4 Environmental Consequences and Mitigation Measures

This chapter presents the assessment of environmental impacts addressed in considering reasonably foreseeable environmental consequences of the four alternatives identified in Chapter 2, *Alternatives*, including: the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. It also presents a discussion of mitigation measures to avoid and minimize potential adverse environmental impacts, as applicable. For reference, the following is a description of the main elements of each alternative. Each alternative is graphically depicted and described in Chapter 2, *Alternatives*, Exhibits 2-1, 2-11, 2-12, and 2-13, respectively.

No Action Alternative: No changes would be made to the airfield or terminal except for projects currently under design or construction.

Alternative 1 (Proposed Action): 10,000-foot Runway 01/19 in the Midfield with 3,100 Feet of Separation to Runway 18R/36L and 1,200 Feet of Separation to Runway 18C/36C, Extension of Concourses B and C, Dual Taxi on Terminal Ramp, and Dual Crossfield Taxi Corridors

Alternative 2: 10,000-foot Runway 01/19 in Midfield with 3,200 Feet of Separation to Runway 18R/36L and 1,100 feet of Separation to Runway 18C/36C, Extension of Concourses B and C, Dual Taxi on Terminal Ramp, and Dual Crossfield Taxi Corridors

Alternative 3: 8,900-foot Runway 01/19 in the Midfield with 3,400 Feet of separation to Runway 18R/36L and 900 feet of separation to Runway 18C/36C, Extension of Concourses B and C, Dual Taxi on Terminal Ramp, and Dual Crossfield Taxi Corridors

4.1 Analysis Years

The following analysis discloses the impacts for the projected future conditions in 2028 and 2033. The Environmental Assessment (EA) uses 2028 as a basis for analysis because 2028 is the projected implementation year of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. In addition, 2033 is used as a basis for analysis, most notably for air quality and noise and noise-compatible land use, because it represents a condition five years beyond the opening year.

4.2 Environmental Resources

As required by the Federal Aviation Administration (FAA) FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, the environmental categories listed below are addressed in this EA. Construction activities could result in potential impacts to multiple categories. As required by FAA Order 1050.1F, the assessment of potential construction related impacts is discussed where applicable for each of the categories listed.

- Air Quality
- Biological Resources (including fish, wildlife, and plants)
- Climate
- Department of Transportation (USDOT) Act, Section 4(f)
- Hazardous Materials, Solid Waste, and Pollution Prevention
- Historical, Architectural, Archeological, and Cultural Resources
- Land Use
- Natural Resources and Energy Supply
- Noise and Noise-Compatible Land Use

- Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks
- Visual Effects (including light emissions)
- Water Resources (including wetlands, floodplains, surface waters, and groundwater)

As discussed in Chapter 3, *Affected Environment*, Coastal Resources, Farmlands, and Wild and Scenic Rivers, a subcategory of water resources, are not present within the project area and would not be affected by the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. Therefore, these resources are not discussed further in this chapter.

4.3 Air Quality

This section presents the analysis of potential significant adverse air quality impacts resulting from the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. 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*,[78] 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 the Clean Air Act (CAA), as amended in 1990.

As discussed in Chapter 3, *Affected Environment*, Mecklenburg County, operates under a maintenance plan for ozone (O_3). Therefore, General Conformity regulations apply. The General Conformity Rule under the CAA establishes minimum values, referred to as the *de minimis* thresholds, for the criteria and precursor pollutants[79] for the purpose of:

- Identifying federal actions with project-related emissions that are clearly negligible (*de minimis*);
- Avoiding unreasonable administrative burdens on the sponsoring agency, and;
- Focusing efforts on key actions that would have potential for significant air quality impacts.

The *de minimis* rates vary depending on the severity of the nonattainment area and further depend on whether the general federal action is located inside an ozone transport region.[80] The USEPA defines *de minimis* as emissions that are so low as to be considered insignificant and negligible. An evaluation relative to the General Conformity Rule (the Rule), published under 40 Code of Federal Regulations (C.F.R.) Part 93, is required only for general federal actions that would cause emissions of the criteria or precursor pollutants, and are:

- Federally-funded or federally-approved;
- Not a highway or transit project;[81]
- Not identified as an exempt project[82] under the CAA;

78 FAA, Aviation Emissions and Air Quality Handbook Version 3, Update 1, January 2015.

79 Precursor pollutants are pollutants that are involved in the chemical reactions that form the resultant pollutant. Ozone precursor pollutants are NO_x and VOC, whereas $PM_{2.5}$ precursor pollutants include NO_x, VOC, SO_2, and ammonia (NH_3).

80 The ozone transport region is a single transport region for ozone (within the meaning of Section 176A(a) of the CAA), comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, as given at Section 184 of the CAA

81 Highway and transit projects are defined under Title 23 United States Code and the Federal Transit Act.

82 The Proposed Project is not listed as an action exempt from a conformity determination pursuant to 40 C.F.R. § 93.153(c). An exempt project is one that the EPA has determined would clearly have no impact on air quality at the facility, and any net increase in emissions would be so small as to be considered negligible.

- Not a project identified on the approving federal agency's Presumed to Conform list;[83] and,
- Located within a nonattainment or maintenance area.

When the action requires evaluation under the General Conformity regulations, the net total direct and indirect emissions due to the federal action may not equal or exceed the relevant *de minimis* thresholds unless:

- An analytical demonstration is provided that shows the emissions would not exceed the National Ambient Air Quality Standards (NAAQS); or
- Net emissions are accounted for in the State Implementation Plan (SIP) planning emissions budget; or
- Net emissions are otherwise accounted for by applying a solution prescribed under 40 C.F.R. § 93.158.

As previously discussed, Mecklenburg County operates under a maintenance plan for ozone and conformity to the *de minimis* threshold is relevant only with regard to the ozone precursor pollutants, nitrous oxide (NOx) and volatile organic compounds (VOCs).

If the General Conformity evaluation for this air quality assessment were to show that any of the applicable thresholds were equaled or exceeded due to an alternative, a more detailed analysis to demonstrate conformity would be required. This is referred to as a General Conformity Determination.[84] Conversely, if the General Conformity evaluation were to show that none of the relevant thresholds were equaled or exceeded, the alternative would be presumed to conform to the applicable SIPs and no further analysis would be required under the CAA.

According to FAA guidance, a Hazardous Air Pollutants (HAPs) emissions inventory should be considered if the Proposed Action is considered "major" (e.g., new airport, new runway, major runway extension, etc.); if the Proposed Action is located in a nonattainment or maintenance area; and/or if a criteria pollutant emissions inventory is also prepared. Because Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 include the construction of a new runway, a HAPS emissions inventory was conducted for the purpose of this analysis and is provided in Appendix C. The results are provided for disclosure purposes as there are currently no Federal standards specifically pertaining to HAPs emissions from aircraft engines or airports. Furthermore, Appendix C presents the methodology used to prepare the emissions inventories for this EA.

4.3.1 Future Conditions: 2028

4.3.1.1 No Action Alternative

Aircraft Activity Levels and Taxi Time: Annual operations at CLT are forecasted to be 631,783 in 2028. Based on a simulation analysis conducted for the 2028 No Action Alternative, the Airport would have an average taxi-in time of 13 minutes and 18 seconds and an average taxi-out time of 20 minutes and 27 seconds with the 2028 No Action Alternative.[85]

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83 The provisions of the CAA allow a Federal agency to submit a list of actions demonstrated to have low emissions that would have no potential to cause an exceedance of the NAAQS and are presumed to conform to the CAA conformity regulations. This list would be referred to as the "Presumed to Conform" list. The FAA Presumed to Conform list was published in the Federal Register on February 12, 2007 (72 FR 6641-6656) and includes airport projects that would not require evaluation under the General Conformity regulations.

84 40 C.F.R. § 93.153.

85 See Appendix B, *Purpose and Need and Alternatives*, for more information on the simulation analysis methodology and results.

Auxiliary Power Units (APUs) and Ground Support Equipment (GSE): AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: No changes to roadways would occur in the No Action Alterative. See Appendix C for more information regarding the vehicle activity for this alternative.

Emissions Inventory: The operational emissions inventory for the 2028 No Action Alternative is shown in **Table 4-1**.

TABLE 4-1, OPERATIONAL EMISSIONS INVENTORY – 2028 NO ACTION ALTERNATIVE

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	3,378	456	2,347	256	21	21
Taxiing	3,013	239	498	136	10	10
LTOs	365	217	1,849	120	11	11
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Motor Vehicles	23	0.5	4	0.0	0.1	0.1
TOTAL	3,926	483	2,477	274	39	39

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.1.2 Alternative 1 (Proposed Action)

Aircraft Activity Levels and Taxi Time: Annual operations in 2028 for Alternative 1 (Proposed Action) would be the same as the 2028 No Action Alternative. Based on a simulation analysis conducted for the 2028 Alternative 1 (Proposed Action), the Airport would have an average taxi-in time of 10 minutes and 13 seconds and an average taxi-out time of 18 minutes and 44 seconds with the implementation of the alternative.[86]

APUs and GSE: Similar to the 2028 No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: 2028 Alternative 1 (Proposed Action) would require the relocation of an approximately one-mile segment of West Boulevard on existing roadways outside of the footprint of the Runway Protection Zone (RPZ) of proposed Runway 01/19 and the south end-around taxiway (SEAT). Motor vehicles that use the existing roadway were assumed to use existing roadways (Piney Top Drive and Byrum Drive). See Appendix C for more information regarding the vehicle activity for this alternative.

Emissions Inventory: The operational emissions inventory for the 2028 Alternative 1 (Proposed Action) is shown in **Table 4-2**.

[86] See Appendix B, *Purpose and Need and Alternatives*, for more information on the simulation analysis methodology and results.

TABLE 4-2, OPERATIONAL EMISSIONS INVENTORY – 2028 ALTERNATIVE 1 (PROPOSED ACTION)

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	2,949	409	2,275	237	19	19
Taxiing	2,584	192	428	117	9	9
LTOs	365	217	1,848	120	10	10
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Motor Vehicles	23	0.5	4	0.0	0.1	0.1
TOTAL	3,498	436	2,405	255	37	37

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.1.3 Alternative 2

Airfield Configuration and Taxi Time: Annual operations in 2028 for Alternative 2 would be the same as the 2028 No Action Alternative. Furthermore, taxi times in 2028 for Alternative 2 were assumed to be the same as 2028 Alternative 1 (Proposed Action) due to the similarity in airfield configuration.

APUs and GSE: Similar to the 2028 No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: Motor vehicle assumptions for 2028 Alternative 2 would be the same as those for 2028 Alternative 1 (Proposed Action).

Emissions Inventory: The operational emissions inventory for the 2028 Alternative 2 is shown in **Table 4-3**.

TABLE 4-3, OPERATIONAL EMISSIONS INVENTORY – 2028 ALTERNATIVE 2

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	2,949	409	2,275	237	19	19
Taxiing	2,584	192	428	117	9	9
LTOs	365	217	1,848	120	10	10
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Motor Vehicles	23	0.5	4	0.0	0.1	0.1
TOTAL	3,498	436	2,405	255	37	37

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.1.4 Alternative 3

Aircraft Activity Levels and Taxi Time: Annual operations in 2028 for Alternative 3 would be the same as the No Action Alternative. Based on a simulation analysis conducted for the 2028 Alternative 3, the Airport would have an average taxi-in time of 11 minutes and 49 seconds and an average taxi-out time of 17 minutes and 28 seconds.[87]

APUs and GSE: Similar to the No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: Motor vehicle assumptions for 2028 Alternative 3 would be the same as those for 2028 Alternative 1 (Proposed Action).

Emissions Inventory: The operational emissions inventory for the 2028 Alternative 3 is shown in **Table 4-4**.

TABLE 4-4, OPERATIONAL EMISSIONS INVENTORY – 2028 ALTERNATIVE 3

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	2,979	412	2,280	238	20	20
Taxiing	2,614	195	432	118	9	9
LTOs	365	217	1,848	120	11	11
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Motor Vehicles	23	0	4	0	0	0
TOTAL	3,528	439	2,410	256	38	38

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.2 Construction

Although a final construction schedule has not been determined, an eight-year construction program is proposed for the main project elements, including terminal and ramp expansion and the new parallel runway construction (see Chapter 1, *Purpose and Need*). Modeling assumptions regarding construction activities and estimates for Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 are provided in Appendix C.

Alternative 1 (Proposed Action) and Alternative 2 propose a 10,000-foot parallel runway while Alternative 3 proposes an 8,900-foot parallel runway. As such, Alternative 1(Proposed Action) and Alternative 2 would be expected to involve more construction than those for Alternative 3. However, overall grading would remain the same for all three alternatives. Therefore, overall construction emissions for Alternative 3 would be lower than those estimated for Alternative 1 (Proposed Action) and Alternative 2 during the years involving runway construction (2024 through 2028). **Table 4-5** summarizes the estimated construction emissions for Alternative 1 (Proposed Action), Alternative 2, and Alternative 3.

[87] See Appendix B, *Purpose and Need and Alternatives*, for more information on the simulation analysis methodology and results.

TABLE 4-5, CONSTRUCTION EMISSIONS INVENTORY

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
2021						
Alternative 1 (Proposed Action)	31.7	1.2	7.2	0.0	1.2	0.4
Alternative 2	31.7	1.2	7.2	0.0	1.2	0.4
Alternative 3	31.7	1.2	7.2	0.0	1.2	0.4
2022						
Alternative 1 (Proposed Action)	53.7	1.8	10.0	0.1	0.4	0.3
Alternative 2	53.7	1.8	10.0	0.1	0.4	0.3
Alternative 3	53.7	1.8	10.0	0.1	0.4	0.3
2023						
Alternative 1 (Proposed Action)	124.8	6.0	50.6	0.3	15.5	4.1
Alternative 2	124.8	6.0	50.6	0.3	15.5	4.1
Alternative 3	124.8	6.0	50.6	0.3	15.5	4.1
2024						
Alternative 1 (Proposed Action)	101.3	4.6	31.1	0.2	18.7	3.8
Alternative 2	102.8	4.6	31.6	0.2	19.3	3.9
Alternative 3	107.0	4.6	30.6	0.2	16.4	3.5
2025						
Alternative 1 (Proposed Action)	114.3	5.1	34.6	0.2	18.9	4.0
Alternative 2	115.8	5.2	35.2	0.2	19.5	4.1
Alternative 3	107.9	4.8	31.9	0.2	16.5	3.6
2026						
Alternative 1 (Proposed Action)	99.9	4.5	30.8	0.2	18.7	3.8
Alternative 2	101.4	4.6	31.4	0.2	19.2	3.9
Alternative 3	93.5	4.2	28.0	0.2	16.3	3.4
2027						
Alternative 1 (Proposed Action)	46.4	2.2	15.7	0.1	9.6	2.0
Alternative 2	47.9	2.3	16.3	0.1	10.1	2.1
Alternative 3	40.0	1.9	12.9	0.1	7.2	1.5
2028						
Alternative 1 (Proposed Action)	20.6	0.7	3.6	0.0	0.2	0.2
Alternative 2	20.6	0.7	3.6	0.0	0.2	0.2
Alternative 3	20.6	0.7	3.6	0.0	0.2	0.2

Source: Landrum & Brown analysis, 2021

4.3.3 Future Conditions: 2033

4.3.3.1 No Action Alternative

Aircraft Activity Levels and Taxi Time: Annual operations at CLT are forecasted to be 675,643 in 2033. Based on a simulation analysis conducted for the 2033 No Action Alternative, the Airport would have an average taxi-in time of 15 minutes and 7 seconds and an average taxi-out time of 21 minutes and 45 seconds with the No Action Alternative.[88]

APUs and GSE: AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

[88] See Appendix B, *Purpose and Need and Alternatives*, for more information on the simulation analysis methodology and results.

Motor Vehicles: No changes to roadways would occur in the No Action Alternative. See Appendix C for more information regarding the vehicle activity for this alternative.

Emissions Inventory: The operational emissions inventory for the 2033 No Action Alternative is shown in **Table 4-6**.

TABLE 4-6, OPERATIONAL EMISSIONS INVENTORY –2033 NO ACTION ALTERNATIVE

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	3,834	526	2,599	285	23	23
Taxiing	3,453	295	577	157	12	12
LTOs	381	231	2,022	127	11	11
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Motor Vehicles	18	0.2	2	0.0	0.1	0.1
TOTAL	4,413	555	2,734	304	42	41

Note: LTOs denotes aircraft landing and takeoff operations; APUs represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.3.2 Alternative 1 (Proposed Action)

Aircraft Activity Levels and Taxi Time: Annual operations in 2033 for Alternative 1 (Proposed Action) would be the same as the 2033 No Action Alternative. Based on an assessment of the capacity and demand of the 2033 Alternative 1 (Proposed Action), the Airport would have an average taxi-in time of 10 minutes and 26 seconds and an average taxi-out time of 19 minutes and 20 seconds.

APUs and GSE: Similar to the No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: 2033 Alternative 1 (Proposed Action) would require the relocation of an approximately one-mile segment of West Boulevard on existing roadways outside of the footprint of the RPZ of proposed Runway 01/19 and the SEAT. See Appendix C for more information regarding the vehicle activity for this alternative.

Emissions Inventory: The operational emissions inventory for the 2033 Alternative 1 (Proposed Action) is shown in **Table 4-7**.

TABLE 4-7, OPERATIONAL EMISSIONS INVENTORY – 2033 ALTERNATIVE 1 (PROPOSED ACTION)

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	3,169	450	2,487	254	20	20
Taxiing	2,788	219	466	127	9	9
LTOs	381	231	2,020	127	11	11
APU	172.7	14.3	100.3	15.2	16.1	16.1
GSE	388.2	14.6	32.1	4.1	2.3	2.1
Motor Vehicles	18	0.2	3	0.0	0.1	0.1
TOTAL	3,748	479	2,622	274	39	39

Note: LTOs denotes aircraft landing and takeoff operations; APUs represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.3.3 Alternative 2

Airfield Configuration and Taxi Time: Annual operations in 2033 for Alternative 2 would be the same as the No Action Alternative. Furthermore, taxi times in 2033 for Alternative 2 were assumed to be the same as 2033 Alternative 1 (Proposed Action) due to the similarity in airfield configuration.

APUs and GSE: Similar to the No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: Motor vehicle assumptions for 2033 Alternative 2 were assumed to be the same as those for 2033 Alternative 1 (Proposed Action).

Emissions Inventory: The operational emissions inventory for the 2033 Alternative 2 is shown in **Table 4-8**.

TABLE 4-8, OPERATIONAL EMISSIONS INVENTORY – 2033 ALTERNATIVE 2

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	3,169	450	2,487	254	20	20
Taxiing	2,788	219	466	127	9	9
LTOs	381	231	2,020	127	11	11
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Motor Vehicles	18	0.2	3	0.0	0.1	0.1
TOTAL	3,748	479	2,622	274	39	39

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.3.4 Alternative 3

Aircraft Activity Levels and Taxi Time: Annual operations in 2033 for Alternative 3 would be the same as the 2033 No Action Alternative. Based on a simulation analysis conducted for 2033 Alternative 3, the Airport would have an average taxi-in time of 12 minutes and 8 seconds and an average taxi-out time of 18 minutes and 13 seconds.[89]

APUs and GSE: Similar to the 2033 No Action Alternative, AEDT defaults for APUs and GSE were assumed for the purpose of this analysis.

Motor Vehicles: Motor vehicle assumptions for 2033 Alternative 3 were assumed to be the same as those for 2033 Alternative 1 (Proposed Action).

Emissions Inventory: The operational emissions inventory for the 2033 Alternative 3 is shown in **Table 4-9**.

[89] See Appendix B, *Purpose and Need and Alternatives*, for more information on the simulation analysis methodology and results.

TABLE 4-9, OPERATIONAL EMISSIONS INVENTORY – 2033 ALTERNATIVE 3

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NOx	SOx	PM_{10}	$PM_{2.5}$
Aircraft	3,224	456	2,496	257	21	21
Taxiing	2,843	225	475	130	10	10
LTOs	381	231	2,020	127	12	12
APUs	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Motor Vehicles	18	0.2	3	0.0	0.1	0.1
Total	3,803	485	2,631	276	40	40

Note: LTOs denotes aircraft landing and takeoff operations; APU represents Auxiliary Power Units; GSE represents Ground Support Equipment. Numbers may not appear to sum as reported due to rounding.
Source: Landrum & Brown analysis, 2021

4.3.4 Total Emissions

The emissions inventories prepared for Alternative 1 (Proposed Action), Alternative 2, and Alternative 3, were compared to the emissions inventory prepared for the No Action Alternative of the same future year to disclose the potential net increase in emissions caused by each alternative (see **Tables 4-10 through 4-12**). 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 under the CAA (including the 1990 Amendments).

From 2021 through 2027, there is an increase in net emissions solely due to construction activities associated with Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. As previously discussed, Alternative 1 (Proposed Action) and Alternative 2 both involve more construction activities associated with runway construction compared to Alternative 3. As such, construction emissions are lower for Alternative 3 when compared to those of Alternative 1 (Proposed Action) and Alternative 2. Construction activities are also included in the first operational year (2028) for each alternative.

The West Boulevard relocation associated with Alternative 1 (Proposed Action), Alternative 2, and Alternative 3, would result in a slight increase in motor vehicle emissions in both 2028 and 2033 due to the longer distance required to be traveled with the new route. The total annual operations remain the same (if not be very similar) between the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3; emissions resulting from aircraft landings and takeoffs would remain the same between the four alternatives. However, there is an overall decrease in emissions due to aircraft taxiing emissions. Compared to the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 have substantially reduced taxi times in 2028 and 2033 due to the reduction in taxi delays from congestion in the terminal apron and the shortened departure queues. Therefore, the airfield configuration of Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would provide airfield efficiencies that would reduce overall operational air quality emissions at the Airport.

