibit 4-13.

Defining the Timeframes

Cumulative impacts include past, present, and reasonably foreseeable future actions. The past actions are defined as those that were completed within the last five years (through 2022). Present actions are defined as those where construction is ongoing. Reasonably foreseeable future actions are defined as those planned to be completed between 2023 and 2028 and that have been developed with enough specificity to provide meaningful data for analysis.

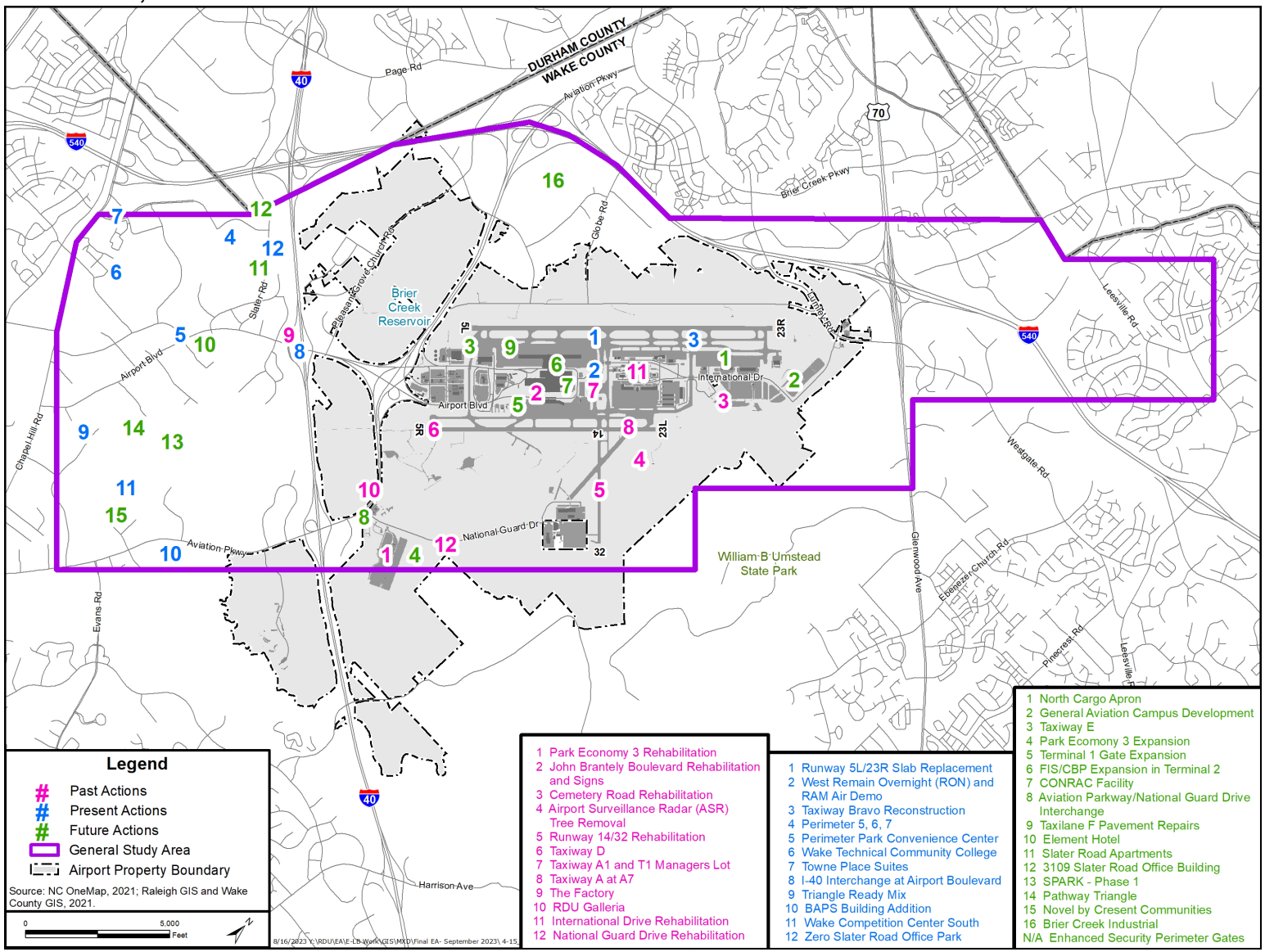
Identification of the Past, Present, and Reasonably Foreseeable Future Actions

Past, present, and reasonably foreseeable future actions include projects both on and off-Airport property as shown on **Exhibit 4-15**. The projects to be included in the cumulative impact analysis were identified through coordination with the Airport Authority, the FAA, and the USACE. In addition, the

Town of Morrisville's Planning Department development website[131] was reviewed, and the Town of Morrisville's Planning Department was contacted directly to identify the list of projects that they have permitted or are considering for development. The Town of Cary's Interactive Development Map[132] was also reviewed to identify approved development that will be occurring within the GSA. No past, present, and reasonably foreseeable future actions were identified within the City of Raleigh.

131 https://www.townofmorrisville.org/government/departments-services/planning
132 https://www.townofcary.org/projects-initiatives/maps/interactive-development-map

EXHIBIT 4-15, CUMULATIVE IMPACT PROJECTS



Source: Landrum & Brown, 2023.

4.14.1 Past Actions

Past actions are identified in **Table 4-24**.

TABLE 4-24, PAST ACTIONS

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
1	Park Economy 3 Rehabilitation	Airport Property	This project included rehabilitation of the asphalt pavement and restoration of the pavement markings.	Project complete
2	John Brantley Boulevard Rehabilitation and Signs	Airport Property	This project included rehabilitation of the asphalt pavement and restoration of the pavement markings on John Brantley Boulevard and the entrance to and exit from the parking garages.	Project complete
3	Cemetery Road Rehabilitation	Airport Property	This project involved asphalt pavement reclamation and a section of new concrete pavement poured on Cemetery Road.	Project complete
4	Airport Surveillance Radar (ASR) Tree Removal	Airport Property	This project included clearing trees that obstructed the ASR causing safety of flight issues.	Project complete
5	Runway 14/32 Rehabilitation	Airport Property	This project included construction activities for milling and pavement rehabilitation on the runway.	Project complete
6	Taxiway D	Airport Property	This project included the reconstruction of the asphalt portion of Taxiway D, the service road adjacent to Taxiway D, Taxiway A5, and the portion of Taxiway C between Taxiway A and Runway 5R/23L.	Project complete
7	Taxiway A1 and T1 Managers Lot	Airport Property	This project included the reconstruction of the pavement section on the centerline portion of the taxiway, milling and re-paving adjacent sections, and crack sealing outer portions of the taxiway for preservation.	Project complete
8	Taxiway A at A7	Airport Property	This project included the full-depth replacement where the subgrade and base need strengthening, and it also included stepped milling and re-paving for additional pavement restoration and the transition back to existing pavement.	Project complete
9	The Factory	Off-Airport (Morrisville, NC)	Change in use of existing 248,362 SF building to Office use	Project complete

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
10	RDU Galleria	Off-Airport Property	This project included the construction of a three-story 30,000 square foot mixed-use office building and gas station at the intersection of Aviation Parkway and RDU Center Drive.	Project Complete
11	International Drive Rehabilitation	Airport Property	This project included rehabilitation of the asphalt pavement and restoration of the pavement markings on International Drive and in the Aircraft Rescue and Fire Fighting parking lot.	Project Complete
12	National Guard Drive Rehabilitation	Airport Property	This project involved the rehabilitation of National Guard Drive from Aviation Parkway to the entrance of the National Guard Facility.	Project Complete

Sources: Town of Morrisville Planning Department Map Services, New Development Map; https://morrisvillenc.maps.arcgis.com/apps/MapSeries/index.html?appid=4b84ccb082d044879946521ef08bb2cc; Raleigh-Durham Airport Authority, 2022.

4.14.2 Present Actions

Present actions would be defined as those where construction is ongoing. Present actions are identified in **Table 4-25**.