As presented in Tables 4-10 through 4-12, neither Alternative 1 (Proposed Action), nor Alternative 2, nor Alternative 3 would cause an increase in air emissions above the applicable *de minimis* thresholds. Therefore, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 conform to the SIP and the CAA and would not create any new violation of the 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 of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. No further analysis or reporting is required under the CAA or NEPA.

TABLE 4-10, NET EMISSIONS INVENTORY – ALTERNATIVE 1 (PROPOSED ACTION)

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
			2021			
Construction	32	1	7	0	1	0
Alternative 1 Subtotal	*32*	*1*	*7*	*0*	*1*	*0*
			2022			
Construction	54	2	10	0	0	0
Alternative 1 Subtotal	*54*	*2*	*10*	*0*	*0*	*0*
			2023			
Construction	25	6	51	0	15	4
Alternative 1 Subtotal	*125*	*6*	*51*	*0*	*15*	*4*
			2024			
Construction	101	5	31	0	19	4
Alternative 1 Subtotal	*101*	*5*	*31*	*0*	*19*	*4*
			2025			
Construction	114	5	35	0	19	4
Alternative 1 Subtotal	*114*	*5*	*35*	*0*	*19*	*4*
			2026			
Construction	100	5	31	0	19	4
Alternative 1 Subtotal	*100*	*5*	*31*	*0*	*19*	*4*
			2027			
Construction	46	2	16	0	10	2
Alternative 1 Subtotal	*46*	*2*	*16*	*0*	*10*	*2*
			2028			
No Action Alternative						
Aircraft	3,378	456	2,347	256	21	21
Taxiing	*3,013*	*239*	*498*	*136*	*10*	*10*
LTOs	*365*	*217*	*1,849*	*120*	*11*	*11*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
No Action Alternative Subtotal	*3,926*	*483*	*2,477*	*274*	*39*	*39*
Alternative 1						
Construction	21	0.7	4	0.0	0.2	0.2
Aircraft	2,949	409	2,275	237	19	19
Taxiing	*2,584*	*192*	*428*	*117*	*9*	*9*
LTOs	*365*	*217*	*1,848*	*120*	*10*	*10*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
Alternative 1 Subtotal	*3,519*	*437*	*2,408*	*255*	*37*	*37*
2028 Net Emissions	***-408***	***-47***	***-69***	***-19***	***-2***	***-2***
			2033			
No Action Alternative						
Aircraft	3,834	526	2,599	285	23	23
Taxiing	*3,453*	*295*	*577*	*157*	*12*	*12*
LTOs	*381*	*231*	*2,022*	*127*	*11*	*11*
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Vehicles	18	0.2	2	0.0	0.1	0.1
No Action Alternative Subtotal	*4,413*	*555*	*2,734*	*304*	*42*	*41*
Alternative 1						
Aircraft	3,169	450	2,487	254	20	20
Taxiing	*2,788*	*219*	*466*	*127*	*9*	*9*
LTOs	*381*	*231*	*2,020*	*127*	*11*	*11*
APU	173	14	100	15	16	16

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
GSE	388	15	32	4	2	2
Vehicles	18	0.2	3	0.0	0.1	0.1
Alternative 1 Subtotal	*3,748*	*479*	*2,622*	*274*	*39*	*39*
2033 Net Emissions	***-665***	***-76***	***-112***	***-30***	***-3***	***-3***
Federal Threshold Exceeded?	***N/A***	***NO***	***NO***	***N/A***	***N/A***	***N/A***

Source: Landrum & Brown analysis, 2021

TABLE 4-11, NET EMISSIONS INVENTORY – ALTERNATIVE 2

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
2021						
Construction	32	1	7	0.0	1	0.4
Alternative 2 Subtotal	32	1	7	0.0	1	0.4
2022						
Construction	54	2	10	0.1	0.4	0.3
Alternative 2 Subtotal	54	2	10	0.1	0.4	0.3
2023						
Construction	125	6	51	0.3	15	4
Alternative 2 Subtotal	125	6	51	0.3	15	4
2024						
Construction	103	5	32	0.2	19	4
Alternative 2 Subtotal	103	5	32	0.2	19	4
2025						
Construction	116	5	35	0.2	19	4
Alternative 2 Subtotal	116	5	35	0.2	19	4
2026						
Construction	101	5	31	0.2	19	4
Alternative 2 Subtotal	101	5	31	0.2	19	4
2027						
Construction	48	2	16	0.1	10	2
Alternative 2 Subtotal	48	2	16	0.1	10	2
2028						
No Action Alternative						
Aircraft	3,378	456	2,347	256	21	21
Taxiing	*3,013*	*239*	*498*	*136*	*10*	*10*
LTOs	*365*	*217*	*1,849*	*120*	*11*	*11*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
No Action Alternative Subtotal	*3,926*	*483*	*2,477*	*274*	*39*	*39*
Alternative 2						
Construction	21	0.7	4	0.0	0.2	0.2
Aircraft	2,949	409	2,275	237	19	19
Taxiing	*2,584*	*192*	*428*	*117*	*9*	*9*
LTOs	*365*	*217*	*1,848*	*120*	*10*	*10*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
Alternative 2 Subtotal	*3,519*	*437*	*2,408*	*255*	*37*	*37*
2028 Net Emissions	***-408***	***-47***	***-69***	***-19***	***-2***	***-2***
2033						
No Action Alternative						
Aircraft	3,834	526	2,599	285	23	23
Taxiing	*3,453*	*295*	*577*	*157*	*12*	*12*

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
LTOs	*381*	*231*	*2,022*	*127*	*11*	*11*
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Vehicles	18	0.2	2	0.0	0.1	0.1
No Action Alternative Subtotal	*4,413*	*555*	*2,734*	*304*	*42*	*41*
Alternative 2						
Aircraft	3,169	450	2,487	254	20	20
Taxiing	*2,788*	*219*	*466*	*127*	*9*	*9*
LTOs	*381*	*231*	*2,020*	*127*	*11*	*11*
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Vehicles	18	0.2	3	0.0	0.1	0.1
Alternative 2 Subtotal	*3,748*	*479*	*2,622*	*274*	*39*	*39*
2033 Net Emissions	***-665***	***-76***	***-112***	***-30***	***-3***	***-3***
Federal Threshold Exceeded?	***N/A***	***NO***	***NO***	***N/A***	***N/A***	***N/A***

Source: Landrum & Brown analysis, 2021

TABLE 4-12, NET EMISSIONS INVENTORY – ALTERNATIVE 3

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
2021						
Construction	32	1	7	0.0	1	0.4
Alternative 3 Subtotal	32	1	7	0.0	1	0.4
2022						
Construction	54	2	10	0.1	0.4	0.3
Alternative 3 Subtotal	54	2	10	0.1	0.4	0.3
2023						
Construction	125	6	51	0.3	15	4
Alternative 3 Subtotal	125	6	51	0.3	15	4
2024						
Construction	107	5	31	0.2	16	3
Alternative 3 Subtotal	107	5	31	0.2	16	3
2025						
Construction	108	5	32	0.2	17	4
Alternative 3 Subtotal	108	5	32	0.2	17	4
2026						
Construction	93	4	28	0.2	16	3
Alternative 3 Subtotal	93	4	28	0.2	16	3
2027						
Construction	40	2	13	0.1	7	2
Alternative 3 Subtotal	40	2	13	0.1	7	2
2028						
No Action Alternative						
Aircraft	3,378	456	2,347	256	21	21
Taxiing	*3,013*	*239*	*498*	*136*	*10*	*10*
LTOs	*365*	*217*	*1,849*	*120*	*11*	*11*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
No Action Alternative Subtotal	*3,926*	*483*	*2,477*	*274*	*39*	*39*
Alternative 3						
Construction	21	0.7	4	0.0	0.2	0.2
Aircraft	2,979	412	2,280	238	20	20
Taxiing	*2,614*	*195*	*432*	*118*	*9*	*9*

Source	Annual Emissions (Short Tons Per Year)					
	CO	VOC	NO_x	SO_x	PM_{10}	$PM_{2.5}$
Federal de minimis Threshold	**N/A**	**100**	**100**	**N/A**	**N/A**	**N/A**
LTOs	*365*	*217*	*1,848*	*120*	*11*	*11*
APU	164	13	94	14	15	15
GSE	363	13	31	4	2	2
Vehicles	23	0.5	4	0.0	0.1	0.1
Alternative 3 Subtotal	*3,549*	*440*	*2,413*	*256*	*38*	*38*
2028 Net Emissions	***-378***	***-43***	***-64***	***-18***	***-0.8***	***-0.8***
2033						
No Action Alternative						
Aircraft	3,834	526	2,599	285	23	23
Taxiing	*3,453*	*295*	*577*	*157*	*12*	*12*
LTOs	*381*	*231*	*2,022*	*127*	*11*	*11*
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Vehicles	18	0.2	2	0.0	0.1	0.1
No Action Alternative Subtotal	*4,413*	*555*	*2,734*	*304*	*42*	*41*
Alternative 3						
Aircraft	3,224	456	2,496	257	21	21
Taxiing	*2,843*	*225*	*475*	*130*	*10*	*10*
LTOs	*381*	*231*	*2,020*	*127*	*12*	*12*
APU	173	14	100	15	16	16
GSE	388	15	32	4	2	2
Vehicles	18	0.2	3	0.0	0.1	0.1
Alternative 3 Subtotal	*3,803*	*485*	*2,631*	*276*	*40*	*40*
2033 Net Emissions	***-610***	***-70***	***-103***	***-28***	***-2***	***-2***
Federal Threshold Exceeded?	***N/A***	***NO***	***NO***	***N/A***	***N/A***	***N/A***

Source: Landrum & Brown analysis, 2021

4.3.5 Mitigation, Avoidance, and Minimization Measures

Neither Alternative 1 (Proposed Action), nor Alternative 2, nor Alternative 3 exceed the applicable thresholds of significance for any pollutants; therefore, no mitigation measures are required. However, the following minimization measures and best management practices (BMPs) are being provided to further minimize air quality impacts from Alternative 1 (Proposed Action), Alternative 2, or Alternative 3.

Construction of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 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. The Airport Sponsor would ensure that measures would be 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 will be implemented to the maximum possible extent and may 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;
- Reduce idling time on equipment;

[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.

- Using dust palliatives or penetration asphalt on haul roads; and,
- Using plastic sheet coverings.

In addition, when possible, the utilizing alternatively fueled equipment and reducing the idling time on equipment will be employed to minimize potential air quality impacts.

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

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 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.

4.4.1 Future Conditions: 2028

4.4.1.1 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 on biological resources.

4.4.1.2 Alternative 1 (Proposed Action)

Based on field surveys and a letter from the USFWS stating that no Federally listed species or their habitats occur in the project area (see Appendix D, *Biological Resources*), it was determined that Alternative 1 (Proposed Action) would have no effect on the bald eagle, Carolina heelsplitter, Michaux's sumac, Schweinitz's sunflower, or smooth coneflower. Alternative 1 (Proposed Action) may affect, but is not likely to adversely affect, the northern long-eared bat; however, the may affect, not likely to adversely affect determination meets the criteria for the 4(d) rule and any associated take is exempted/excepted. Therefore, Alternative 1 (Proposed Action) would not cause a significant impact to biological resources.

4.4.1.3 Alternative 2

Alternative 2 would have the same effects upon biological resources as described for Alternative 1 (Proposed Action) in 2028. Therefore, Alternative 2 would not cause a significant impact to biological resources.

4.4.1.4 Alternative 3

Alternative 3 would have the same effects upon biological resources as described for Alternative 1 (Proposed Action) in 2028. Therefore, Alternative 3 would not cause a significant impact to biological resources.

4.4.2 Future Conditions: 2033

None of the alternatives (No Action Alternative, Alternative 1 [Proposed Action], Alternative 2, or Alternative 3) include additional development in 2033. Therefore, there would be no significant impacts to the bald eagle, Carolina heelsplitter, Michaux's sumac, Schweinitz's sunflower, smooth coneflower, or the northern long-eared bat in 2033.

4.4.3 Mitigation, Avoidance, and Minimization Measures

Neither Alternative 1 (Proposed Action) nor Alternative 2, nor Alternative 3 would have significant adverse impact on biological resources; therefore, no mitigation is required.

4.5 Climate

This section provides the estimate of greenhouse gas (GHG) emissions attributable to aircraft operations, motor vehicles, and construction-related emissions resulting from the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. This estimate is provided for information only as the FAA has not identified specific factors to consider in making a significance determination for GHG emissions. There are currently no accepted methods for determining significance applicable to aviation or commercial space launch projects given the small amount of emissions they contribute. GHG emissions for an FAA NEPA review follows the basic procedure of considering the potential incremental change in carbon dioxide (CO_2) emissions that would result from the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 for the same timeframe, and discussing the context for interpreting and understanding the potential changes.

For the purpose of this analysis, the carbon dioxide equivalent (CO_2E) method to show relative impacts on climate change of different chemical species. The resulting CO_2E is provided for information only because no Federal NEPA standard for the significance of GHG emissions from individual projects on the environment has been established. **Table 4-13** provides the CO_2E emissions inventory for the construction and operational activities for from the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 discussed in Section 4.3, *Air Quality*.

TABLE 4-13, TOTAL EMISSIONS INVENTORY

Alternative	CO_2E (metric tons per year)
2021	
Alternative 1 (Proposed Action)	5,497
Alternative 2	5,497
Alternative 3	5,497
2022	
Alternative 1 (Proposed Action)	6,735
Alternative 2	6,735
Alternative 3	6,735
2023	
Alternative 1 (Proposed Action)	33,829
Alternative 2	33,829
Alternative 3	33,829

Alternative	CO_2E (metric tons per year)
2024	
Alternative 1 (Proposed Action)	22,575
Alternative 2	23,004
Alternative 3	22,268
2025	
Alternative 1 (Proposed Action)	24,681
Alternative 2	25,110
Alternative 3	22,668
2026	
Alternative 1 (Proposed Action)	22,377
Alternative 2	22,806
Alternative 3	20,364
2027	
Alternative 1 (Proposed Action)	11,356
Alternative 2	11,784
Alternative 3	9,343
2028	
No Action Alternative	631,409
Alternative 1 (Proposed Action)	584,709
Alternative 2	584,709
Alternative 3	587,988
2033	
No Action Alternative	697,927
Alternative 1 (Proposed Action)	625,300
Alternative 2	625,300
Alternative 3	630,690

Source: Landrum & Brown analysis, 2021

4.5.1 Mitigation, Avoidance, and Minimization Measures

The FAA has not identified specific factors to consider in making a significance determination for GHG emissions; therefore, no mitigation measures are required to mitigate the potential increase in GHGs attributed to Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. However, for NEPA reviews of proposed FAA actions that would result in increased emissions of GHGs, consideration should be given to whether there are areas within the scope of a project where such emissions could be reduced. GHG emissions reduction can come from measures such as changes to more fuel-efficient equipment, delay reductions, use of renewable fuels, and operational changes.

4.6 Department of Transportation Act, Section 4(f)

Exhibit 4-1 of FAA Order 1050.1F provides the FAA's significance threshold for Section 4(f) properties as when the action involves more than a minimal physical use of a Section 4(f) resource or constitutes a "constructive use" based on an FAA determination that the aviation project 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. If a project would physically use Section 4(f) property, the FAA is responsible for complying with Section 4(f) even if the impacts are less than significant for NEPA purposes.

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

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 of structures or facilities on the property. Constructive use occurs when the impacts of a project on a Section 4(f) property are so severe that the activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. The FAA may also make a *de minimis* impact determination with respect to a physical use of Section 4(f) property if, after taking into account any measures to minimize harm, the result is either:

A determination that the project would not adversely affect the activities, features, or attributes qualifying a park, recreation area, or wildlife or waterfowl refuge for protection under Section 4(f); or
A Section 106 finding of no adverse effect or no historic properties affected.

Section 6(f) of the Land and Water Conservation Fund Act (LWCF) is also pertinent to Section 4(f) lands. Section 6(f) prohibits recreational facilities funded under the LWCF from being converted to non-recreational use unless approval is received from the director of the grantor agency.

4.6.1 Future Conditions: 2028

4.6.1.1 No Action Alternative

Physical Use

The No Action Alternative includes no new construction or changes in operating procedures. Therefore, the implementation of the No Action Alternative would result in no physical use Section 4(f) resources.

Constructive Use

In the 2028 No Action Alternative noise exposure contour, the Works Progress Administration (WPA) Douglas Airport Hangar and the Old Terminal would be exposed to noise levels of Day-Night Average Sound Level (DNL) 70-75 decibels (dB). As no physical changes to the Airport would occur under this alternative, implementation of the No Action Alternative would not result in a direct or constructive use of Section 4(f) resources.

4.6.1.2 Alternative 1 (Proposed Action)

Physical Use

One historic resource, Old Terminal, identified as eligible for listing in the National Register of Historic Places (NRHP) would be removed as part of Alternative 1 (Proposed Action) and therefore, would result in a physical use of the resource. An analysis was conducted to determine if there is a feasible and prudent alternative that would avoid the resource. Results concluded that expanding the taxiway system south to support Runway 18L/36R is needed to allow departures to queue closer to the runway end and away from the terminal area and there is no feasible and prudent alternative that would avoid removal of the Old Terminal.

Constructive Use

The WPA Douglas Airport Hangar is located on Airport property, adjacent to an active airport environment. Thus, the sound of aircraft at the Airport is a common feature associated with an aircraft hangar building. Under the 2028 Alternative 1 (Proposed Action), the WPA Douglas Airport Hangar would be exposed to DNL 70-75 dB noise levels, which would be the same noise level as in the 2028 No Action Alternative. This structure was previously recommended as historically significant for architecture and are eligible for listing in the NRHP under Criterion A (Association with Events). However, these noise levels would not substantially impair the property because the activities, features,

and attributes that qualify the property for protection under Section 4(f) would not be affected by the implementation of 2028 Alternative 1 (Proposed Action). In addition, the 2028 Alternative 1 (Proposed Action) would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property. Therefore, the 2028 Alternative 1 (Proposed Action) would not result in a constructive use of the property.

4.6.1.3 Alternative 2

Physical Use

The Old Terminal, identified as eligible for listing in the NRHP, would be removed as part of Alternative 2 and therefore, would result in a physical use of the resource.

Constructive Use

Similar to 2028 Alternative 1 (Proposed Action), 2028 Alternative 2 would not result in a constructive use of the WPA Douglas Airport Hangar as the noise levels would remain the same as the 2028 No Action Alternative (DNL 70-75 dB). Furthermore, 2028 Alternative 2 would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property. Therefore, the 2028 Alternative 2 would not result in a constructive use of the property.

4.6.1.4 Alternative 3

Physical Use

The Old Terminal, identified as eligible for listing in the NRHP, would be removed as part of Alternative 3 and therefore, would result in a physical use of the resource.

Constructive Use

Similar to 2028 Alternative 1 (Proposed Action), 2028 Alternative 3 would not result in a constructive use of the WPA Douglas Airport Hangar as the noise levels would remain the same as the 2028 No Action Alternative (DNL 70-75 dB). Furthermore, 2028 Alternative 3 would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property. Therefore, the 2028 Alternative 3 would not result in a constructive use of the property.

4.6.2 Future Conditions: 2033

4.6.2.1 No Action Alternative

Physical Use

The No Action Alternative includes no new construction or changes in operating procedures. Therefore, the implementation of the No Action Alternative would result in no physical use of a Section 4(f) resources.

Constructive Use

In the 2033 No Action Alternative noise exposure contour, the WPA Douglas Airport Hangar and the Old Terminal would be exposed to noise levels of DNL 70-75 dB. As no physical changes to the Airport would occur under this alternative, implementation of the 2033 No Action Alternative would not result in a direct or constructive use of Section 4(f) resources.

4.6.2.2 Alternative 1 (Proposed Action)

Physical Use

Implementation of Alternative 1 (Proposed Action) in 2033 would not result in the physical use of any Section 4(f) resource to other purposes.

Constructive Use

Under the 2033 Alternative 1 (Proposed Action) noise exposure contours, the WPA Douglas Airport Hangar would continue to be exposed to DNL 70-75 dB noise levels, which would be the same noise level as in the 2033 No Action Alternative. This structure was previously recommended as historically significant for architecture and is eligible for listing in the NRHP under Criterion A (Association with Events). However, these noise levels would not substantially impair the property because the activities, features, and attributes that qualify the property for protection under Section 4(f) would not be affected by the implementation of 2033 Alternative 1 (Proposed Action). In addition, Alternative 1 (Proposed Action) would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property in 2033. Therefore, 2033 Alternative 1 (Proposed Action) would not result in a constructive use of the property.

4.6.2.3 Alternative 2

Physical Use

Implementation of Alternative 2 in 2033 would not result in the physical use of any Section 4(f) resource to other purposes.

Constructive Use

Similar to 2033 Alternative 1 (Proposed Action), 2033 Alternative 2 would not result in a constructive use of the WPA Douglas Airport Hangar as the noise levels would remain the same as the 2033 No Action Alternative (DNL 70-75 dB). Furthermore, 2033 Alternative 2 would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property. Therefore, the 2033 Alternative 2 would not result in a constructive use of the property.

4.6.2.4 Alternative 3

Physical Use

Implementation of Alternative 3 in 2033 would not result in the physical use of any Section 4(f) resource to other purposes.

Constructive Use

Similar to 2033 Alternative 1 (Proposed Action), 2033 Alternative 3 would not result in a constructive use of the WPA Douglas Airport Hangar as the noise levels would remain the same as the 2033 No Action Alternative (DNL 70-75 dB). Furthermore, 2033 Alternative 3 would not cause significant air pollutant emissions, water pollutants, or other environmental impacts that could affect the property. Therefore, the 2033 Alternative 3 would not result in a constructive use of the property.

4.6.3 Mitigation, Avoidance, and Minimization Measures

The implementation of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 would require the removal of the Old Terminal, a Section 4(f) resource, and would result in a physical use of the resource. Additional analysis of the potential impacts to this resource is discussed in Section 4.10. The FAA has initiated Section 4(f) consultation with the U.S. Department of Interior (DOI) regarding proposed impacts

to the Old Terminal. Appendix E*, Department of Transportation Section 4(f) Resources*, of the Final EA will include a copy of the FAA's submittal to the U.S. DOI.

4.7 Hazardous Materials, Solid Waste, and Pollution Prevention

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.

The potential impacts resulting from hazardous materials and solid waste collection, control, and disposal due to airport projects are assessed under four primary laws that govern the handling and disposal of hazardous materials, chemicals, substances, and wastes:

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), (as amended by the Superfund Amendments and Reauthorization Act of 1986 [SARA] and the Community Environmental Response Facilitation Act of 1992 [CERFA]); [91]
- Pollution Prevention Act of 1990 (PPA);[92]
- Toxic Substances Control Act of 1976, as amended (TSCA); [93] and
- Resource Conservation and Recovery Act of 1976 (RCRA), (as amended by SARA and CERFA).[94]

The two statutes that are of most pertinent to FAA actions to construct and operate airport facilities and navigational aids are RCRA and CERCLA. RCRA governs the generation, treatment, storage, and

[91] 42 U.S.C. §§ 9601-9675.
[92] 42 U.S.C. §§ 13101-13109
[93] 15 U.S.C. §§ 2601-2692
[94] 42 U.S.C. §§ 6901-6992(k)

disposal of hazardous wastes. CERCLA provides for consultation with natural resources' trustees and cleanup of any release of a hazardous substance (excluding petroleum) into the environment.

4.7.1 Future Conditions: 2028

4.7.1.1 No Action Alternative

Hazardous Materials and Pollution Prevention

No physical changes to the Airport would occur under this alternative. Therefore, there would be no change to hazardous materials described in Section 3.3.7 for the No Action Alternative in 2028. Furthermore, there would be no change to existing pollution prevention measures described in Section 3.3.7 for the No Action Alternative.

Solid Waste

No physical changes to the Airport would occur under No Action Alternative. Therefore, there would be no construction debris generated. The existing passenger terminal would remain unchanged and would continue to operate at the existing site. As such, the existing passenger terminal at CLT would accommodate the increase in passenger activity that is forecasted to occur at CLT. The forecast increase in aircraft operations would similarly increase the volume of solid waste generated at the Airport. The estimated volume of solid waste generated from the Airport in 2028 would be approximately 13,400 tons. This volume of solid waste can be accommodated at the existing landfill facilities without substantially compromising capacity. In conjunction with area recycling activities, the level of solid waste produced under the No Action Alternative in 2028 would not significantly impact the capacity of the solid waste systems.

Recycling

According to the Airport's Comprehensive Sustainability Plan that has identified sustainability goals through 2030, the Airport is committed to reducing the volume of waste generated and to shift the waste stream toward increased diversion, maximizing reuse, recovery, and recycling over disposal through 2030. Therefore, there would be no change to the Airport's current recycling program for the No Action Alternative in 2028.

4.7.1.2 Alternative 1 (Proposed Action)

Hazardous Materials and Pollution Prevention

Construction

As discussed in Section 3.3.7, the DSA contains contamination sites for which cleanup or remediation activities may be needed or are ongoing and would be a potential continuing source of contaminants at the Airport. The sites have been coordinated with the North Carolina Department of Environmental Quality (NCDEQ) to ensure remediation of these contaminated sites meets state and Federal requirements. In order to implement Alternative 1 (Proposed Action), ongoing remediation activities, discussed in Section 3.3.7, would need to be completed or impacted areas would need to be avoided during construction activities in coordination with the NCDEQ. Soil and groundwater management plans would be prepared as necessary prior to construction to ensure all hazardous materials are identified and properly disposed of to prevent further contamination. Any contaminated soil and/or groundwater encountered during demolition and construction activities would be properly disposed of and/or remediated pursuant to all applicable regulations. To the extent feasible, contaminated soils encountered during construction would be remediated or reused on-site. For soils that cannot be

reused on-site, the contaminated soils would be disposed of by a certified hauler at a permitted disposal facility.

Construction and implementation of Alternative 1 (Proposed Action) may require the removal and/or the relocation of existing fuel tanks and underground fuel distribution lines as well as the use of portable above ground storage tanks for fuel storage. All activities that involve disturbing or excavating soils would be performed by the contractor in accordance with applicable regulatory requirements. Furthermore, 14 structures proposed for removal contain lead-containing materials and nine structures contain asbestos-containing materials (ACMs).[95] If lead and/or ACMs are present in the structure, their removal (including abatement and disposal) would be conducted by qualified and properly licensed asbestos abatement contractors prior to demolition. The Airport maintains and follows pollution prevention measures identified in the Airport's Spill Prevention, Control, and Countermeasure (SPCC) Master Plan that satisfies USEPA oil pollution prevention regulations, by which all construction contractor(s) would be required to abide. The SPCC Master Plan details measures for small spill response, reporting, and disposal and defers to the NCDEQ for cleanup of larger soils, groundwater, and surface water contamination. Should any contaminated materials be encountered during construction, the finding would be reported and the material excavated and stored on site for testing in accordance with applicable regulations. Contaminated material would be disposed of by a certified hauler at a permitted disposal facility.

Operational

The use of fuel, deicing fluids, and other regulated substances necessary for routine operations at the Airport would increase in 2028 with Alternative 1 (Proposed Action) to the same level as the No Action Alternative. The storage, use, transportation, and disposal of hazardous materials and other regulated substances would continue to be governed by Federal, state, and local regulations. These regulations, combined with existing technologies and work practices developed to properly manage these substances, substantially reduce the risks of causing environmental contamination from the operation of Alternative 1 (Proposed Action) in 2028. Therefore, Alternative 1 (Proposed Action) is not likely to result in significant impacts from hazardous materials or environmental contamination.

Solid Waste

Construction

Solid wastes associated with construction of Alternative 1 (Proposed Action) are expected to be comprised of waste materials typical of earthwork, demolition, and paving projects. The volume of solid waste is expected to be minor during construction as most of the earthwork would involve moving dirt from one area to another area within the DSA to achieve the proper grade. Recycling of concrete and asphalt could substantially reduce the amount of the construction-related solid wastes. Construction waste not diverted, recycled, or re-used would be transported to and disposed of in local permitted construction/demolition facilities or in accordance with applicable state and local requirements. Alternative 1 (Proposed Action) also includes the demolition of 20 structures. Of those structures, 14 have been found to contain lead and nine have been found to contain ACMs. Lead and ACMs would be removed and remediated in accordance with applicable regulations. Building materials and debris would be recycled to the greatest extent feasible. Materials that cannot be recycled would be disposed

[95] The Airport conducted lead and asbestos surveys for the structures anticipated to be removed or relocated as part Alternative 1 (Proposed Action), except for Building 220 which was not accessible for a lead survey. The surveys are available in Appendix F.

of in accordance with all Federal, state, and local regulations. Therefore, no significant construction-related solid waste impacts would occur.

Operational

The number of aircraft operations at the Airport is forecasted to increase in 2028 for Alternative 1 (Proposed Action) to the same level as the No Action Alternative in 2028. Therefore, the resulting increase in the volume of solid waste generated at the Airport for the No Action Alternative is the same as that anticipated for Alternative 1 (Proposed Action). This volume of solid waste can be accommodated at the existing landfill facilities without substantially compromising capacity. In conjunction with area recycling activities, this alternative would not significantly impact the capacity of the solid waste systems.

Recycling

Alternative 1 (Proposed Action) would increase the volume of solid waste generated on Airport property during construction. However, the Airport routinely recycles concrete and asphalt on-site during construction. Additionally, stored materials are reused in future Airport roadway, taxiway, and airfield maintenance projects. According to the Airport's Comprehensive Sustainability Plan that has identified sustainability goals through 2030, the Airport is committed to continuing the recycling of construction and demolition waste to divert construction waste from the landfill. As such, the Airport would have sufficient capacity to continue to recycle solid waste generated by construction activities, including materials like concrete and asphalt.

4.7.1.3 Alternative 2

Alternative 2 would have the same effects upon hazardous materials, solid waste, and recycling as described for Alternative 1 (Proposed Action) in 2028. Therefore, Alternative 2 would not have any significant impacts related to hazardous materials or solid waste.

4.7.1.4 Alternative 3

Alternative 3 would have the same effects upon hazardous materials, solid waste, and recycling as described for Alternative 1 (Proposed Action) in 2028, although this alternative would not require structures at the entrance to the Norfolk-Southern Intermodal Facility to be relocated. Therefore, Alternative 3 would not have any significant impacts related to hazardous materials or solid waste.

4.7.2 Future Conditions: 2033

4.7.2.1 No Action Alternative

Hazardous Materials and Pollution Prevention

No physical changes to the Airport would occur for the No Action Alternative in 2033. Furthermore, there would be no change to existing pollution prevention measures described in Section 3.3.7 for the No Action Alternative.

Solid Waste

No physical changes to the Airport would occur under No Action Alternative in 2033. Therefore, there would be no construction debris generated. The existing passenger terminal would remain unchanged and would continue to operate at the existing site. As such, the existing passenger terminal at CLT would accommodate the increase in passenger activity that is forecasted to occur at CLT. The forecasted increase in aircraft operations would similarly increase the volume of solid waste generated at the Airport. The estimated volume of solid waste generated from the Airport in 2033 would be

approximately 14,600 tons. This volume of solid waste can be accommodated at the existing landfill facilities without substantially compromising capacity. In conjunction with area recycling activities, this alternative would not significantly impact the capacity of the solid waste systems.

Recycling

The Airport would continue to implement the recycling efforts outlined in the Airport's Comprehensive Sustainability Plan. Therefore, no change to the Airport's current recycling program for the No Action Alternative would occur in 2033.

4.7.2.2 Alternative 1 (Proposed Action), Alternative 2, and Alternative 3

Hazardous Materials and Pollution Prevention

Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 in 2033 would have the same effects upon hazardous materials as described for each alternative in 2028. No significant impacts related to hazardous materials would be expected to occur under any of the alternatives in 2033. Additionally, the established pollution prevention measures the Airport follows would remain in place.

Solid Waste

Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 in 2033 would have the same effects on solid waste as described for each alternative in 2028. No significant impacts related to solid waste would be expected to occur under any of the alternatives in 2033.

Recycling

With or without the implementation of Alternative 1(Proposed Action), Alternative 2, or Alternative 3, the Airport would continue to implement the recycling efforts outlined in the Airport's Comprehensive Sustainability Plan. There would be no change to the Airport's recycling program in 2033 for Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 as the existing recycling plan would continue to accommodate the Airport's recycling needs.

4.7.3 Mitigation, Avoidance, and Minimization Measures

No mitigation is required for Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. However, all activities that involve disturbing or excavating soils would be performed in accordance with applicable Federal, state, and local regulations. Additionally, all construction contractor(s) would be required to abide by the Airport's SPCC Master Plan that satisfies USEPA oil pollution prevention regulations. Should any contaminated materials be encountered during construction, the finding would be reported, and the material excavated and stored on site for testing in accordance with applicable regulations. Demolition of buildings would be conducted in accordance with all applicable regulations to address removal and disposal of lead and asbestos.

4.8 Historical, Architectural, Archeological, and Cultural Resources

The FAA has not established a significance threshold for the full range of historical, architectural, archeological, 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, archeological, 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 or alternative(s) 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.

The National Historic Preservation Act of 1966 (NHPA)[96] and the Archeological and Historic Preservation Act of 1974[97] are primary Federal laws governing the preservation of historic and prehistoric resources, encompassing art, architecture, archeological, and other cultural resources. Section 106 of the NHPA requires that, prior to approval of a Federal or Federally-assisted project, or before the issuance of a license, permit, or other similar approval, Federal agencies take into account the effect of the project on properties that are on or eligible for listing on the NRHP. As discussed in Section 3.3.8, there are two properties located within the Area of Potential Effects (APE). The two properties are the Old Terminal and the WPA Douglas Airport Hangar. No archeological resources were located within the APE.

4.8.1 Future Conditions: 2028

4.8.1.1 No Action Alternative

No physical development would occur under the No Action Alternative in 2028. Therefore, no impacts to historical, architectural, archeological, or cultural resources would occur.

4.8.1.2 Alternative 1 (Proposed Action)

Direct Effects

Of the two properties located within the APE (WPA Douglas Airport Hangar and the Old Terminal), only the Old Terminal would be directly impacted by Alternative 1 (Proposed Action). Coordination was conducted with the North Carolina State Historic Preservation Office (NCSHPO) per Section 106 of the NHPA regarding this impact. Based on this coordination, it was determined that this would constitute an adverse impact per the NHPA. Efforts to avoid this adverse impact were considered but no viable alternative was identified that met the purpose and need while avoiding impacts to the Old Terminal. Therefore, the FAA, NCSHPO, and City of Charlotte Aviation Department will enter into a Memorandum of Agreement (MOA) to address the impacts and mitigate the adverse effects. Additional information on this coordination is included in Appendix G, *Historic, Architectural, Archeological, and Cultural Resources*.

Indirect Effects

The WPA Douglas Airport Hangar was reviewed for potential indirect effects due to noise or visual impacts in Alternative 1 (Proposed Action). In the 2028 No Action Alternative noise exposure contour, the WPA Douglas Airport Hangar would be exposed to DNL 70-75 dB noise levels. Under the 2028 Alternative 1 (Proposed Action) noise exposure contour, the WPA Douglas Airport Hangar would continue to be exposed to DNL 70-75 dB noise levels. These noise levels would not significantly change the property's setting or diminish the integrity of the property's significant features because the WPA Douglas Airport Hangar would maintain their association with events. In addition, the 2028 Alternative 1 (Proposed Action) would not cause significant air pollutant emissions or water pollutants that could affect this structure (see Section 4.3, *Air Quality* and Section 4.16, *Water Resources* for additional information). Therefore, the FAA finds No Adverse Effect from the proposed Undertaking on the WPA Doulas Airport Hangar within the APE.

4.8.1.3 Alternative 2

Alternative 2 would result in the same direct and indirect impacts as Alternative 1 (Proposed Action) in 2028.

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96 Public Law 89-665; 16 U.S.C. § 470 et seq.
97 Public Law 86-523, 16 U.S.C. §§ 469 - 469c-2

4.8.1.4 Alternative 3

Alternative 3 would result in the same direct and indirect impacts as Alternative 1 (Proposed Action) in 2028.

4.8.2 Future Conditions: 2033

4.8.2.1 No Action Alternative

No physical development would occur under the No Action Alternative in 2033. Therefore, no impacts to historical, architectural, archeological, or cultural resources would occur.

4.8.2.2 Alternative 1 (Proposed Action)

Direct Effects

No physical development would occur in 2033 under Alternative 1 (Proposed Action). Therefore, no impacts to historical, architectural, archeological, or cultural resources would occur.

Indirect Effects

The WPA Douglas Airport Hangar was reviewed for potential indirect effects due to noise or visual impacts in Alternative 1 (Proposed Action). In the 2033 No Action Alternative noise exposure contour, the WPA Douglas Airport Hangar would be exposed to DNL 70-75 dB noise levels. Under the 2033 Alternative 1 (Proposed Action) noise exposure contour, the WPA Douglas Airport Hangar would continue to be exposed to DNL 70-75 dB noise levels. In addition, the 2033 Alternative 1 (Proposed Action) would not cause significant air pollutant emissions or water pollutants that could affect this structure. Therefore, there would be no adverse effect from Alternative 1 (Proposed Action) on the WPA Doulas Airport Hangar in 2033.

4.8.2.3 Alternative 2

Alternative 2 would result in the same direct and indirect impacts as Alternative 1 (Proposed Action) in 2033.

4.8.2.4 Alternative 3

Alternative 3 would result in the same direct and indirect impacts as Alternative 1 (Proposed Action) in 2033.

4.8.3 Mitigation, Avoidance, and Minimization Measures

A MOA will be prepared between the FAA, NCSHPO, and the City of Charlotte for the adverse effect to the Old Terminal. The City of Charlotte is responsible for carrying out the mitigation in the MOA and FAA is responsible for ensuring sponsor compliance.

Unanticipated Discovery Plan

If previously undocumented buried cultural resources are identified by contractors during construction activities, all work in the immediate vicinity of the discovery would stop until the find can be confirmed by a professional archaeologist and evaluated for its significance. It will be CLT's responsibility to notify the FAA, NCSHPO, and tribal officer if undocumented resources are found. If human skeletal remains are encountered during construction, the provisions of North Carolina General Statute Chapter 70, Article 3 apply. The State Archaeologist should be contacted immediately.

4.9 Land Use

The determination that significant impacts exist in the land use impact category is normally dependent on the significance of other impacts. Potential impacts on noise compatible land use are discussed in Section 4.11, *Noise and Compatible Land Use*. Potential impacts related to potential for disruptions to communities or relocation of residences or businesses is discussed in Section 4.12, *Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks*. Regarding consistency with state and/or local plans, an inconsistency with surrounding land uses and zoning by itself does not automatically result in a significant impact.

This section presents the analysis of potential land use incompatibility of the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. This includes potential conflicts with surrounding land uses and zoning with the comprehensive plans of the surrounding communities.

4.9.1 Future Conditions: 2028

4.9.1.1 No Action Alternative

No physical development would occur under the No Action Alternative in 2028. Therefore, the No Action Alternative would be consistent with future plans and would not cause any land use incompatibilities or inconsistencies with local land use plans. As such, no impacts to land use would occur as a result of the No Action Alternative in 2028.

4.9.1.2 Alternative 1 (Proposed Action)

Implementation of Alternative 1 (Proposed Action) would result in the SEAT impacting West Boulevard. As a result, West Boulevard would be relocated using existing roadways, Byrum Drive and Piney Top. Relocation of West Boulevard would not be expected to cause any change in land use patterns. Additionally, the entrance to the Norfolk Southern Intermodal Facility would need to be reconfigured as part of this alternative. However, it is not expected that this reconfiguration would cause a significant change in land use patterns. No other direct or indirect impacts to land use would occur. As such, Alternative 1 (Proposed Action) would be consistent with future plans and would not cause any land use incompatibilities or inconsistencies with local land use plans. In addition, Alternative 1 (Proposed Action) would not create a new wildlife attractant or create an obstruction to navigation airspace per 14 C.F.R. Part 77, *Safe, Efficient Use, and Preservation of the Navigable Airspace*. Therefore, no significant impacts to land use would occur with implementation of Alternative 1 (Proposed Action).

4.9.1.3 Alternative 2

Alternative 2 would result in the same land use impacts as Alternative 1 (Proposed Action) in 2028. Therefore, no significant impacts to land use would occur with implementation of the Alternative 2 scenario.

4.9.1.4 Alternative 3

Alternative 3 would result in the same land use impacts as Alternative 1 (Proposed Action) in 2028, although this alternative would not require reconfiguring the entrance to the Norfolk Southern Intermodal Facility. Therefore, no significant impacts to land use would occur with implementation of the Alternative 3 scenario.

4.9.2 Future Conditions: 2033

No physical development would occur in 2033. Therefore, the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would be consistent with future plans and would not

cause any land use incompatibilities or inconsistencies with local land use plans. As such, no impacts to land use would occur in 2033.

4.9.3 Mitigation, Avoidance, and Minimization Measures

Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would not result in significant land use impacts. Therefore, there is no mitigation required or proposed.

Land Use Assurance

The FAA has received the required Land Use Assurance letter that CLT would continue to work closely with the City of Charlotte and Mecklenburg County 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 signed is included in Appendix H, *Land Use*.

4.10 Natural Resources and Energy Supply

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 or alternative(s) 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. To make a significance determination, evaluate the estimated amount of natural and energy resources that are expected to be needed for a project and compare the information to the local context of supply and demand to make an evaluation of significance.

This section presents the analysis of potential impacts to natural resources and energy supplies as a result of the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. The supply of natural resources may be impacted by a construction project because the use of dirt, rock, gravel, or other resources could diminish or deplete the local supply. In addition, the operation of an airport requires energy in the form of electricity, natural gas, aviation fuel, diesel fuel, and gasoline. There are two primary sources of energy consumption at an airport – stationary facilities and aircraft operations. Stationary facilities use utility energy (electricity and natural gas) to provide lighting, cooling, heat, and hot water to buildings, the airfield, and parking areas. Aircraft operations and GSE consume fuel energy including jet fuel (Jet-A), low-lead aviation gasoline (AvGas), unleaded gasoline, and diesel fuel to operate the aircraft and power GSE.

4.10.1 Future Conditions: 2028

4.10.1.1 No Action Alternative

<u>Natural Resources</u>

Resources such as sand, gravel, stone, concrete, asphalt water, wood, metals, plastic, and other resources are used for airport construction and maintenance. No new facilities would be constructed that would consume natural resources or other construction materials in 2028 for the No Action Alternative. It is expected that small amounts of these materials would be used for general maintenance activities.

Electricity

There would be no increase in demand for electricity not occurring or anticipated to occur in 2028 for the No Action Alternative. No facilities or lighting would be constructed due to this alternative. Electricity usage would continue to power the existing facilities and accommodate the forecast demand for travelers and aircraft operations.

Natural Gas

There would be no increase in demand for natural gas not occurring or anticipated to occur for the No Action Alternative in 2028. No new facilities would be constructed that would require natural gas due to this alternative. Natural gas consumption would continue to power the existing facilities and accommodate the forecast demand for travelers and aircraft operations at CLT.