TABLE 4-25, PRESENT ACTIONS

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
1	Runway 5L/23R Slab Replacement	Airport Property	This project includes 1) Removal and replacement of specific failing runway slabs; 2) Partial depth concrete repairs; 3) Sawing, cleaning, and re-sealing pavement joints; 4) Repair or replacement of impacted in-pavement lights; and 5) Re-painting the runway as needed.	Project continuing on annual basis as needed
2	West Remain Overnight (RON) and RAM Air Demo	Airport Property	This project includes the expansion of RON parking area northeast of Terminal 2.	Project closeout ongoing / estimated completion 2023
3	Taxiway Bravo Reconstruction	Airport Property	This project includes the reconstruction of Taxiway B north of Taxiway D.	Project closeout ongoing/estimated completion in 2023
4	Perimeter 5, 6, 7	Off-Airport (Morrisville, NC)	3 office buildings totaling 534,500 square feet (Phase 1 building totals 214,500 sf)	Construction ongoing / construction completion date unknown
5	Perimeter Park Convenience Center	Off-Airport (Morrisville, NC)	4,155 square feet convenience store/gas station	Construction ongoing / construction completion date unknown

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
6	Wake Technical Community College	Off-Airport (Morrisville, NC)	Phase II Construction of 66,000 square feet of institutional use on 18.37 acres of a 97.11-acre tract	Construction ongoing / construction completion date unknown
7	Towne Place Suites	Off-Airport (Morrisville, NC)	A new 112 room hotel	Construction ongoing / construction completion date unknown
8	I-40 Interchange at Airport Boulevard	Off-Airport Property	This project includes the construction/expansion of the I-40 off ramp at Airport Boulevard.	Construction ongoing / construction completion date unknown
9	Triangle Ready Mix	Off-Airport (Morrisville, NC)	Concrete plant	Construction ongoing / construction completion date unknown
10	BAPS Building Addition	Off-Airport (Morrisville, NC)	Expansion of religious use building (approximately 24,000 square feet)	Construction ongoing / construction completion date unknown
11	Wake Competition Center South	Off-Airport (Morrisville, NC)	12 lot commercial subdivision and associated public roads	Construction ongoing / construction completion date unknown
12	Zero Slater Road Office Park	Off-Airport (Morrisville, NC)	125,000 square feet of office space on 8.82 acres	Construction ongoing / construction completion date unknown

Sources: Source: Town of Morrisville Planning Department Map Services, New Development Map; https://morrisvillenc.maps.arcgis.com/apps/MapSeries/index.html?appid=4b84ccb082d044879946521ef08bb2cc; Airport Authority, 2022.

4.14.3 Reasonably Foreseeable Future Actions

The FAA 1050.1F Desk Reference defines reasonably foreseeable future actions as actions that may affect projected impacts of this EA and are not remote or speculative.[133] For this analysis, reasonably foreseeable future actions are defined as those planned to be completed between 2023 and 2028. This timeframe represents a window of time that is long enough to identify potential follow-on impacts yet near enough that realistic predictions of projects and impacts can be made. Potential projects beyond 2028 would be considered speculative and too far into the future to realistically predict potential impacts. Reasonably foreseeable future actions are identified in **Table 4-26**.

[133] Per FAA's 1050.1F Desk Reference, future actions may be considered improbable or remote even though they have been mentioned in planning documents.

TABLE 4-26, REASONABLY FORESEEABLE FUTURE ACTIONS

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
1	North Cargo Apron	Airport Property	This project includes the reconstruction of North Cargo apron.	Estimated to start construction 2023
2	General Aviation Campus Development	Airport Property	This project includes development of General Aviation facilities including hangars, apron area, and taxiways to access the runway on the northeast side of airfield.	Estimated to start construction 2023
3	Taxiway E	Airport Property	This project includes the reconstruction of Taxiway E.	Estimated to start construction 2023
4	Park Economy 3 Expansion (new 7,000 spaces)	Airport Property	This project includes the expansion of the existing Park Economy 3 to accommodate 7,000 additional parking spaces. The project will consist of grading, paving, perimeter fencing, bus shelters, tree removal, landscaping, and stormwater collection/storage/retention facilities.	Estimated to start construction 2023
5	Terminal 1 Expansion	Airport Property	This project includes the expansion of Terminal 1 to add additional aircraft gates and terminal space. It includes expansion of bag makeup area, checked baggage reconciliation area, terminal processing components, holdroom/gate areas, Security Screening Checkpoint (SSCP) common areas, support spaces, apron, and site work.	Estimated to start construction prior to 2028
6	Federal Inspection Station (FIS) / Customs and Border Protection (CBP) expansion in Terminal 2	Airport Property	This project expands Terminal 2 Level 2 to increase FIS primary arrival hall queuing and processing areas and expands Terminal 2 Level 1 to replace FIS secondary screening areas and US CBP offices in order to add bag claim carousel devices and associated bag claim lobby areas.	Estimated to start construction 2025
7	CONRAC facility	Airport Property	This project includes developing a Consolidated Rental Car (CONRAC) facility, Ground Transportation Center (GTC), remote rental car storage lot and related roadway improvements. The development of a CONRAC will require the removal of existing public parking, which will be replaced with a new 4 story parking structure adjacent to Terminal 2.	Estimate to start construction 2025 to 2028