Fuel Consumption

Aviation fuel demand at the Airport is a function of the number of operations at CLT 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 or AvGas, is provided to airport users by various suppliers that obtain and sell fuel through existing contracts and on an as-needed basis. No new facilities would be constructed that would increase the demand for fuel for the No Action Alternative in 2028. Current forecasts project growth in aircraft operations at CLT and additional aircraft movements would likely increase fuel consumption. In addition to aircraft fuel, diesel fuel and gasoline are also used to power GSE and other service vehicles at CLT. The fuel requirement for GSE is roughly related to the number of aircraft operations that are serviced, which affects the number of GSE units and the amount of time in which they operate. Aircraft operations are projected to increase for No Action Alternative in 2028, which would result in an increase in fuel usage for GSE.

4.10.1.2 Alternative 1 (Proposed Action)

Natural Resources

There would be no increased demand for natural resources for Alternative 1 (Proposed Action) as compared to the No Action Alternative in 2028 for operational purposes. However, as a result of implementing Alternative 1 (Proposed Action), construction activities would require natural resources such as steel, gravel, sand, aggregate, concrete, asphalt, water, and other construction materials. These materials are not in short supply in the Charlotte Metropolitan Area and consumption of these materials is not expected to deplete or cause a shortage of existing supplies.

Electricity

Alternative 1 (Proposed Action) would include the construction of a new runway, taxiways and facilities. Electricity is used to power and light the airfield and buildings. Many of the proposed new facilities in the south midfield would replace older, less efficient facilities, in-kind, which would achieve a reduction in energy use per square foot of terminal area. As such, only development related to the new runway and terminal expansion would result in an increase in energy usage on the Airport. The proposed new facilities in the south midfield would utilize energy conservation features identified in the Airport's Comprehensive Sustainability Plan, reduce energy use from airport operations, and increase renewable energy supply and/or purchase. Appropriate energy conservation features would be implemented with respect to project design. Construction of these replacement facilities would increase energy demand in the short-term; however, operation of these facilities would not result in an increase in demand for

electricity because they would be replacing existing facilities. However, the new runway and terminal expansion would result in an increase in energy demand.

Estimates of electricity usage were based on the number of lights needed for the new runway and the square footage of the proposed terminal expansion using similar energy demand as the existing airfield and buildings. The estimates did not include the use of energy conservation features in order to present the maximum potential demand for electricity. It is estimated that the new runway and terminal lighting would require an increase of approximate 22,500 megawatt-hours (MWh) per year.

The implementation of Alternative 1 (Proposed Action) would potentially increase the demand for electricity during construction and implementation. However, the increase in demand can be met by current capacity and existing supplies in the Charlotte Metropolitan Area would not be depleted. The electric utility, Duke Energy, was contacted to determine if the utility has the capacity to meet the estimated increase in demand. Duke Energy confirmed they have sufficient capacity to supply the potential increase in electricity demand due to implementing Alternative 1 (Proposed Action).[98]

Natural Gas

As a result of implementing Alternative 1 (Proposed Action), additional natural gas would be needed to provide for the operation of the proposed terminal expansion. It is not anticipated that there would be additional need for natural gas during construction. The estimated increase in natural gas demand due to Alternative 1 (Proposed Action) is approximately 19,400 million British thermal units (MMBtu).[99] As such, the implementation of Alternative 1 (Proposed Action) would potentially increase the operational demand for natural gas. While implementing the Alternative 1 (Proposed Action) would potentially increase the demand for natural gas, the potential demand would not exceed the existing and future natural gas capacity. The natural gas utility, Piedmont Natural Gas, was contacted and confirmed the utility has the capacity to meet the estimated increase in demand.[100]

Fuel Consumption

It is anticipated there would be increased demand for diesel fuel for construction vehicles during the construction of Alternative 1 (Proposed Action). This increase would be temporary and would diminish as Alternative 1 (Proposed Action) is constructed. Furthermore, current forecasts project growth in aircraft operations at CLT and additional aircraft movements would likely increase the overall fuel consumption of the Airport. In addition to aircraft fuel, diesel fuel and gasoline are also used to power GSE and other service vehicles at CLT. However, the number of aircraft operations at the Airport are forecasted to increase in Alternative 1 (Proposed Action) to the same level as the No Action Alternative in 2028. Therefore, operation of Alternative 1 (Proposed Action) would result in the same increase in fuel consumption as the No Action Alternative. However, the increase in fuel demand can be met by existing supplies and future supplies in the Charlotte Metropolitan Area would not be depleted.

4.10.1.3 Alternative 2

Natural resource, electricity, natural gas, and fuel demands in 2028 for Alternative 2 would be the same as Alternative 1 (Proposed Action) and would not exceed existing supplies.

98 Email correspondence Amber Leathers, February 22, 2021.
99 One BTU of heat is equal to 1/180 of the heat required to raise the temperature of one pound of water from 32 degrees Fahrenheit to 212 degrees Fahrenheit at a constant pressure of one atmosphere.
100 Email correspondence Amber Leathers, February 25, 2021.

4.10.1.4 Alternative 3

Alternative 3 includes a proposed runway of shorter length than that of Alternative 1 (Proposed Action). Therefore, Alternative 3 would require less paving materials during construction and less electricity to operate runway and taxiway lighting on this runway. Other development would be similar to Alternative 1 (Proposed Action). Therefore, natural resource, electric, natural gas, and fuel demands in 2028 for Alternative 3 would be the same or less than Alternative 1 (Proposed Action) and would not exceed existing supplies.

4.10.2 Future Conditions: 2033

The No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would have the same effects in 2033 upon natural resources and energy supply as described in 2028.

4.10.3 Mitigation, Avoidance, and Minimization Measures

No demand for energy or natural resources has been identified due to Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 that would exceed current or future supplies in the Charlotte Metropolitan Area. Neither Alternative 1 (Proposed Action), nor Alternative 2, nor Alternative 3 would exceed the applicable thresholds of significance; therefore, no mitigation measures are required. However, energy efficient and sustainable measures, including renewable energy sources, will be implemented to the extent possible.

4.11 Noise and Noise-Compatible Land Use

According to FAA Order 1050.1F, the FAA's significance threshold for noise is if the 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 DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level 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 DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB.

This section presents the analysis of aircraft noise exposure to surrounding communities as a result of the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3. Additional information on the background and characteristics of noise are provided in Appendix I. The impact of airport-related noise levels upon the surrounding area is presented in terms of the number and type of noise-sensitive land uses located within the noise contours for the Alternative 1 (Proposed Action) and the No Action Alternative for both 2028 and 2033. This is in accordance with FAA Order 1050.1F guidance, which specifies that an operational impact analysis should be prepared for the year of anticipated project implementation and five years after implementation.[101] The analysis of noise exposure around CLT was prepared using the latest version of the AEDT, Version 3b. 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 routes of flight used when arriving to and departing from the runways, the proportional use of those flight routes, and the length of the trips. The AEDT calculates noise exposure for the area around the airport and outputs contours of equal noise exposure using the DNL metric. For this EA, equal noise contours for the levels of DNL 65, 70, and 75 dB were calculated and represent average-annual day conditions.

[101] FAA, 2020, 1050.1F Desk Reference, 11. Noise and Noise-Compatible Land Use, 11.3 Environmental Consequences.

4.11.1 Future Conditions: 2028

4.11.1.1 No Action Alternative

Exhibit 4-1 reflects the 2028 No Action Alternative average-annual day noise exposure contours at CLT. The DNL 65+ dB of the 2028 No Action Alternative noise exposure contour encompasses approximately 6.5 square miles and extends to the north and south of the airport. A majority of the lands to the north consist of Airport property and commercial property. Residential lands uses are located to the north of Runway 18C/36C, north of I-85. To the south, the land uses are also Airport property, commercial land uses, and residential land uses south of Runway 18C/36C. The shape of the contour reflects the runway use. Runway 18R/36L is an arrival runway which is indicative of the long, thinner noise contour. Runway 18C/36C and Runway 18L/36R are mixed use runways and are used by both arrivals and departures.

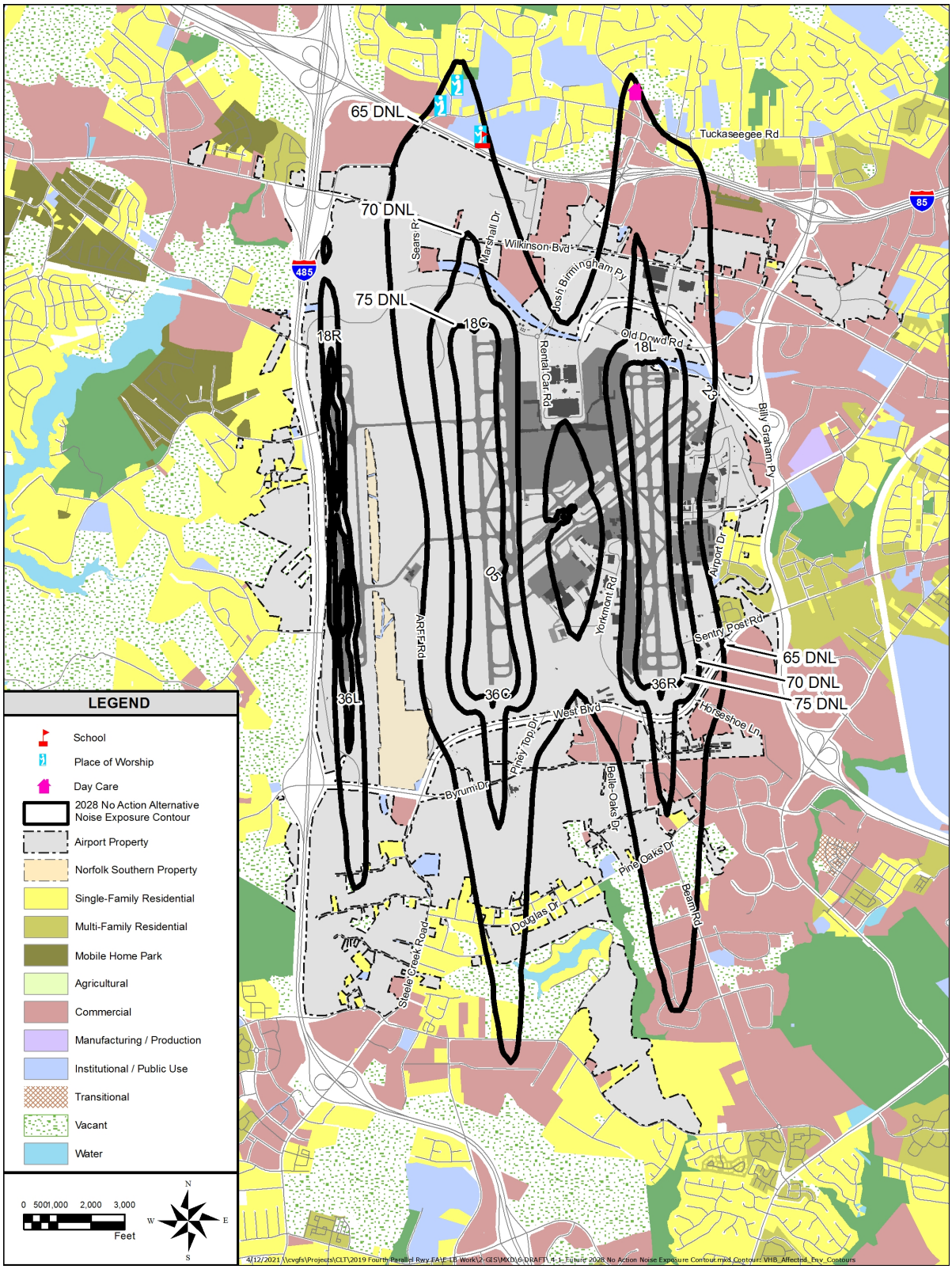
Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2028 No Action Alternative noise exposure contours are provided in **Table 4-14**. The noise sensitive facilities (NSF) located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte), three churches (Harvest Church, Montagnard Alliance Church, and Every Nation Church), and one day care facility (Beginning Years Day Care, Inc). No nursing homes, hospitals, or libraries are located within the DNL 65+ dB.

TABLE 4-14, 2028 NO ACTION ALTERNATIVE INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	77	0	0	**77**
Duplex/Triplex Units	0	0	0	**0**
Mobile Home Units	1	0	0	**1**
Total	**78**	**0**	**0**	**78**
ESTIMATED POPULATION				
Single-Family Units	210	0	0	**210**
Duplex/Triplex Units	0	0	0	**0**
Mobile Home Units	3	0	0	**3**
Total	**213**	**0**	**0**	**213**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	1
Churches	3	0	0	3
Day Care Facilities	1	0	0	1
Total	**5**	**0**	**0**	**5**

Source: Landrum & Brown analysis, 2021

EXHIBIT 4-1, 2028 NO ACTION ALTERNATIVE NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

4.11.1.2 Alternative 1 (Proposed Action)

The 2028 Alternative 1 (Proposed Action) noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-2**. The DNL 65+ dB of the 2028 Alternative 1 (Proposed Action) noise exposure contour encompasses approximately 6.7 square miles. **Exhibit 4-3** provides a comparison of the 2028 Alternative 1 (Proposed Action) and the 2028 No Action Alternative noise exposure contours.

The 2028 Alternative 1 (Proposed Action) contour widens along the Runway 18C/36C centerline compared to the 2028 No Action Alternative noise contour due to the addition of Runway 01/19. The two closely spaced runways (Runway 18C/36C and Runway 01/19) together create a noise contour similar to the 2028 No Action Alternative contour for Runway 18C/36C. Runway 01/19 would be primarily a departure runway; therefore, the noise contour extends farther west from that runway over Airport property. The 2028 Alternative 1 (Proposed Action) contour, along the Runway 18L/36R centerline, shrinks slightly to the north and south as compared to the 2028 No Action Alternative contour. This is attributed to the offloading of arrivals onto Runway 18C/36C. As a result, Runway 18L/36R is not as heavily used in 2028 Alternative 1 (Proposed Action) for arrivals. The slight bump out on the northeast side of the contour is due to the offloading of northeast bound departures from Runway 36C in the No Action Alternative to Runway 36R in Alternative 1 (Proposed Action). In addition, the 2028 Alternative 1 (Proposed Action) contour along Runway 18R/36L extends farther to the north due to the runway being used a small percentage more for arrivals in south flow in order to balance the use of the runways.

Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2028 Alternative 1 (Proposed Action) noise exposure contour are provided in **Table 4-15**. The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte) and three churches (Harvest Church, Montagnard Alliance Church, and Every Nation Church).

TABLE 4-15, 2028 ALTERNATIVE 1 (PROPOSED ACTION) INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	67	0	0	**67**
Duplex/Triplex Units	6	0	0	**6**
Mobile Home Units	3	0	0	**3**
Total	**76**	**0**	**0**	**76**
ESTIMATED POPULATION				
Single-Family Units	180	0	0	**180**
Duplex/Triplex Units	17	0	0	**17**
Mobile Home Units	8	0	0	**8**
Total	**205**	**0**	**0**	**205**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	**1**
Churches	3	0	0	**3**
Day Care Facilities	0	0	0	**0**
Total	**4**	**0**	**0**	**4**

Source: Landrum & Brown analysis, 2021

A noise impact would be considered to be significant if there were an increase of 1.5 dB or more over noise-sensitive facilities within the DNL 65 dB contour when comparing the No Action Alternative and Proposed Action of the same corresponding year.[102] The 2028 Alternative 1 (Proposed Action) noise exposure contour, compared to the 2028 No Action Alternative noise exposure contour, did not experience DNL 1.5 dB increase within the 65 DNL over NSF. The DNL 1.5 dB increase area would remain over compatible Airport-owned land. Therefore, no significant noise impacts would occur with 2028 Alternative 1 (Proposed Action).

As shown in **Table 4-16**, there would be two less residential units and the day care facility no longer would be exposed to DNL 65 dB in the 2028 Alternative 1 (Proposed Action) noise exposure contour compared to the 2028 No Action Alternative. This overall decrease in residences and noise sensitive facilities is attributed to the change in the shape and size of the 2028 Alternative 1 (Proposed Action) noise exposure as compared to the 2028 No Action Alternative. As previously discussed, the addition of the new departure runway and the subsequent changes in the use of the runways results in some areas where the 2028 Alternative 1 (Proposed Action) noise contour is larger than the 2028 No Action Alternative noise contour and other areas where the 2028 Alternative 1 (Propose Action) noise contour is smaller than the 2028 No Action Alternative noise contour.

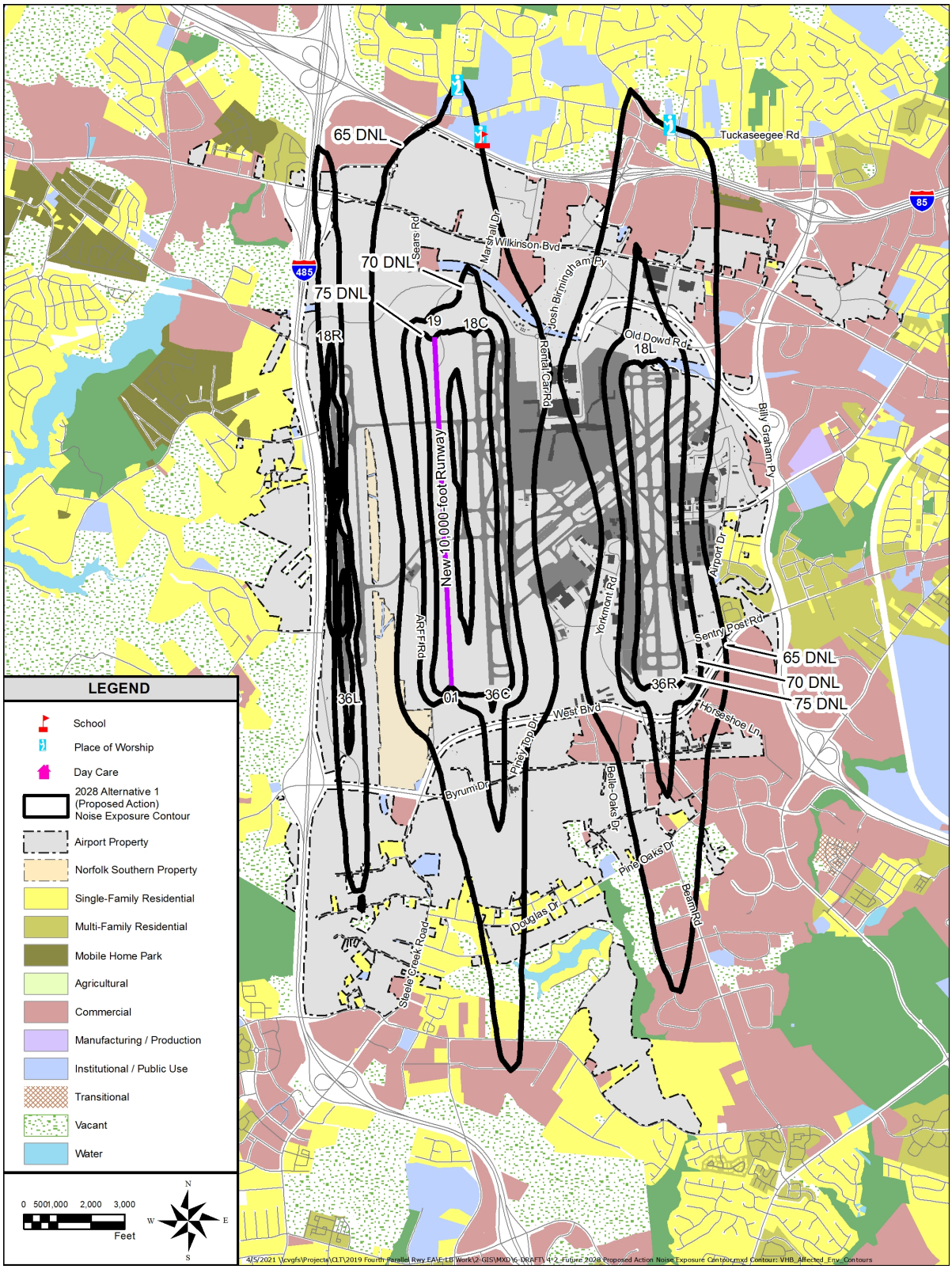
TABLE 4-16, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2028 ALTERNATIVE 1 (PROPOSED ACTION) NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	-10	0	0	**-10**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+2	0	0	**+2**
Total	**-2**	**0**	**0**	**-2**
ESTIMATED POPULATION				
Single-Family Units	-30	0	0	**-30**
Duplex/Triplex Units	+17	0	0	**+17**
Mobile Home Units	+5	0	0	**+5**
Total	**-8**	**0**	**0**	**-8**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	0	0	0	**0**
Churches	0	0	0	**0**
Day Care Facilities	-1	0	0	**-1**
Total	**-1**	**0**	**0**	**-1**

Source: Landrum & Brown analysis, 2021

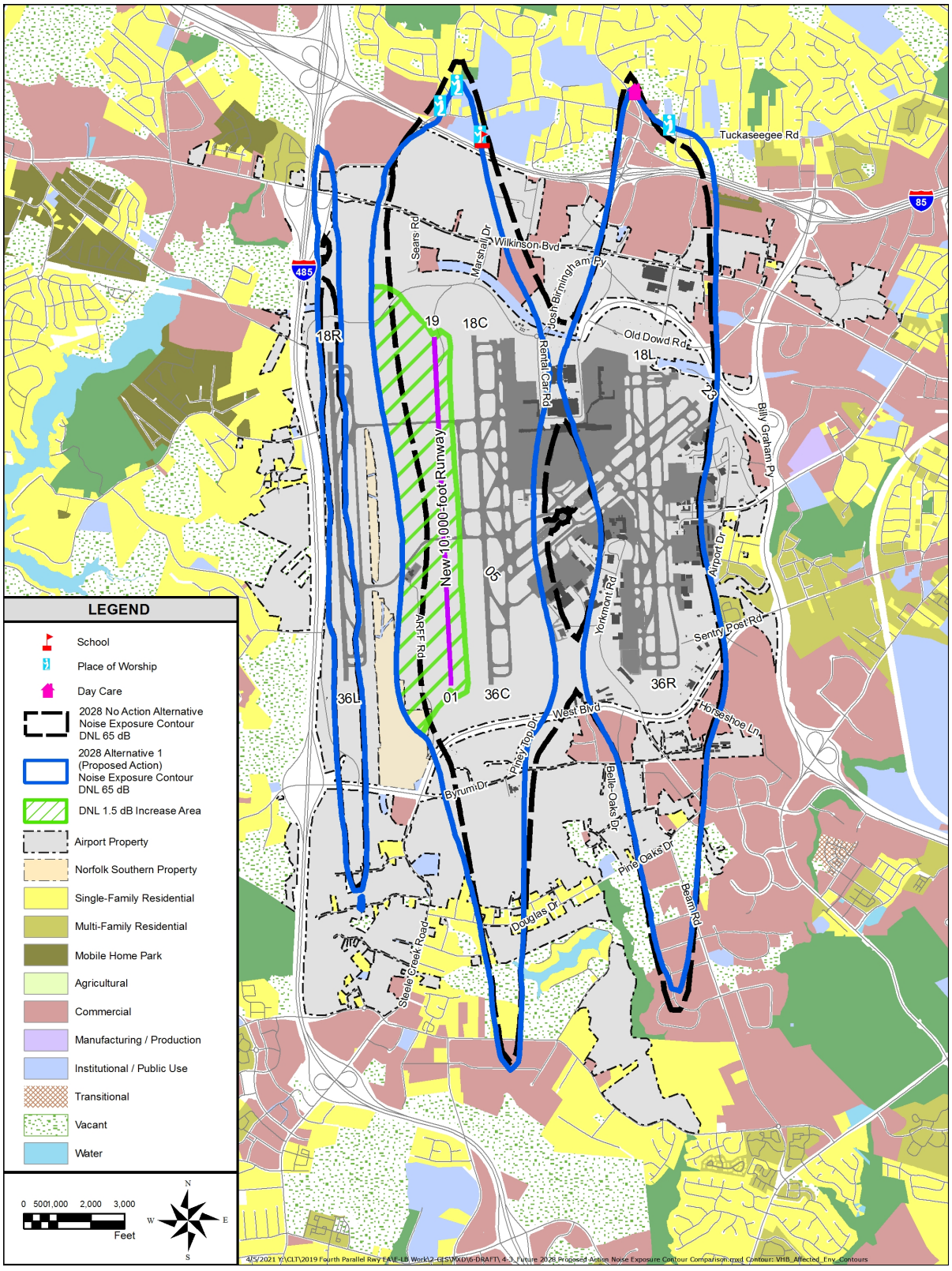
[102] FAA Order 1050.1F, *Environmental Impacts: Policies and Procedures*, Section 4.3-3 Significance Thresholds.

EXHIBIT 4-2, 2028 ALTERNATIVE 1 (PROPOSED ACTION) NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-3, COMPARISON OF 2028 ALTERNATIVE 1 (PROPOSED ACTION) AND 2028 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.1.3 Alternative 2

The 2028 Alternative 2 noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-4**. The DNL 65+ dB of the 2028 Alternative 2 noise exposure contour encompasses approximately 6.7 square miles. **Exhibit 4-5** provides a comparison of the 2028 Alternative 2 and the 2028 No Action Alternative noise exposure contours. The 2028 Alternative 2 contour is the same shape and size as the 2028 Alternative 1 (Proposed Action) contour except that the contour along Runway 18C/36C and Runway 01/19 is slightly narrower and longer. This is due to the placement of Runway 01/19 being 100 feet closer to Runway 18C/36C.

Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2028 Alternative 2 noise exposure contour are provided in **Table 4-17**. The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte) and three churches (Harvest Church, Montagnard Alliance Church, and Every Nation Church).

TABLE 4-17, 2028 ALTERNATIVE 2 INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	69	0	0	**69**
Duplex/Triplex Units	6	0	0	**6**
Mobile Home Units	3	0	0	**3**
Total	**78**	**0**	**0**	**78**
ESTIMATED POPULATION				
Single-Family Units	186	0	0	**186**
Duplex/Triplex Units	17	0	0	**17**
Mobile Home Units	8	0	0	**8**
Total	**211**	**0**	**0**	**211**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	**1**
Churches	3	0	0	**3**
Day Care Facilities	0	0	0	**0**
Total	**4**	**0**	**0**	**4**

Source: Landrum & Brown analysis, 2021

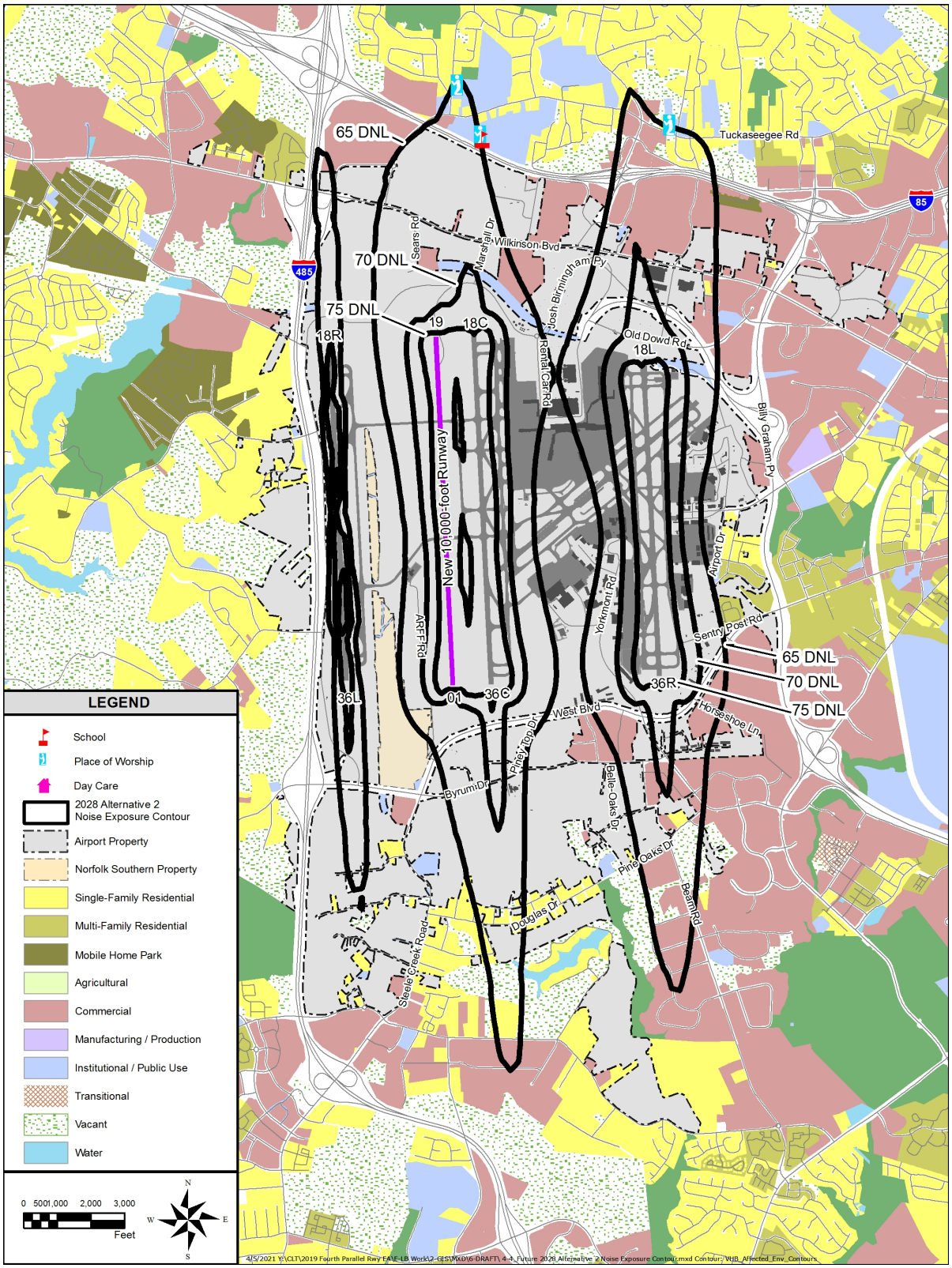
The 2028 Alternative 2 noise exposure contour, compared to the 2028 No Action Alternative noise exposure contour, did not experience DNL 1.5 dB increase within the 65 DNL over NSF. The DNL 1.5 dB increase area would remain over compatible Airport-owned land. Therefore, no significant noise impacts would occur with 2028 Alternative 2. As shown in **Table 4-18**, there would be the same number of residential units and the day care facility no longer would be exposed to DNL 65 dB in the 2028 Alternative 2 noise exposure contour.

TABLE 4-18, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2028 ALTERNATIVE 2 NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	-8	0	0	**-8**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+2	0	0	**+2**
Total	**0**	**0**	**0**	**0**
ESTIMATED POPULATION				
Single-Family Units	-24	0	0	**-24**
Duplex/Triplex Units	+17	0	0	**+17**
Mobile Home Units	+5	0	0	**+5**
Total	**-2**	**0**	**0**	**-2**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	0	0	0	**0**
Churches	0	0	0	**0**
Day Care Facilities	-1	0	0	**-1**
Total	**-1**	**0**	**0**	**-1**

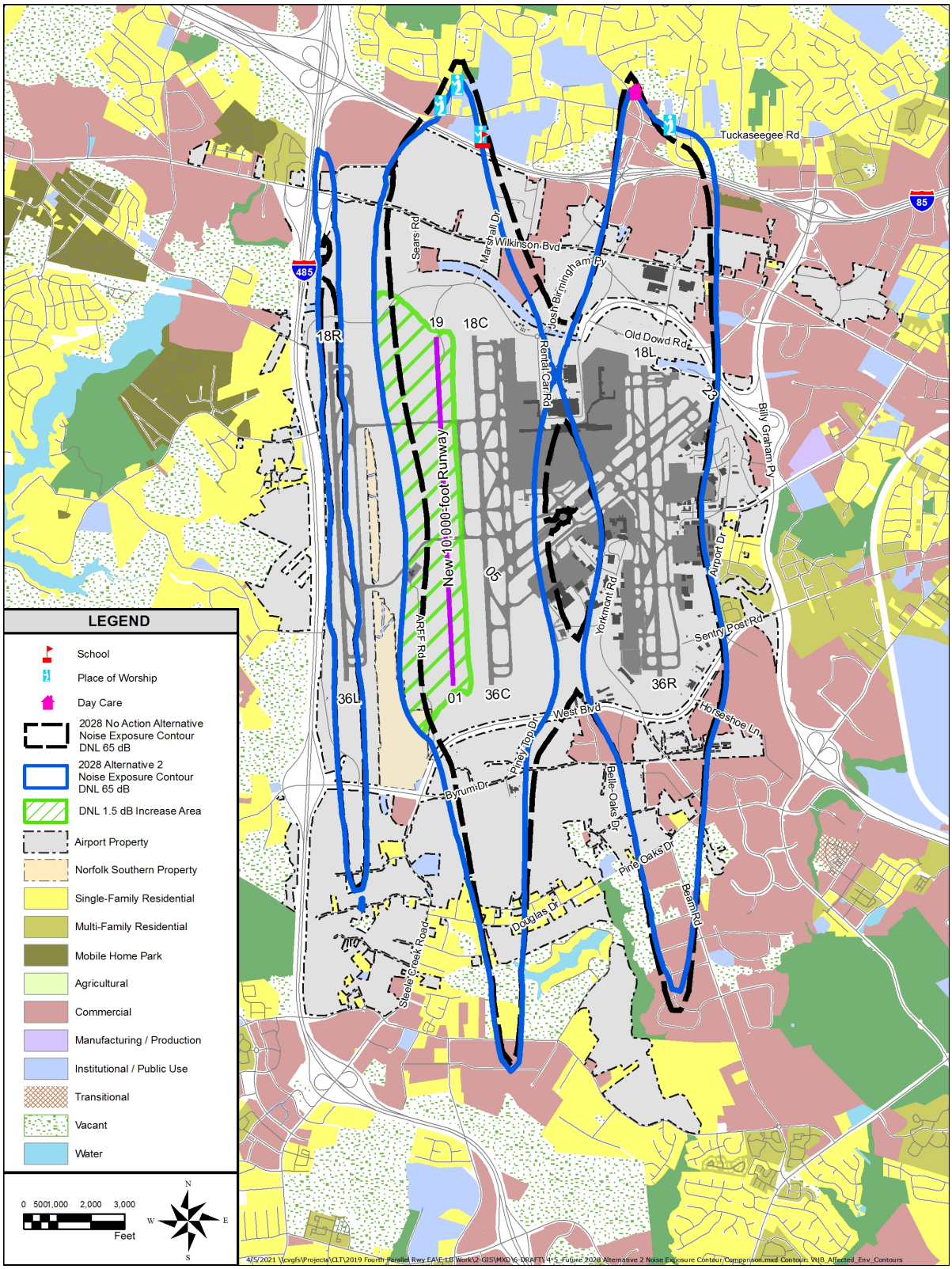
Source: Landrum & Brown analysis, 2021

EXHIBIT 4-4, 2028 ALTERNATIVE 2 NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-5, COMPARISON OF 2028 ALTERNATIVE 2 AND 2028 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.1.4 Alternative 3

The 2028 Alternative 3 noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-6**. The DNL 65+ dB of the 2028 Alternative 3 noise exposure contour encompasses approximately 6.6 square miles. **Exhibit 4-7** provides a comparison of the 2028 Alternative 3 and the 2028 No Action Alternative noise exposure contours.

In 2028 Alternative 3, Runway 01/19 would primarily be used by arrivals and Runway 18C/36C would primarily be used by departures. As a result, the noise contour extends along the Runway 01/19 centerline to the north and south, and shifts to the west of the 2028 No Action Alternative contour. The 2028 Alternative 3 noise contour, along the Runway 18L/36R centerline, shrinks slightly to the north and south as compared to the 2028 No Action Alternative contour. This is contributed to the offloading of arrivals onto Runway 01/19. As a result, Runway 18L/36R is not as heavily used in 2028 Alternative 3 for arrivals. The slight bump out on the northeast side of the contour is due to the offloading of northeast bound departures from Runway 36C in the No Action Alternative to Runway 36R in Alternative 3. In addition, the 2028 Alternative 3 noise contour along Runway 18R/36L extends farther to the north due to the runway being used a small percentage more for arrivals in south flow in order to balance the use of the runways.

Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2028 Alternative 3 noise exposure contour are provided in **Table 4-19**. The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte) and three churches (Harvest Church, Mulberry Baptist Church, and Every Nation Church).

TABLE 4-19, 2028 ALTERNATIVE 3 INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	89	0	0	**89**
Duplex/Triplex Units	6	0	0	**6**
Mobile Home Units	4	0	0	**4**
Total	**99**	**0**	**0**	**99**
ESTIMATED POPULATION				
Single-Family Units	238	0	0	**238**
Duplex/Triplex Units	17	0	0	**17**
Mobile Home Units	10	0	0	**10**
Total	**265**	**0**	**0**	**265**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	**1**
Churches	3	0	0	**3**
Day Care Facilities	0	0	0	**0**
Total	**4**	**0**	**0**	**4**

Source: Landrum & Brown analysis, 2021

As shown in **Table 4-20**, there would be an increase of 21 residential units exposed to DNL 65 dB in the 2028 Alternative 3 noise exposure contour. The day care facility no longer would be exposed to DNL 65 dB in the 2028 Alternative 3 noise exposure contour.

TABLE 4-20, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2028 ALTERNATIVE 3 NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	+12	0	0	**+12**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+3	0	0	**+3**
Total	**+21**	**0**	**0**	**+21**
ESTIMATED POPULATION				
Single-Family Units	+28	0	0	**+28**
Duplex/Triplex Units	+17	0	0	**+17**
Mobile Home Units	+7	0	0	**+7**
Total	**+52**	**0**	**0**	**+52**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	0	0	0	**0**
Churches	0	0	0	**0**
Day Care Facilities	-1	0	0	**-1**
Total	**-1**	**0**	**0**	**-1**

Source: Landrum & Brown analysis, 2021

The analysis concluded that a DNL1.5 dB increase would occur within the DNL 65 dB or greater noise contour in the 2028 Alternative 3 when compared to the 2028 No Action Alternative. There would be 20 housing units and 50 people located within the DNL 1.5 dB increase area. Of the 20 residential units, 16 have been previously sound insulated. No NSF would be located in the DNL 1.5 dB increase area. **Table 4-21** shows the total number of housing units and estimated population by housing type within the area of DNL 1.5 dB increase within the DNL 65 dB of the 2028 Alternative 3 noise exposure contour.

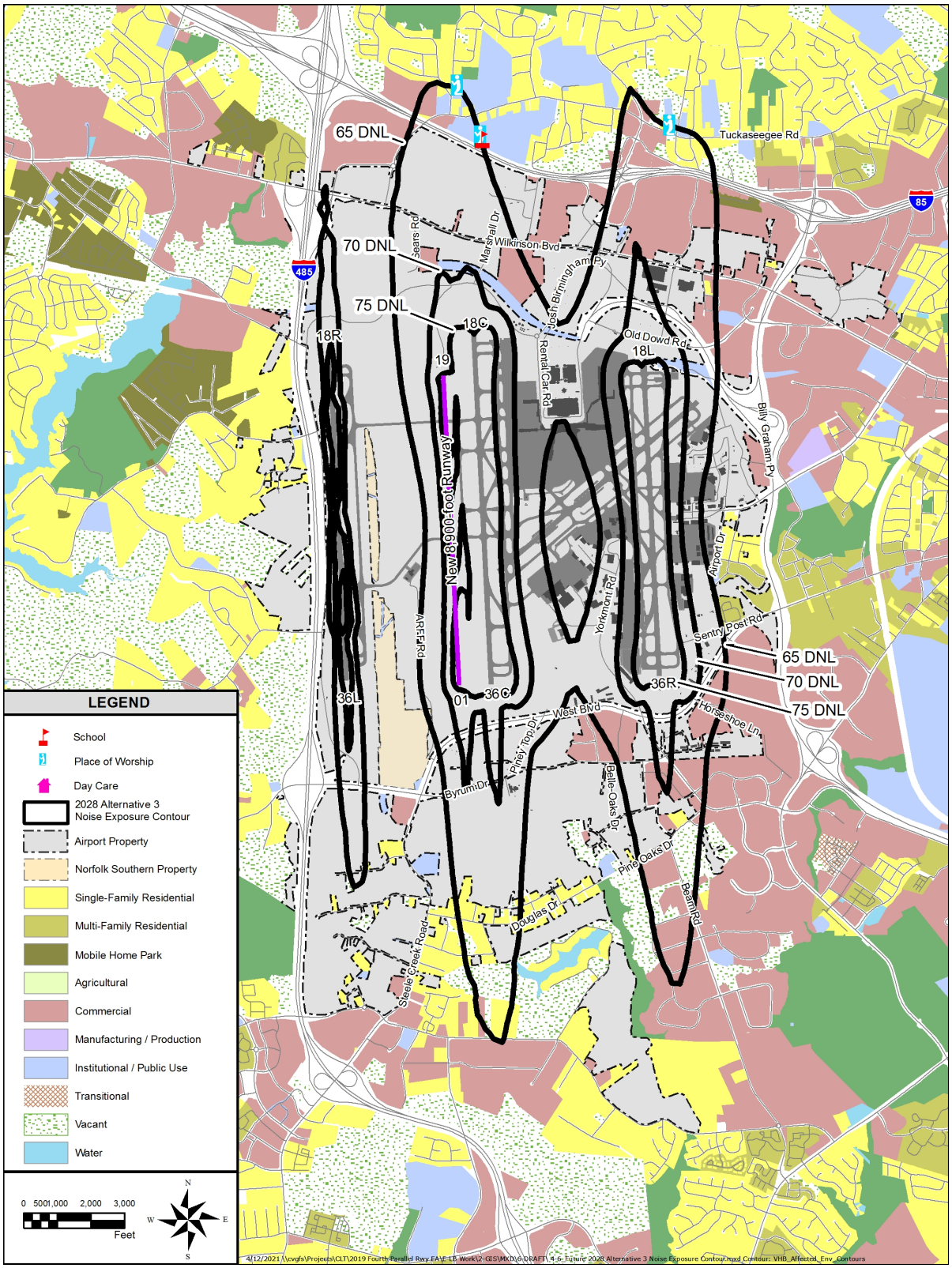
TABLE 4-21, HOUSING AND POPULATION WITHIN THE AREA OF DNL 1.5 DB INCREASE WITHIN DNL 65 DB OF THE 2028 ALTERNATIVE 3 NOISE EXPOSURE CONTOURS

Housing Type	Housing Units	Estimated Population
Single-Family Units	20*	50
Duplex/Triplex Units	0	0
Mobile Home Units	0	0
Total	**20**	**50**

Note: *16 of the 20 homes within the DNL 1.5 dB contour have been previously sound insulated.
Source: Landrum & Brown analysis, 2021