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
8	Aviation Parkway/National Guard Drive Interchange	Airport Property	The project involves capacity and safety improvements to the intersection of National Guard Drive with Aviation Parkway. Improvements will include a grade separated interchange to connect Aviation Parkway and National Guard Drive. The project will include a new dedicated northbound lane between the proposed interchange and John Brantley Boulevard. It will also include connector streets to improve access to vacant parcels of Authority property.	Estimated to start construction 2024 to 2027
9	Taxilane F Pavement Repair	Airport Property	This project involves the repair of pavement at Taxilane F	Estimated to start in 2023
10	Element Hotel	Off-Airport (Morrisville, NC)	New 105 room hotel	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
11	Slater Road Apartments	Off-Airport (Morrisville, NC)	New 199-unit apartment community	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
12	3109 Slater Road Office Building	Off-Airport (Morrisville, NC)	New approximately 36,000 square foot office building	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.

ID	PROJECT	LOCATION	DESCRIPTION	CURRENT STATUS
13	SPARK - Phase I	Off-Airport (Morrisville, NC)	Phase I of a multi-phase development proposing two biomanufacturing buildings, one research lab, associated parking, and infrastructure. The project will include approximately 520,000 square feet of buildings on a 111-acre lot.	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
14	Pathway Triangle	Off-Airport (Morrisville, NC)	420,000 square feet life science development spread across three buildings. This phase covers 14 acres of a 73-acre tract.	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
15	Novel by Crescent Communities	Off-Airport (Morrisville, NC)	340-unit multi-family development including live/work units and 1,380 square feet commercial space on 12.94 acres	The project has been approved for development by the Town of Morrisville, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
16	Brier Creek Industrial	Off-Airport (Cary, NC)	Development of approximately 750,000 square feet of office and warehouse uses	The project has been approved for development by the Town of Cary, however a specific construction schedule is not yet available. For this EA, in order to be conservative, it is assumed the project would start construction prior to 2028.
N/A	Enhanced Security Perimeter Gates	Airport Property	The project involves enhancements to 17 security perimeter gates located throughout the airport. The improvements and upgrades are intended to enhance security into and out of the Air Operations Area (AOA) as recommended by Transportation Security Administration (TSA).	Estimated to start construction in 2022/2023

Notes: The Enhanced Security Perimeter Gates occur at various locations and are not depicted on the exhibit.
Sources: Town of Morrisville Planning Department Map Services, New Development Map; https://morrisvillenc.maps.arcgis.com/apps/MapSeries/index.html?appid=4b84ccb082d044879946521ef08bb2cc; Airport Authority, 2022.

4.14.4 Cumulative Impact Determinations

For this EA, the presentation of the cumulative impacts analysis is presented in this independent section to detail all cumulative impacts by impact category. Significant cumulative impacts are determined according to the same FAA thresholds of significance identified in FAA 1050.1F Desk Reference.

For environmental resources where construction and implementation of the Proposed Action would have no environmental impact, there is no potential for an adverse cumulative environmental impact to occur. Therefore, **Table 4-27** provides only those environmental categories where environmental impacts could result from implementation of the Proposed Action. Coastal Resources, Farmlands and Wild and Scenic Rivers were not reviewed for cumulative effects because they would not be impacted by the Proposed Action:

TABLE 4-27, CUMULATIVE IMPACT DETERMINATIONS

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
Air Quality	As discussed in Section 4.2, the increase in overall emissions does not exceed the federal *de minimis* thresholds. Therefore, the air quality assessment indicates that there would be no significant impact on local or regional air quality with construction and operation of the Proposed Action.	Other past, present, and reasonably foreseeable future projects have, and will continue to result in construction and/or operational related air emissions; however, the combined effect of these actions has not reached a level of significance to prevent attainment of all NAAQS. The past projects are already considered as part of the current attainment status of the region. Present or future projects would be expected to conduct General Conformity evaluations to determine potential emissions. Therefore, implementation of the Proposed Action would not have significant cumulative air quality impacts when compared to the No Action Alternative.
Biological	There is no significant impact to biological resources, as identified in Section 4.3. See Appendix D Biological Resources for FAA's consultation with the USFWS.	The Proposed Action would remove up to 480 acres of forested area, which would result in additional forest fragmentation in the region. Loss of this forested area is likely to push wildlife onto adjacent areas that would remain forested. The Airport Authority would leave 100 feet of the existing trees and vegetation in place as a buffer. This would help provide wildlife a remaining corridor to other forested areas. Most wildlife in the impact area would respond to the disturbance by relocating to other forested areas. Other past, present, and reasonably foreseeable future projects are likely to contribute to the overall loss of natural habitat in the area. For present and foreseeable future actions that do not involve an undertaking by a federal agency, such as private development off Airport property, the private developer (not the

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
		Airport or FAA) would be responsible to meet any local, state, or federal requirements for impact to threatened and endangered species and potential habitat loss. Given these requirements, the combined effect of these projects is not anticipated to be significant. None of the four factors identified in Section 4.3.1 are met that would indicate a potential significant impact. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects would not result in significant adverse impacts to biological resources.
Climate	As stated in Section 4.4, the Proposed Action would not result in a significant impact to climate.	As noted in Section 3.3.1 of the Desk Reference for FAA Order 1050.1F, the CEQ has indicated, “climate change is a particularly complex challenge given its global nature and inherent interrelationships among its sources, causation, mechanisms of action and impacts…” Given the enormity of GHG emissions worldwide, the contributions of one project, or several geographically related projects are negligible. CEQ has also noted that “it is not currently useful for the NEPA analysis to attempt to link specific climatological changes, or the environmental impacts thereof, to the particular project or emissions, as such direct linkage is difficult to isolate and to understand.” Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects would not result in significant adverse impacts to climate.
USDOT Section 4(f)	The Proposed Action would have no direct or indirect adverse impacts on Section 4(f) or Section 6(f) resources including the William B. Umstead State Park. The Proposed Action moves the primary runway at RDU further away from the park, which has been identified as a Section 4(f) resource.	The Proposed Action would not contribute to cumulative impacts to Section 4(f) or Section 6(f) resources.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
Hazardous Materials	As stated in Section 4.6, there would be no significant impact related to hazardous materials, solid waste, and pollution prevention.	Other past and present projects are assumed to have already complied with local, state and federal regulations governing hazardous materials. Similarly, it is assumed that all future actions would be responsible to meet any local or state requirements. If hazardous materials are encountered during construction of these actions, treatment, disposal, and/or remediation actions would be required under state and federal law, meaning that significant impacts from hazardous materials would be unlikely. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects would not result in significant adverse impacts to hazardous materials.
Solid Waste	As stated in Section 4.6, there would be no significant impact related to solid waste.	The Proposed Action, in combination with cumulative projects, would not result in a significant impact related to solid waste because there is ample capacity at existing solid waste sites.
Historical, Architectural, Archeological, and Cultural Resources	As stated in Section 4.7, there would be no Direct or Indirect effects to any historical, architectural, archeological, or cultural resources.	Since the Proposed Action has no impact on this impact category, when combined with other past, present, or reasonably foreseeable future projects, it would not result in significant adverse cumulative impacts to historic, architectural, archeological, and cultural resources.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
Land Use	As stated in Section 4.8, there are no significant impacts related to land use.	Other on and off-airport cumulative projects have or would be reviewed either by the Airport Authority, the Town of Morrisville, Wake County, or the City of Raleigh for consistency with applicable land use plans and policies, such as zoning requirements and general plan policies, during project approvals. Implementation of the Proposed Action combined with the implementation of one or more of the past, present, and reasonably foreseeable future actions would not result in a cumulative impact to land uses, because projects requiring a change in land use would have to be evaluated by the respective jurisdiction to determine its consistency with future land use plans. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable future projects, would not result in significant adverse impacts to existing or future land uses.
Natural Resources and Energy Supply	As stated in Section 4.9, there would be no significant impact related to natural resources and energy supply.	The Proposed Action, when combined with other past, present, or reasonably foreseeable future projects, would not result in significant adverse impacts to energy supply. Given the availability of natural resources for construction in the region, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects, would not result in significant impacts to consumable natural resources.
Noise and Noise-Compatible Land Use	As stated in Section 4.10, with mitigation, there is no significant impact related to noise and noise compatible land use.	Any future noise impact from an airport project would review the noise impacts in a cumulative manner based on operations at the airport. Significant impacts due to noise would be required to have their own mitigation measures to minimize impacts during implementation of the project. Projects off-airport would be isolated to nearby areas and would not have an appreciable impact on the noise contours of the airport. In addition, there are noise regulations within each municipality that projects would need to comply with. Therefore, the Proposed Action, when combined with other past, present, or reasonably foreseeable future projects, would not result in significant adverse impacts to noise and noise-compatible land uses.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
Socioeconomic (including surface transportation)	As stated in Section 4.11, there would not be a significant impact related to socioeconomics, including surface transportation.	Other past and present projects are assumed to have already complied with local, state and federal regulations governing socioeconomics including consistency with applicable land use plans and policies, such as zoning requirements and general plan policies, during project approvals. In addition, other past and present projects are assumed to have already complied with local, state and federal regulations governing surface transportation including construction or relocation of roadways. Similarly, it is assumed that all future actions would be responsible to meet any local or state requirements. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects are not expected to result in significant adverse impacts to socioeconomics including surface transportation.
Environmental Justice	As stated in Section 4.11, there would not be a significant impact related to environmental justice.	Other past and present projects are assumed to have already complied with local, state and federal regulations governing environmental justice communities. Similarly, it is assumed that all future actions would be responsible to meet any federal, local, or state requirements. Local municipalities are reviewing potential impacts to environmental justice communities in their planning, zoning, and development projects. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects are not expected to result in significant adverse impacts to environmental justice communities.
Children's environmental health and safety risks	As stated in Section 4.11, there would not be a significant impact related to children's environmental health and safety risks.	Other past and present projects are assumed to have already complied with local, state and federal regulations governing children's environmental health and safety risks. Similarly, it is assumed that all future actions would be responsible to meet any local or state requirements through enforcement of local zoning codes. Therefore, implementation of the Proposed Action, when combined with other past, present, or reasonably foreseeable projects are not expected to result in significant adverse impacts to children's environmental health and safety risks.