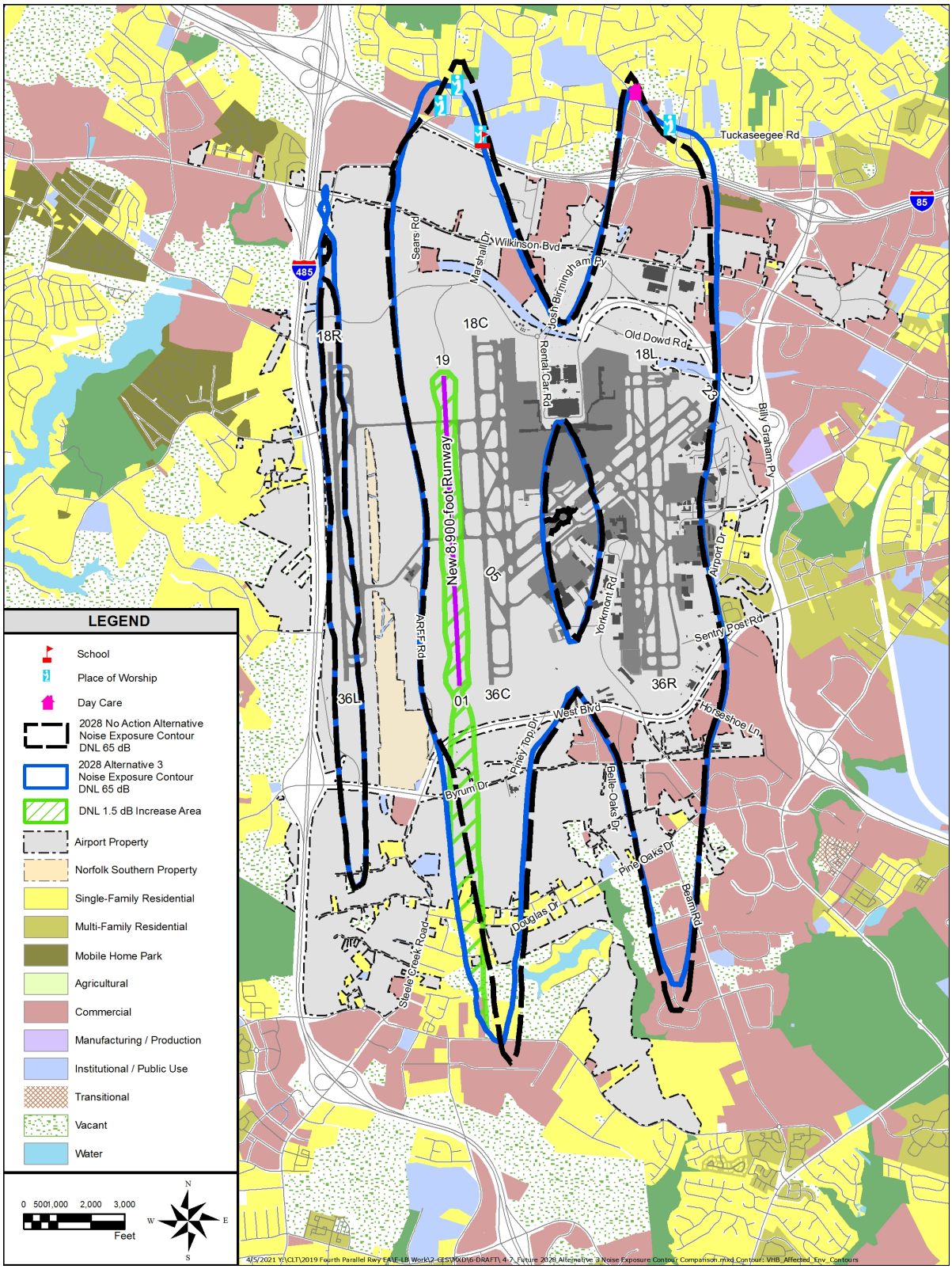
Per the 1990 Federal Interagency Committee on Noise (FICON) report, if screening analysis shows that noise-sensitive areas would be at or above DNL 65 dB and would have an increase of DNL 1.5 dB or more, further analysis should be conducted of noise-sensitive areas between DNL 60-65 dB having an increase of DNL 3 dB or more due to the proposed airport noise exposure. An analysis was conducted later in this section to assess the potential noise impacts to housing units and the population located between the DNL 60 and 65 dB noise contours due to changes in airspace and air traffic procedures.

EXHIBIT 4-6, 2028 ALTERNATIVE 3 NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-7, COMPARISON OF 2028 ALTERNATIVE 3 AND 2028 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.2 Future Conditions: 2033

4.11.2.1 No Action Alternative

The 2033 No Action Alternative noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-8**. The DNL 65+ dB of the 2033 No Action Alternative noise exposure contour encompasses approximately 7.0 square miles. The 2033 No Action Alternative noise exposure contour retains a similar shape as the 2028 No Action Alternative noise exposure contour but is larger due to the forecasted increase in aircraft operations.

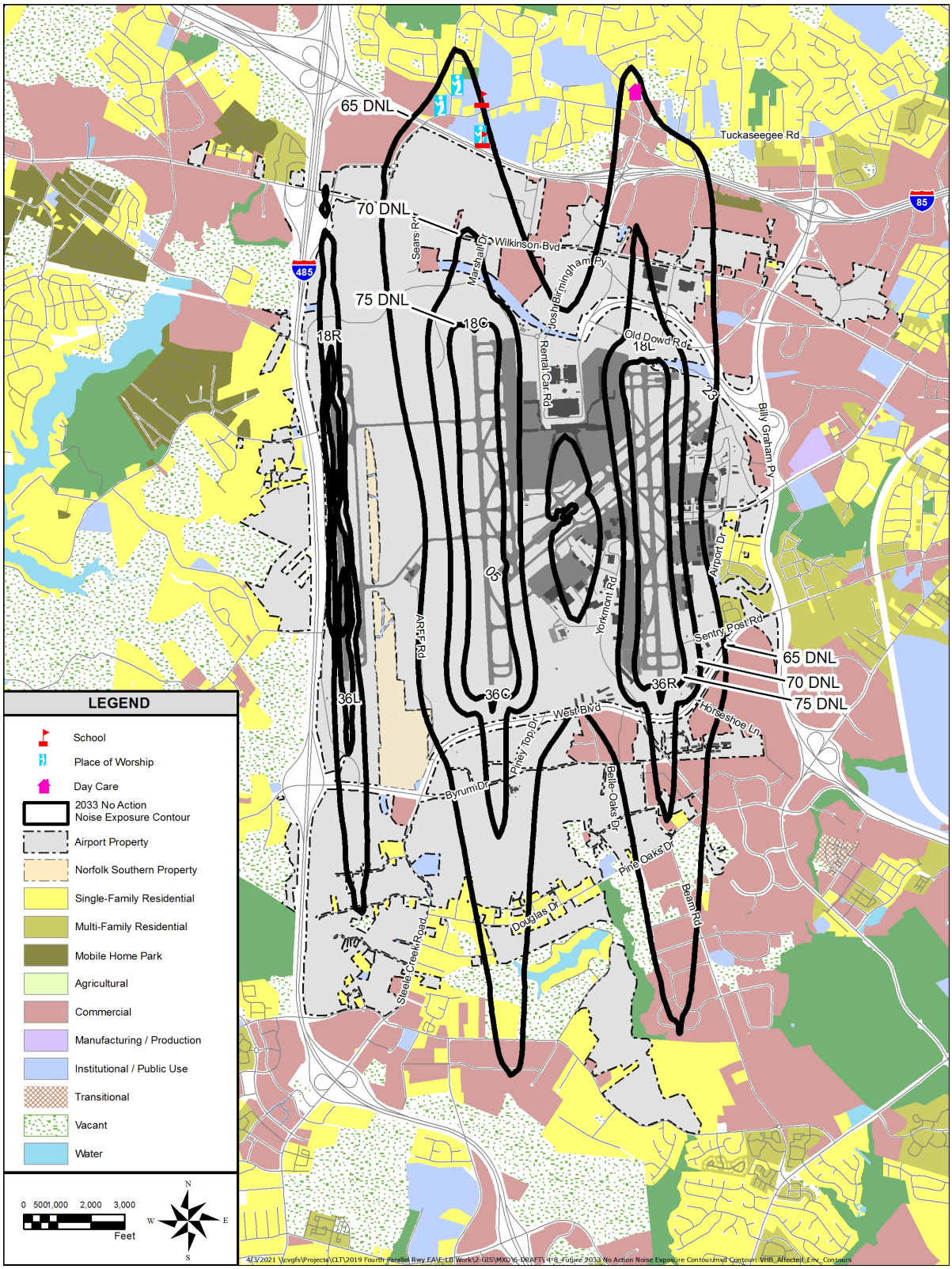
Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2033 No Action Alternative noise exposure contours are provided in **Table 4-22**. The NSF located in the DNL 65-70 dB contour include two schools (East Voyager Academy of Charlotte and West Mecklenburg High School), three churches (Harvest Church, Montagnard Alliance Church, and Every Nation Church), and one day care facility (Beginning Years Day Care, Inc). No nursing homes, hospitals, or libraries are located within the DNL 65+ dB.

TABLE 4-22, 2033 NO ACTION ALTERNATIVE INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	117	0	0	**117**
Duplex/Triplex Units	4	0	0	**4**
Mobile Home Units	1	0	0	**1**
Total	**122**	**0**	**0**	**122**
ESTIMATED POPULATION				
Single-Family Units	323	0	0	**323**
Duplex/Triplex Units	11	0	0	**11**
Mobile Home Units	3	0	0	**3**
Total	**337**	**0**	**0**	**337**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	2	0	0	**2**
Churches	3	0	0	**3**
Day Care Facilities	1	0	0	**1**
Total	**6**	**0**	**0**	**6**

Source: Landrum & Brown analysis, 2021

EXHIBIT 4-8, 2033 NO ACTION ALTERNATIVE NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

4.11.2.2 Alternative 1 (Proposed Action)

The 2033 Alternative 1 (Proposed Action) noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-9**. The DNL 65+ dB of the 2033 Alternative 1 (Proposed Action) noise exposure contour encompasses approximately 7.2 square miles. **Exhibit 4-10** provides a comparison of the 2033 Alternative 1 (Proposed Action) and the 2033 No Action Alternative noise exposure contours. The 2033 Alternative 1 (Proposed Action) contour retains the same shape as the 2028 Alternative 1 (Proposed Action) contour as the runways were assumed to operate the same. However, 2033 Alternative 1 (Proposed Action) is larger due to the increase in forecasted operations.

Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2033 Alternative 1 (Proposed Action) noise exposure contour are provided in **Table 4-23.** The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte), four churches (Harvest Church, Montagnard Alliance Church, Mulberry Baptist Church, and Every Nation Church), and two day care facilities (Beginning Years Day Care, Inc and Mulberry Head Start).

TABLE 4-23, 2033 ALTERNATIVE 1 (PROPOSED ACTION) INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	89	0	0	**89**
Duplex/Triplex Units	6	0	0	**6**
Mobile Home Units	6	0	0	**6**
Total	**101**	**0**	**0**	**101**
ESTIMATED POPULATION				
Single-Family Units	240	0	0	**240**
Duplex/Triplex Units	17	0	0	**17**
Mobile Home Units	15	0	0	**15**
Total	**272**	**0**	**0**	**272**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	**1**
Churches	4	0	0	**4**
Day Care Facilities	2	0	0	**2**
Total	**7**	**0**	**0**	**7**

Source: Landrum & Brown analysis, 2021

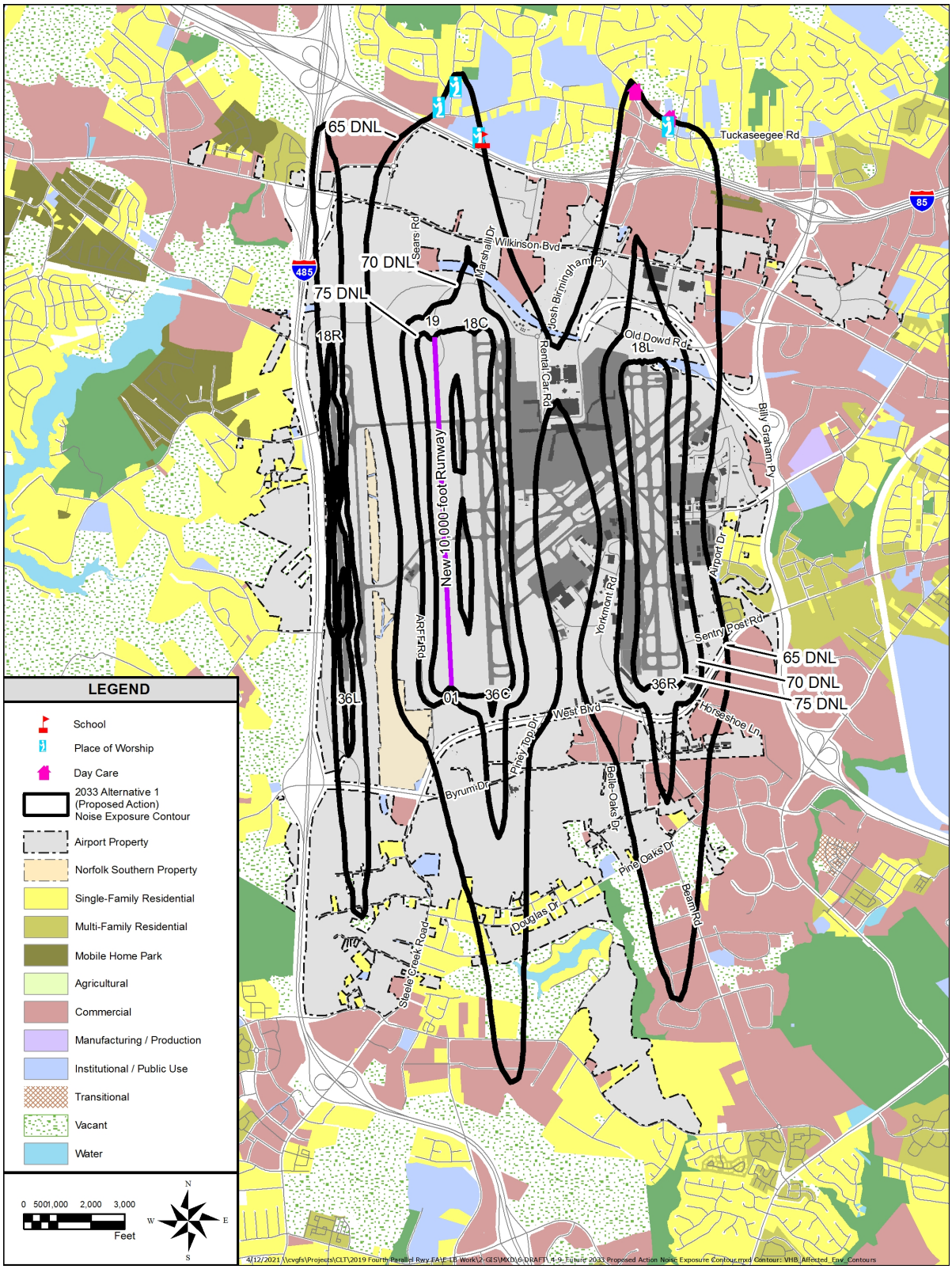
The 2033 Alternative 1 (Proposed Action) noise exposure contour, compared to the 2033 No Action Alternative noise exposure contour, did not experience DNL 1.5 dB increase within the DNL 65 dB over NSF. The DNL 1.5 dB increase area would remain over compatible Airport-owned land. Therefore, no significant noise impacts would occur with 2033 Alternative 1 (Proposed Action). As shown in **Table 4-24**, there would be 21 less residential units, one less school (West Mecklenburg High School), one more church (Mulberry Baptist Church), and one more day care facility (Mulberry Head Start) exposed to DNL 65 dB in the 2033 Alternative 1 (Proposed Action) noise exposure contour. Similar to the 2028 Alternative 1 (Proposed Action) noise exposure contour, the overall decrease in residences and increase in one NSF is attributed to the change in the shape and size of the 2033 Alternative 1 (Proposed Action) noise exposure as compared to the 2033 No Action Alternative. As previously discussed, the addition of the new departure runway and the subsequent changes in use of the runways results in some areas where the 2033 Alternative 1 (Proposed Action) noise contour is larger than the 2033 No Action Alternative noise contour and other areas where the 2033 Alternative 1 (Proposed Action) noise contour is smaller than the 2033 No Action Alternative noise contour.

TABLE 4-24, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2033 ALTERNATIVE 1 (PROPOSED ACTION) NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	-28	0	0	**-28**
Duplex/Triplex Units	+2	0	0	**+2**
Mobile Home Units	+5	0	0	**+5**
Total	**-21**	0	0	**-21**
ESTIMATED POPULATION				
Single-Family Units	-83	0	0	**-83**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+12	0	0	**+12**
Total	**-65**	**0**	**0**	**-65**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	-1	0	0	**-1**
Churches	+1	0	0	**+1**
Day Care Facilities	+1	0	0	**+1**
Total	**+1**	**0**	**0**	**+1**

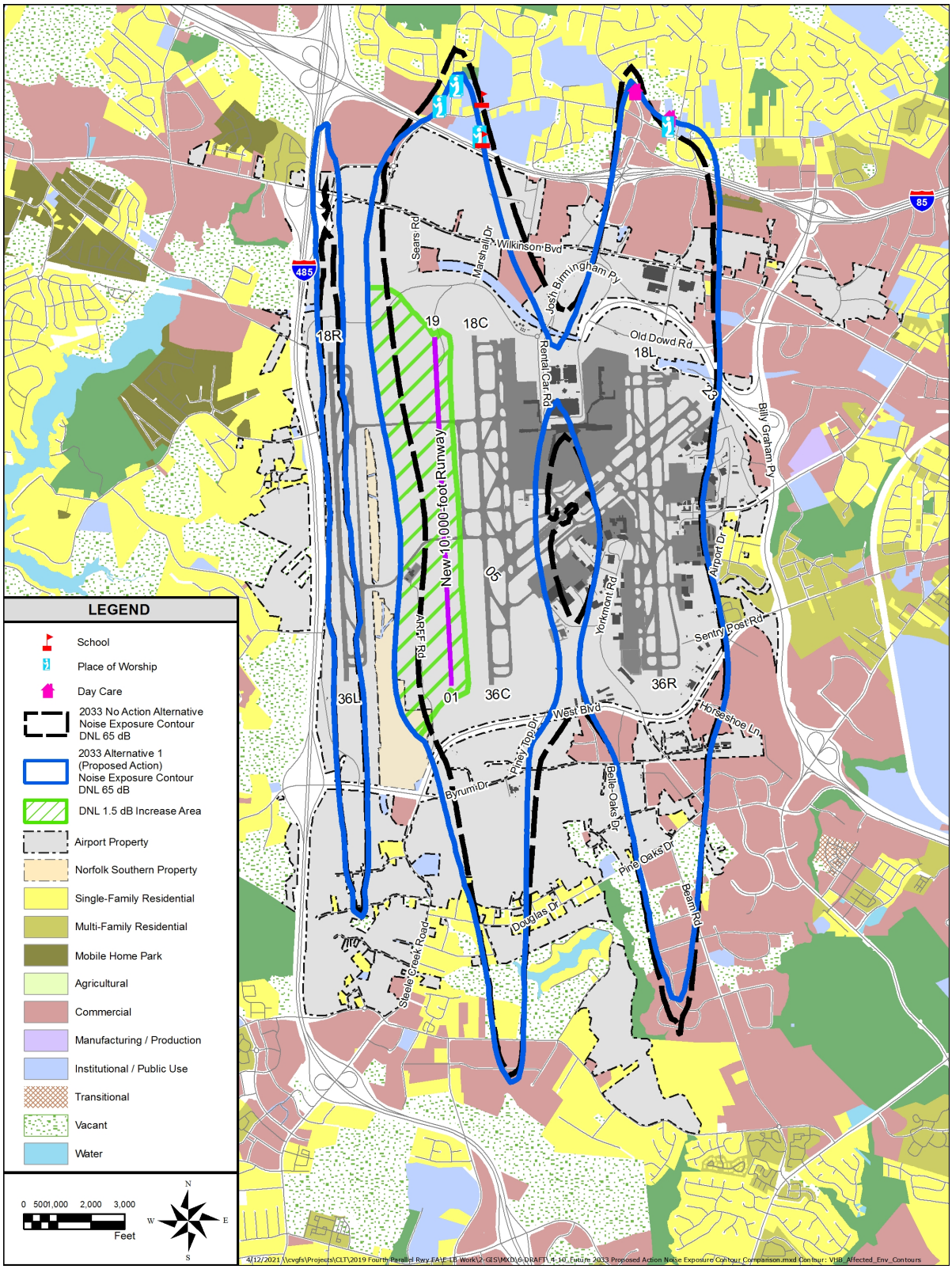
Source: Landrum & Brown analysis, 2021

EXHIBIT 4-9, 2033 ALTERNATIVE 1 (PROPOSED ACTION) NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-10, COMPARISON OF 2033 ALTERNATIVE 1 (PROPOSED ACTION) AND 2033 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.2.3 Alternative 2

The 2033 Alternative 2 noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-11**. The DNL 65+ dB of the 2033 Alternative 2 noise exposure contour encompasses approximately 7.1 square miles. **Exhibit 4-12** provides a comparison of the 2033 Alternative 2 and the 2033 No Action Alternative noise exposure contours. The 2033 Alternative 2 contour retains the same shape as the 2028 Alternative 2 contour as the runways were assumed to operate the same as the 2028 Alternative 2. However, 2033 Alternative 2 is larger due to the increase in forecasted operations.

Summaries of the residential population and housing units affected by noise levels exceeding DNL 65 dB for the 2033 Alternative 2 noise exposure contour are provided in **Table 4-25.** The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte), four churches (Harvest Church, Montagnard Alliance Church, Mulberry Baptist Church, and Every Nation Church), and two day care facilities (Beginning Years Day Care, Inc and Mulberry Head Start).

TABLE 4-25, 2033 ALTERNATIVE 2 INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	93	0	0	93
Duplex/Triplex Units	6	0	0	6
Mobile Home Units	6	0	0	6
Total	**105**	**0**	**0**	**105**
ESTIMATED POPULATION				
Single-Family Units	251	0	0	251
Duplex/Triplex Units	17	0	0	17
Mobile Home Units	15	0	0	15
Total	**283**	**0**	**0**	**283**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	1
Churches	4	0	0	4
Day Care Facilities	2	0	0	2
Total	**7**	**0**	**0**	**7**

Source: Landrum & Brown analysis, 2021

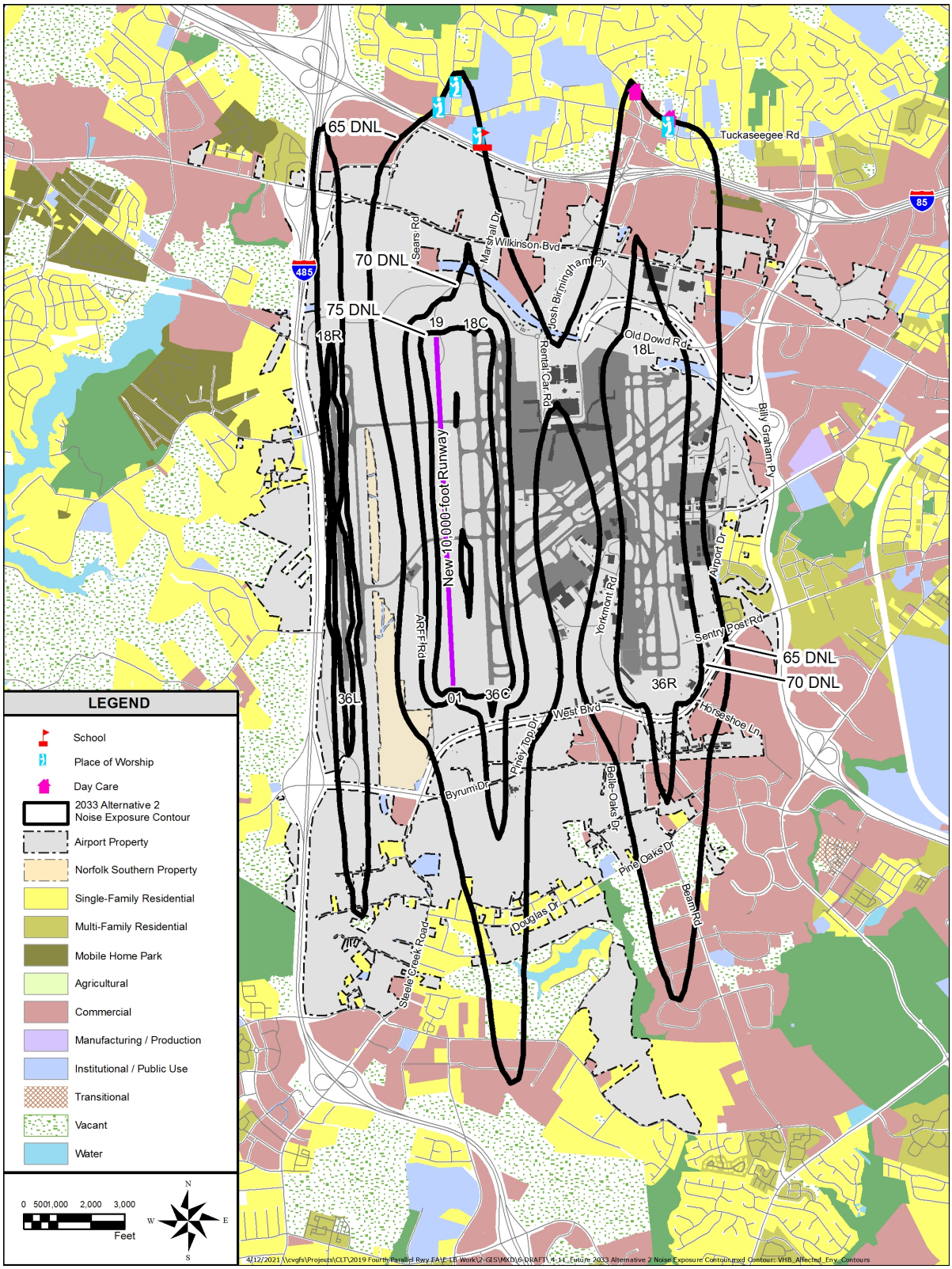
The 2033 Alternative 2 noise exposure contour, compared to the 2033 No Action Alternative noise exposure contour, did not experience DNL 1.5 dB increase within the DNL 65 dB over NSF. The DNL 1.5 dB increase area would remain over compatible Airport-owned land. Therefore, no significant noise impacts would occur with 2033 Alternative 2. As shown in **Table 4-26**, there would be 17 less residential units, one less school (West Mecklenburg High School), one more church (Mulberry Baptist Church), and one more day care facility (Mulberry Head Start) exposed to DNL 65 dB in the 2033 Alternative 2 noise exposure contour

TABLE 4-26, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2033 ALTERNATIVE 2 NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	-24	0	0	**-24**
Duplex/Triplex Units	+2	0	0	**+2**
Mobile Home Units	+5	0	0	**+5**
Total	**-17**	0	0	**-17**
ESTIMATED POPULATION				
Single-Family Units	-72	0	0	**-72**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+12	0	0	**+12**
Total	**-54**	**0**	**0**	**-54**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	-1	0	0	**-1**
Churches	+1	0	0	**+1**
Day Care Facilities	+1	0	0	**+1**
Total	**+1**	**0**	**0**	**+1**

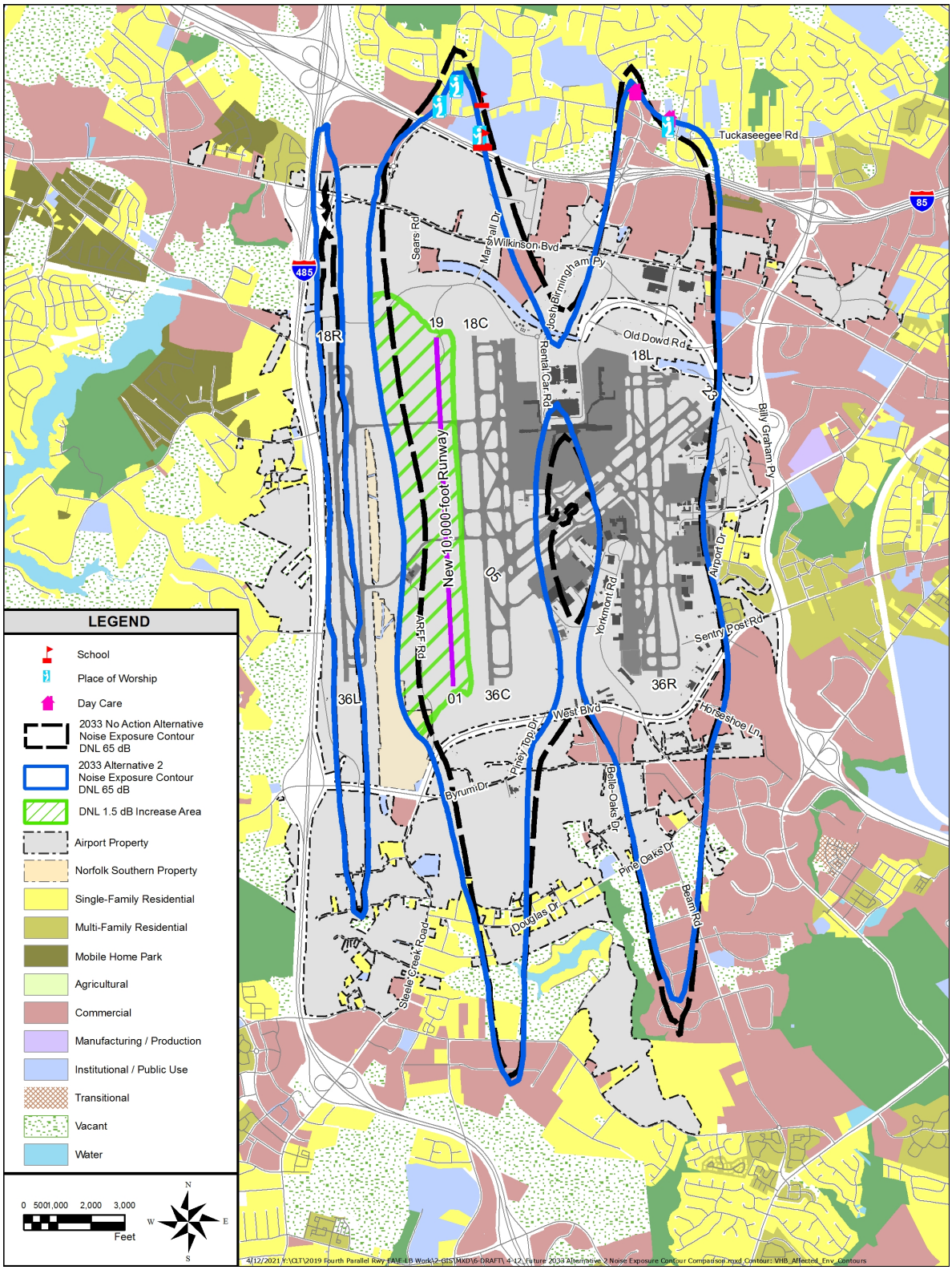
Source: Landrum & Brown analysis, 2021

EXHIBIT 4-11, 2033 ALTERNATIVE 2 NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-12, COMPARISON OF 2033 ALTERNATIVE 2 AND 2033 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.2.4 Alternative 3

The 2033 Alternative 3 noise exposure contour, showing 65, 70, and 75 DNL levels, is presented on **Exhibit 4-13**. The DNL 65+ dB of the 2033 Alternative 3 noise exposure contour encompasses approximately 7.0 square miles. **Exhibit 4-14** provides a comparison of the 2033 Alternative 3 and the 2033 No Action Alternative noise exposure contours. The 2033 Alternative 3 contour retains the same shape as the 2033 Alternative 3 contour as the runways were assumed to operate the same as the 2028 Alternative 3. However, 2033 Alternative 3 is larger due to the increase in forecasted operations.

Summaries of the housing units and population affected by noise levels exceeding DNL 65 dB for the 2033 Alternative 3 noise exposure contour are provided in **Table 4-27.** The NSF located in the DNL 65-70 dB contour includes one school (East Voyager Academy of Charlotte), four churches (Harvest Church, Montagnard Alliance Church, Mulberry Baptist Church, and Every Nation Church), and two day care facilities (Beginning Years Day Care, Inc and Mulberry Head Start).

TABLE 4-27, 2033 ALTERNATIVE 3 INCOMPATIBILITIES

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	113	0	0	113
Duplex/Triplex Units	6	0	0	6
Mobile Home Units	7	0	0	7
Total	**126**	**0**	**0**	**126**
ESTIMATED POPULATION				
Single-Family Units	304	0	0	**304**
Duplex/Triplex Units	17	0	0	**17**
Mobile Home Units	18	0	0	**18**
Total	**339**	**0**	**0**	**339**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	1	0	0	1
Churches	4	0	0	4
Day Care Facilities	2	0	0	2
Total	**7**	**0**	**0**	**7**

Source: Landrum & Brown analysis, 2021

The analysis concluded that a DNL 1.5 dB increase would occur within the DNL 65 dB or greater noise contour in the 2033 Alternative 3 when compared to the 2033 No Action Alternative. As shown in **Table 4-28**, there would be an increase of 4 residential units, one less school (West Mecklenburg High School), one more church (Mulberry Baptist Church), and one more day care facility (Mulberry Head Start) exposed to DNL 65 dB in the 2033 Alternative 3 noise exposure contour.

TABLE 4-28, NEW RESIDENCES AND NOISE-SENSITIVE FACILITIES EXPOSED TO DNL 65 DB IN THE 2033 ALTERNATIVE 3 NOISE EXPOSURE CONTOUR

	DNL 65-70 dB	DNL 70-75 dB	DNL 75+ dB	Total
RESIDENTIAL				
Single-Family Units	-4	0	0	**-4**
Duplex/Triplex Units	+2	0	0	**+2**
Mobile Home Units	+6	0	0	**+6**
Total	**+4**	0	0	**+4**
ESTIMATED POPULATION				
Single-Family Units	-19	0	0	**-19**
Duplex/Triplex Units	+6	0	0	**+6**
Mobile Home Units	+15	0	0	**+15**
Total	**+2**	**0**	**0**	**+2**
NOISE-SENSITIVE FACILITIES (NSF)				
Schools	-1	0	0	**-1**
Churches	+1	0	0	**+1**
Day Care Facilities	+1	0	0	**+1**
Total	**+1**	**0**	**0**	**+1**

Source: Landrum & Brown analysis, 2021

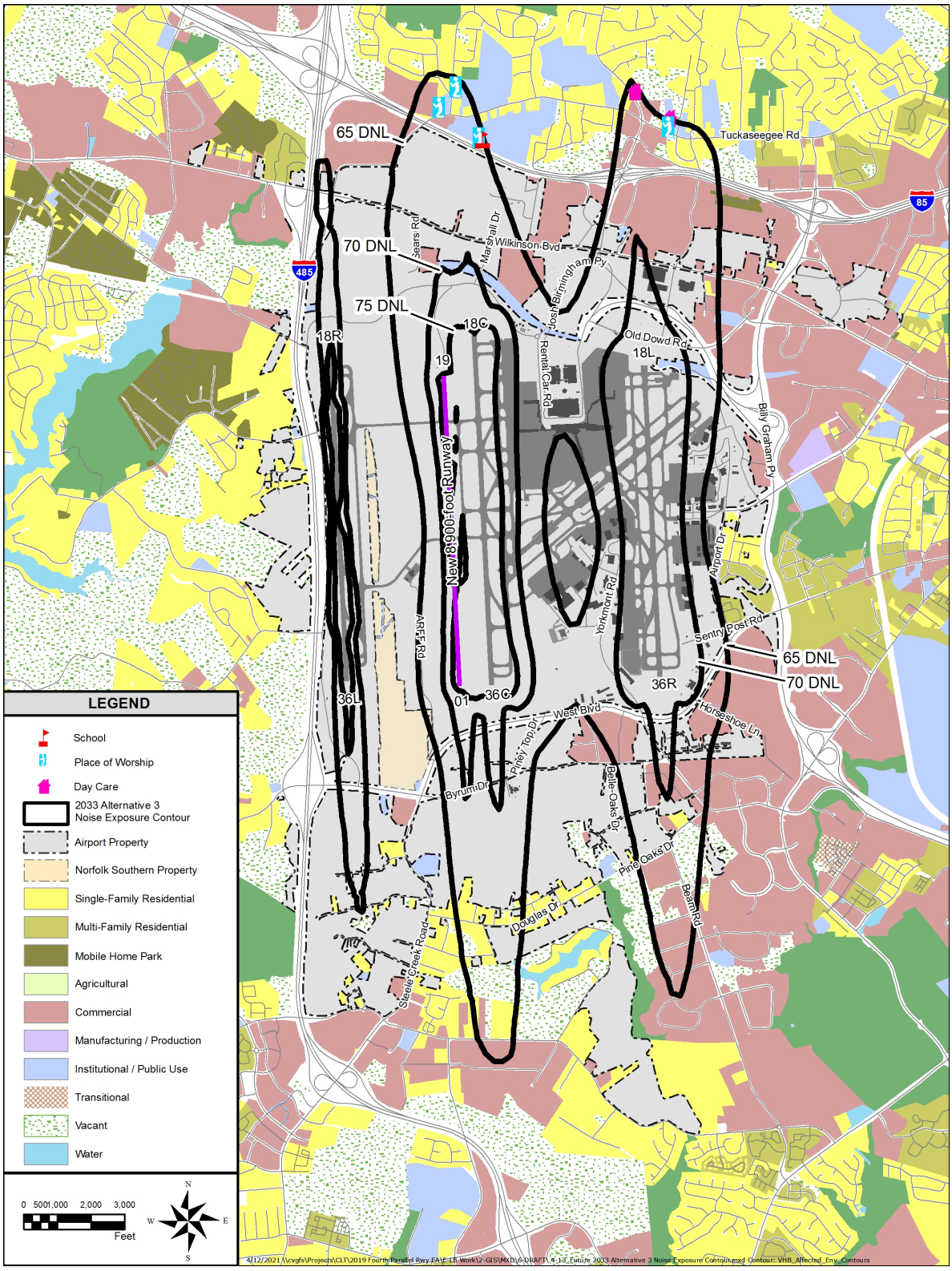
There would be 20 housing units and 50 people located within the DNL 1.5 dB increase area. Of the 20 residential units, 16 have been previously sound insulated. No NSF would be located in the DNL 1.5 dB increase area. **Table 4-29** shows the total number of housing units and estimated population by housing type within the area of DNL 1.5 dB increase within the DNL 65 dB of the 2033 Alternative 3 noise exposure contour.

TABLE 4-29, HOUSING AND POPULATION WITHIN THE AREA OF DNL 1.5 DB INCREASE WITHIN DNL 65 DB OF THE 2033 ALTERNATIVE 3 NOISE EXPOSURE CONTOURS

Housing Type	Housing Units	Estimated Population
Single-Family Units	20*	50
Duplex/Triplex Units	0	0
Mobile Home Units	0	0
Total	**20**	**50**

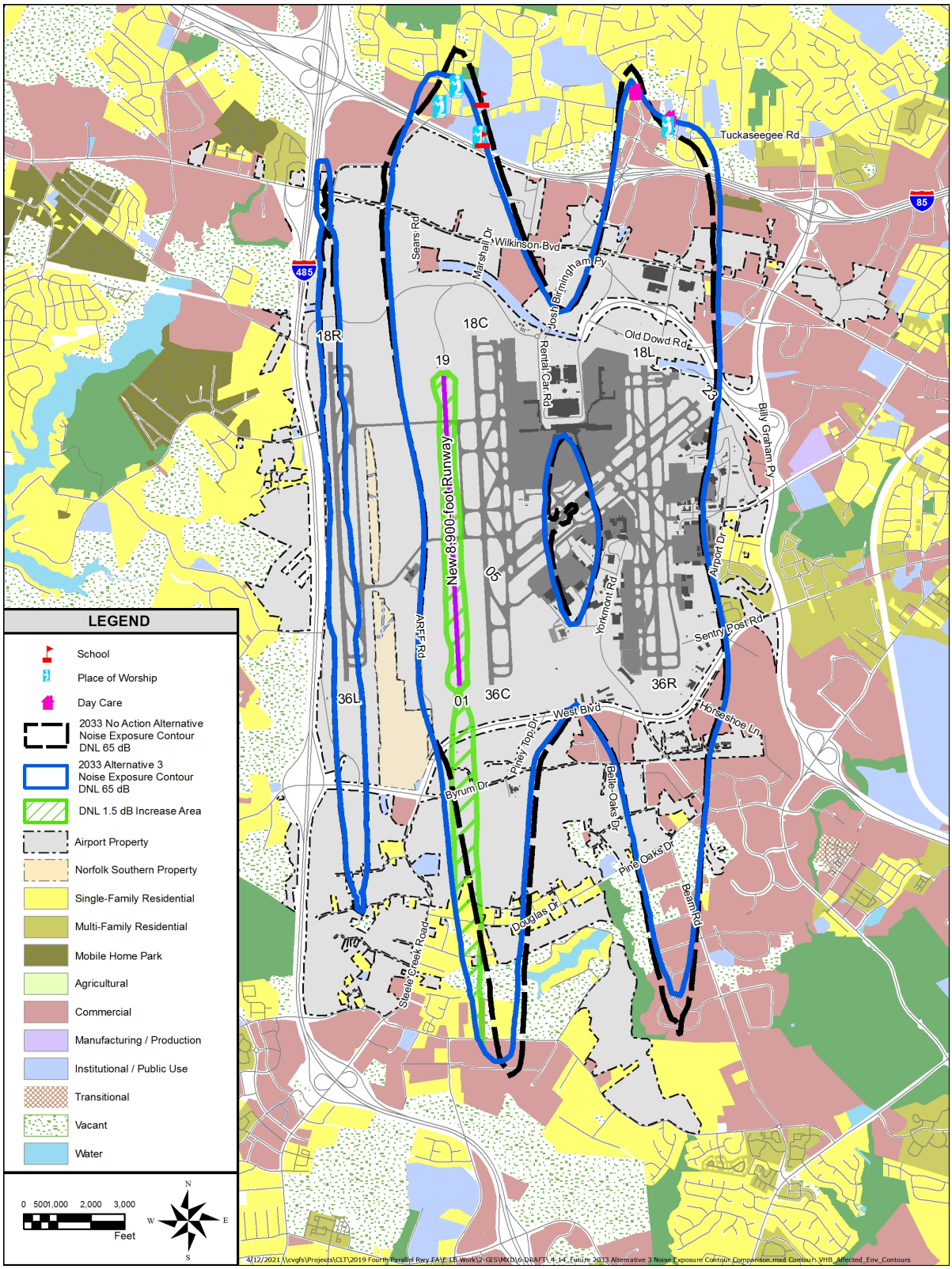
Note: *16 of the 20 homes within the DNL 1.5 dB contour have been previously sound insulated.
Source: Landrum & Brown analysis, 2021

EXHIBIT 4-13, 2033 ALTERNATIVE 3 NOISE EXPOSURE CONTOUR



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-14, COMPARISON OF 2033 ALTERNATIVE 3 AND 2033 NO ACTION ALTERNATIVE WITH AREAS OF SIGNIFICANT INCREASE



Source: Landrum & Brown analysis, 2021

4.11.2.5 Reportable Noise Changes

For air traffic airspace and procedure actions where the study area is larger than the immediate vicinity of an airport, the noise analysis focuses on a change-in-exposure analysis. This analysis examines the change in noise levels as compared to population and demographic information. Per FAA Order 1050.1F, Section 11.3 Environmental Consequences, this analysis may be conducted using noise contours.