ENVIRONMENTAL RESOURCE	IS THERE A SIGNIFICANT IMPACT?	CUMULATIVE IMPACT DETERMINATIONS
Visual Effects	As stated in Section 4.12, there would not be a significant impact related to visual effects.	Other reasonably foreseeable cumulative projects are consistent with the existing commercial, residential, and industrial, development within the GSA, and when combined with the Proposed Action, would not result in a substantial increase in light emissions or change in visual character. Therefore, the Proposed Action in addition to the cumulative projects are not expected to lead to significant cumulative visual effects.
Water Resources	As stated in Section 4.13, with mitigation, there would not be a significant impact related to water resources.	The other past, present, or reasonably foreseeable future projects in combination with the Proposed Action could impact water quality and water resources in the vicinity of the Airport. However, it is reasonable that each past, present, or reasonably foreseeable future project required or will require its own protective measures and permits to avoid and minimize impacts during implementation of the project. Both federal and non-federal projects would have to comply with local regulations regarding stormwater retention and treatment, obtain permits for grading, and comply with water quality certification if required. Therefore, no significant cumulative impacts to water resources would be expected.

4.14.5 Cumulative Impact Summary

The level of cumulative impacts anticipated to occur within these environmental resource categories is not significant due to the types of past, present, and reasonably foreseeable future projects, the extent of the built environment in which they would occur, the lack of certain environmental resources in the area, and the mitigation measures identified for the Proposed Action. Therefore, implementation of the Proposed Action would not result in significant cumulative environmental impacts.

4.15 Identification of the Environmentally Preferred Alternative

The FAA has identified the Proposed Action as the Environmentally Preferred Alternative. In identifying the Environmentally Preferred Alternative, the FAA considered the ability of each alternative to meet the purpose and need for the project, the Airport Authority's goals and objectives, and the potential environmental impacts. The USACE will determine the least environmentally damaging practicable alternative (LEDPA) as part of the CWA Section 404 permitting process.

The Proposed Action will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to Section 102(2)(C) of NEPA, and therefore, an EIS is not necessary.