Analysis was conducted to assess the potential noise impacts to housing units and the population located between the DNL 60 and 65 dB noise contours due to changes in airspace and air traffic procedures. The analysis was conducted using the recommendations of the FICON37,[103] which the FAA has incorporated into FAA Order 1050.1F. The FICON was formed to review and make recommendations on Federal policies that govern the assessment of airport noise impacts. Under one of its policy recommendations, FICON concluded that it is prudent to provide for a systematic analysis of noise levels below DNL 65 dB in NEPA documents using the following screening procedures:

- Determine if a DNL 1.5 dB increase occurs at noise-sensitive sites within the DNL 65 dB or greater noise contour. If a DNL 1.5 dB increase does not occur, then it is likely that a DNL 3.0 dB increase would not be found within the DNL 60 to 65 dB noise contour, and no further screening would be necessary.
- If a DNL 1.5 dB increase does occur at noise-sensitive sites within the DNL 65 dB or greater noise contour, then determine the areas where a DNL 3 dB increase occurs within the DNL 60 to 65 dB noise contour.

According to the policy recommendations of the FICON, when areas of a DNL 3 dB increase in noise exposure within the DNL 60 to 65 dB noise contour and DNL 5 dB increase in the DNL 45 to 60 dB noise contour are identified in a NEPA analysis, the consideration of appropriate mitigation should include the potential for mitigating noise in these areas.[104] The FAA refers to noise changes meeting these criteria as “reportable.” Although they are not significant (see Exhibit 4-1 of Order 1050.1F), they may cause a proposed action to be highly controversial on environmental grounds. The same range of currently approved mitigation options that are potentially available at DNL 65 dB or greater should be considered, including eligibility for Federal funding. The FICON further acknowledges that there is no commitment by either the FAA or the airport sponsor for funding potential land use mitigation within a DNL 60 to 65 dB noise contour, because it is generally expected that Federal priority would be given to mitigating noise at higher levels.

Since only the 2028 and 2033 Alternative 3 noise contours experienced a DNL 1.5 dB increase over a NSF, an analysis was performed to determine if a DNL 3 dB increase occurred within the DNL 60 to 65 dB noise contour occurred. This analysis determined no DNL 3 dB increase occurred in the DNL 60 to 65 dB of Alternative 3 in 2028 or 2033. In addition, none of the alternatives experienced a DNL 5 dB increase within the DNL 45 to 60 dB in 2028 or 2033.

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[103] Federal Interagency Committee on Noise (FICON), August 1992, *Federal Agency Review of Selected Airport Noise Analysis Issues*.

[104] Per FAA Order 1050.1F, AEDT was used to identify where the 5 dB increase within the DNL 45 to 60 dB occurs. This was conducted to evaluate the potential noise impacts as a result of changes in airport arrivals and departures and determine whether there is the potential to increase noise levels over communities beneath the aircraft route.

4.11.3 Construction

Table 4-30 depicts an estimate of the typical maximum sound level energy from various types of construction equipment that is likely to be used during construction of Alternative 1 (Proposed Action) and Alternatives 2 and 3. The total sound energy would be a product of a machine's sound level, the number of such machines in service, and the average time they operate. Construction activities associated with Alternative 1 (Proposed Action) and Alternatives 2 and 3 would result in temporary noise impacts to the residential areas surrounding the DSA. However, major construction activities would be limited to daylight hours. Additionally, noise from construction equipment would likely not be discernible from other background noise sources such as aircraft and roadway noise in most locations.

TABLE 4-30, CONSTRUCTION EQUIPMENT NOISE

Construction Equipment	Typical Maximum Sound Level (LMAX) In DB(A) At 50 Feet
Backhoe	78
Chain Saw	84
Concrete Mixer Truck	79
Dozer	82
Dump Truck	76
Excavator	81
Generator	81
Jackhammer	89
Paver	77
Pump	81
Pneumatic Tools	85
Rock Drill	81
Scraper	84

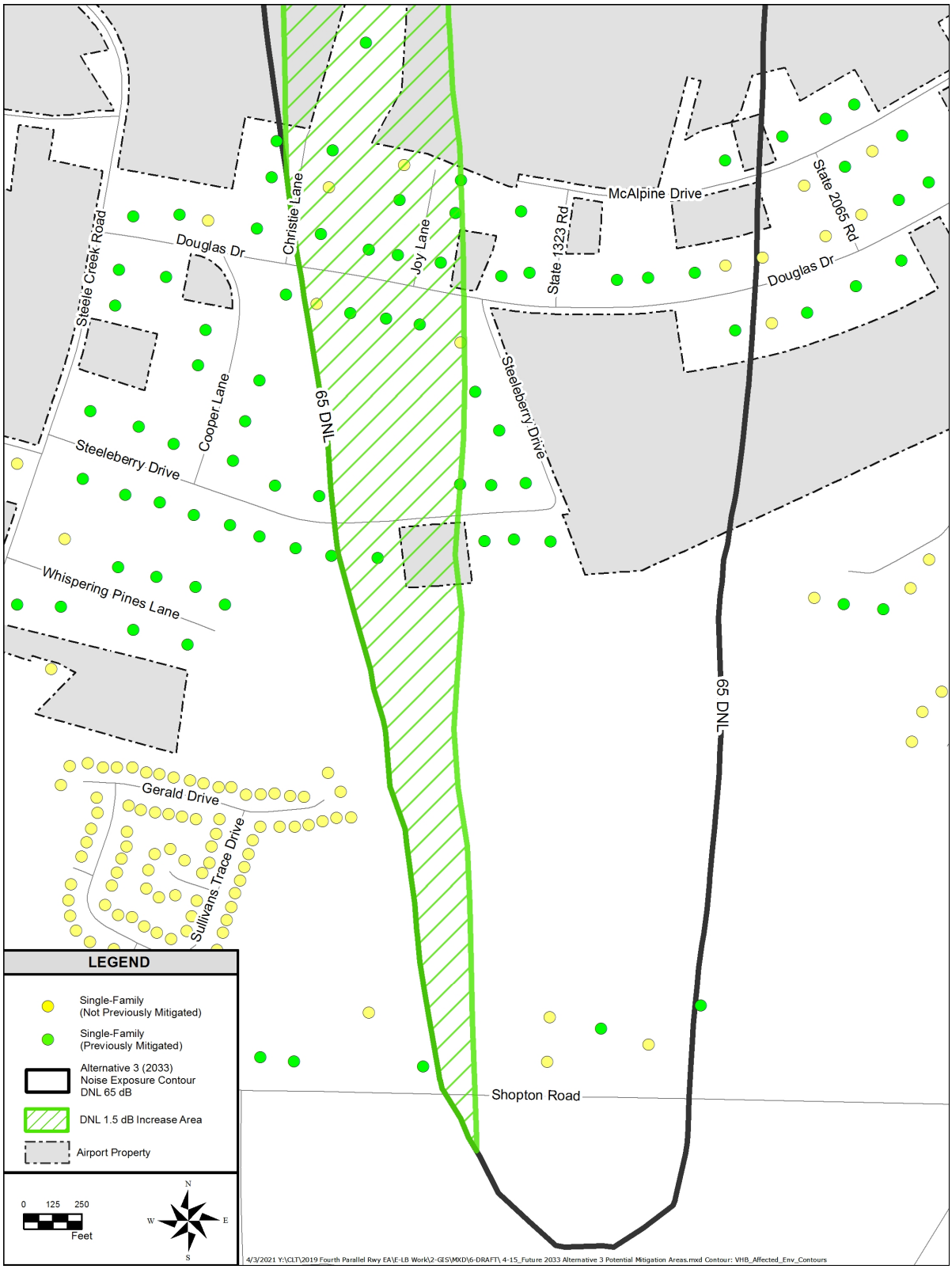
Source: Federal Highway Administration, Construction Noise Handbook, 9.0 Construction Equipment Noise Levels and Ranges. Online at http://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/handbook09.cfm, Accessed August 2, 2018.

4.11.4 Mitigation, Avoidance, and Minimization Measures

No significant noise impacts would occur due to Alternative 1 (Proposed Action) or Alternatives 2 in 2028 or 2033. Alternative 3 would result in significant noise impacts to NSF. Under Alternative 3, 20 housing units would be located within the 1.5 dB increase area within the 65 DNL noise exposure contour in both 2028 and 2033. Of the 20 residences, 16 have previously been sound insulated and the remaining four were offered sound insulation as part of previous Part 150 Noise Compatibility Programs. **Exhibit 4-15** shows all of the housing units in the potential areas of significant noise impact for 2028 and 2033 Alternative 3.

In order to be eligible for sound insulation, the interior noise levels must be at DNL 45 dB or above. If Alternative 3 was implemented, CLT would offer to sound insulate the four single-family housing units that have not been previously sound insulated. CLT would need to verify the number and types of housing units and their eligibility prior to implementing mitigation.

EXHIBIT 4-15, ALTERNATIVE 3 POTENTIAL MITIGATION AREAS



Source: Landrum & Brown analysis, 2021

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

This section presents the analysis of potential impacts to socioeconomic impacts, environmental justice impacts, and children's environmental health and safety risks that would occur as a result of the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3.

4.12.1 Future Conditions: 2028

4.12.1.1 No Action Alternative

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,
- disruption of local traffic patterns and substantially reducing the levels of service of roads serving an airport and its surrounding communities; or, or
- producing a substantial loss of the community tax base.

Induced Growth: The No Action Alternative would not result in economic growth for the area near the Airport because no construction activity would occur. Therefore, no impacts to socioeconomic resources would occur.

Disrupting Communities: The No Action Alternative would not result in the division of established communities near the Airport. No construction activities would occur on the Airport. Therefore, no impacts to socioeconomic resources would occur.

Relocation of Residences: The No Action Alternative would not result in the acquisition or the conversion of residential properties to Airport property. Therefore, no impacts to socioeconomic resources would occur.

Relocation of Businesses: The No Action Alternative would not result in impacts to businesses located on or off-Airport. Therefore, no impacts to socioeconomic resources would occur.

Disruptions of Local Traffic Patterns: The No Action Alternative would not result in modifications to off-Airport roadways or increase surface traffic. Therefore, no impacts to socioeconomic resources would occur.

Substantial Loss in Community Tax Base: The No Action Alternative would not result in a substantial loss in community tax base. Therefore, no impacts to socioeconomic resources would occur.

Environmental Justice

A specific significance threshold for Environmental Justice has not been defined by the FAA. However, potential impacts would occur if disproportionately high environmental impacts in one or more environmental categories were to occur to 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 environmental justice analysis. The action would have the potential to lead to a disproportionately high and adverse impact to an environmental justice population, i.e., a low-income or minority 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 nonminority population and/or non-low-income population.

Noise impacts were analyzed in order to quantify the potential environmental justice impacts in the 2028 No Action Alternative. Of the 78 housing units within the DNL 65 dB noise contour of the 2028 No Action Alternative, 77 were single-family residences and one was a manufactured home. Seven census block groups, identified as minority and/or low-income populations, intersect the DNL 65 dB noise contour for the 2028 No Action Alternative. Therefore, the No Action Alternative in 2028 would impact minority and low-income populations.

Children's Environmental Health and Safety Risks

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

4.12.1.2 Alternative 1 (Proposed Action)

Socioeconomic Impacts

Induced Growth: The construction and implementation of Alternative 1 (Proposed Action) would result in temporary growth in economic activity from the creation of construction jobs. Therefore, no adverse impacts to economic growth would occur as a result of Alternative 1 (Proposed Action) in 2028.

Disrupting Communities: The construction and implementation of Alternative 1 (Proposed Action) would occur on existing Airport property. Alternative 1 (Proposed Action) would not result in the division of established communities near the Airport. Therefore, no impacts to socioeconomic resources would occur.

Relocation of Residences: The construction and implementation of Alternative 1 (Proposed Action) would not result in acquisition or the conversion of any residential properties to Airport property. Therefore, no adverse impacts due to the relocation of residences would occur.

Relocation of Businesses: The construction and operation of Alternative 1 (Proposed Action) would not result in significant adverse impacts to businesses located on- or off-Airport. Alternative 1 (Proposed

Action) would require the relocation of facilities in the south midfield area; however, these facilities would be relocated in the same general area of the Airport. Additionally, the relocations would occur in-kind. Therefore, no adverse impacts to businesses would occur as a result of Alternative 1 (Proposed Action).

Disruptions of Local Traffic Patterns: The construction and implementation of Alternative 1 (Proposed Action) would require the relocation of a portion of West Boulevard, as it is located in the area where the south end-around taxiway would be constructed. The relocation of West Boulevard would be completed using existing roadways (Piney Top Drive and Byrum Drive) with minor roadway and intersection improvements to achieve an acceptable level of service (LOS)[105] on the road. Coordination regarding the proposed West Boulevard relocation was conducted with North Carolina Department of Transportation, Charlotte Department of Transportation, and the City of Charlotte Aviation Department. All parties agreed that improvements can be implemented in design to accommodate the relocation of West Boulevard. As such, coordination with the above-mentioned parties would continue through the design and implementation of the proposed relocation. The traffic analysis and coordination materials prepared for the purpose of this EA are included in Appendix J, *Traffic.* Furthermore, the construction of Alternative 1 (Proposed Action), including the relocation of West Boulevard, would result in a temporary increase in surface traffic during construction. Given the capacity of the roadways surrounding CLT and the proposed minor roadway improvements, it is concluded that surrounding roadways are sufficient to handle this temporary increase during construction. Alternative 1 (Proposed Action) does not include construction and implementation of a new haul road. Therefore, no permanent significant disruption of local traffic patterns would result from implementing Alternative 1 (Proposed Action).

Substantial Loss in Community Tax Base: Alternative 1 (Proposed Action) would not result in a substantial loss in community tax base as all businesses being relocated would be done, in-kind, in the south airfield. Therefore, no adverse impacts to the community tax base would occur as a result of Alternative 1 (Proposed Action).

Environmental Justice

The 2028 Alternative 1 (Proposed Action) would not result in a DNL1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. As shown in **Exhibit 4-16,** census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience changes in noise with the 2028 Alternative 1 (Proposed Action). These census block groups would experience both, increases (shaded in yellow) and decreases (shaded in blue) in noise. The 2028 Alternative 1 (Proposed Action) would result in 23 housing units experiencing an increase in noise and 25 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour in a minority and low-income census block group when compared to the 2028 No Action Alternative. As such, there would be a decrease of two housing units exposed to DNL 65+ dB within minority and low-income census block groups when compared to the 2028 No Action Alternative. In addition, eight of the housing units that would experience an increase in noise have previously been mitigated.

While the 2028 Alternative 1 (Proposed Action) would cause an impact to housing units in environmental justice communities, there would be two fewer total housing units in a minority and/or low-income census block group affected as compared to the 2028 No Action Alternative. Therefore,

[105] Level of Service (LOS) for intersections assign LOS grades A through F to intersections based on average delay per vehicle at an intersection, which range from short delays up to 35 seconds per vehicle to long delays over 80 seconds per vehicle for signalized intersections. LOS are published in the Highway Capacity Manual, by the National Academies of Sciences, Transportation Research Board

Alternative 1 (Proposed Action) would not have a disproportionately high and adverse impact on low-income and minority populations.

While the 2028 Alternative 1 (Proposed Action) noise exposure contour would cause an impact to environmental justice populations, there would be eight fewer total people affected in minority and low-income census block groups as compared to the 2028 No Action Alternative noise exposure contour. Therefore, Alternative 1 (Proposed Action) would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2028. Implementation of Alternative 1 (Proposed Action) would not cause those populations to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income populations.

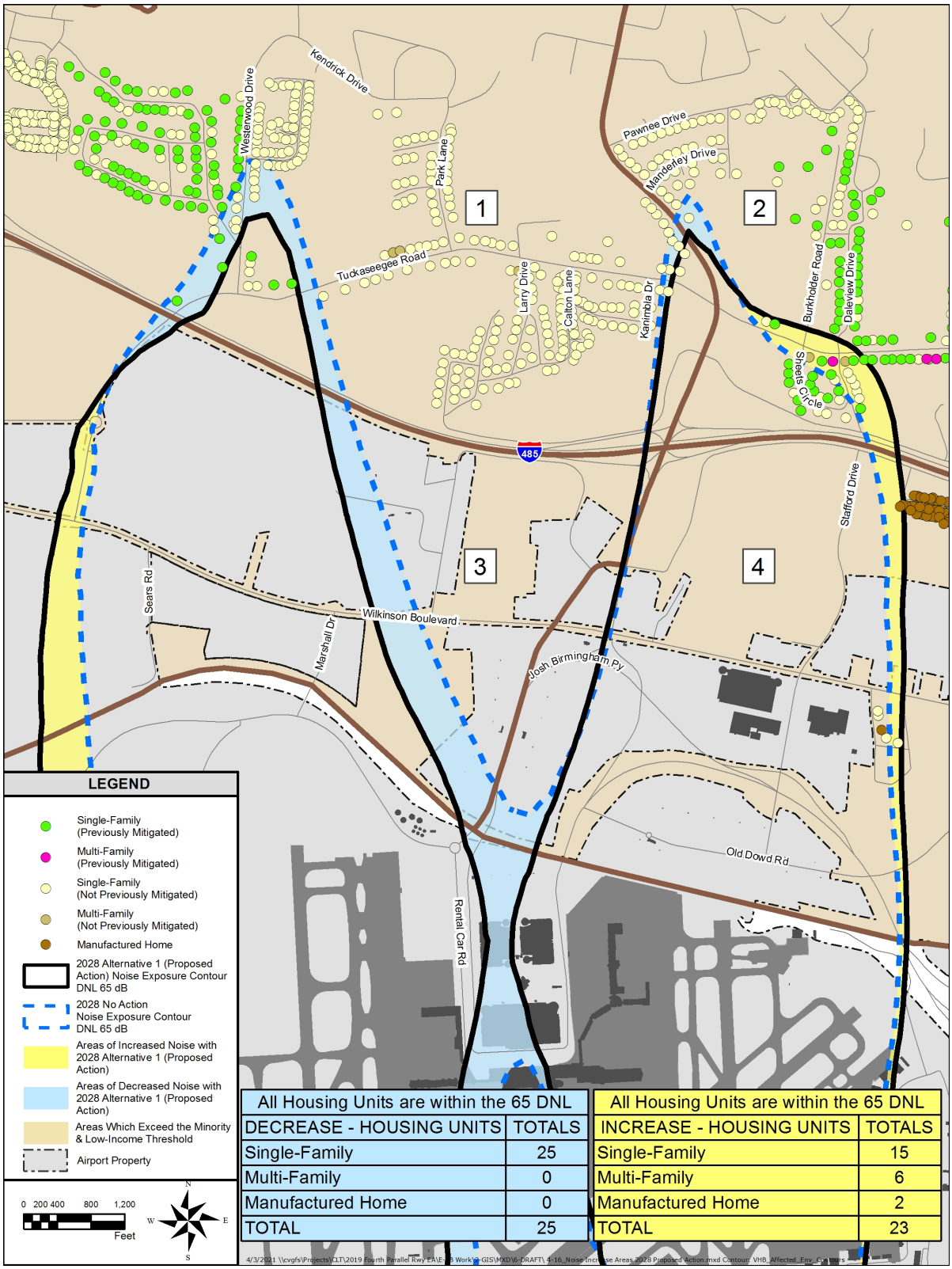
Children's Environmental Health and Safety Risks

In order to determine whether Alternative 1 (Proposed Action) would result in an elevated risk related to health or safety concerns of children, Section 4.3, *Air Quality* and Section 4.16, *Water Resources* were examined. According to the analysis in Section 4.3, Alternative 1 (Proposed Action) would not create air quality conditions that would worsen breathing conditions for children because Alternative 1 (Proposed Action) would not exceed the applicable standards and would not result in an adverse impact on local or regional air quality. According to the analysis in Section 4.16, Alternative 1 (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 nearest school where children are congregated is approximately 4,300 feet to the north of the DSA where construction activities are anticipated from Alternative 1 (Proposed Action). The construction site would be fenced off 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 Alternative 1 (Proposed Action).

Therefore, Alternative 1 (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.

EXHIBIT 4-16, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2028 ALTERNATIVE 1 (PROPOSED ACTION) COMPARED TO 2028 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	25
Multi-Family	0
Manufactured Home	0
TOTAL	25

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	15
Multi-Family	6
Manufactured Home	2
TOTAL	23

Source: Landrum & Brown analysis, 2021

4.12.1.3 Alternative 2

Socioeconomic Impacts

The construction and implementation of Alternative 2 would have the same induced growth, disruption to communities, relocation of residences, relocation of businesses, disruption of traffic patterns, and community tax base impacts as Alternative 1 (Proposed Action) in 2028. Therefore, no adverse socioeconomic impacts would occur as a result of Alternative 2 in 2028.

Environmental Justice

The 2028 Alternative 2 would not result in a DNL 1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. As shown in **Exhibit 4-17,** census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience changes in noise with the 2028 Alternative 2. These census block groups would experience both, increases (shaded in yellow) and decreases (shaded in blue) in noise. The 2028 Alternative 2 would result in 24 housing units experiencing an increase in noise and 24 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour in a minority and low-income census block group when compared to the 2028 No Action Alternative. This results in no change in the number of housing units in the 65+ DNL noise exposure contour, within minority and low-income census block groups, when compared to the 2028 No Action Alternative. In addition, eight of the housing units that would experience an increase in noise have previously been mitigated.

While the 2028 Alternative 2 would cause an impact to housing units in environmental justice communities, there would be no difference in the total housing units affected as compared to the 2028 No Action Alternative. Therefore, Alternative 2 would not have a disproportionately high and adverse impact on low-income and minority populations.

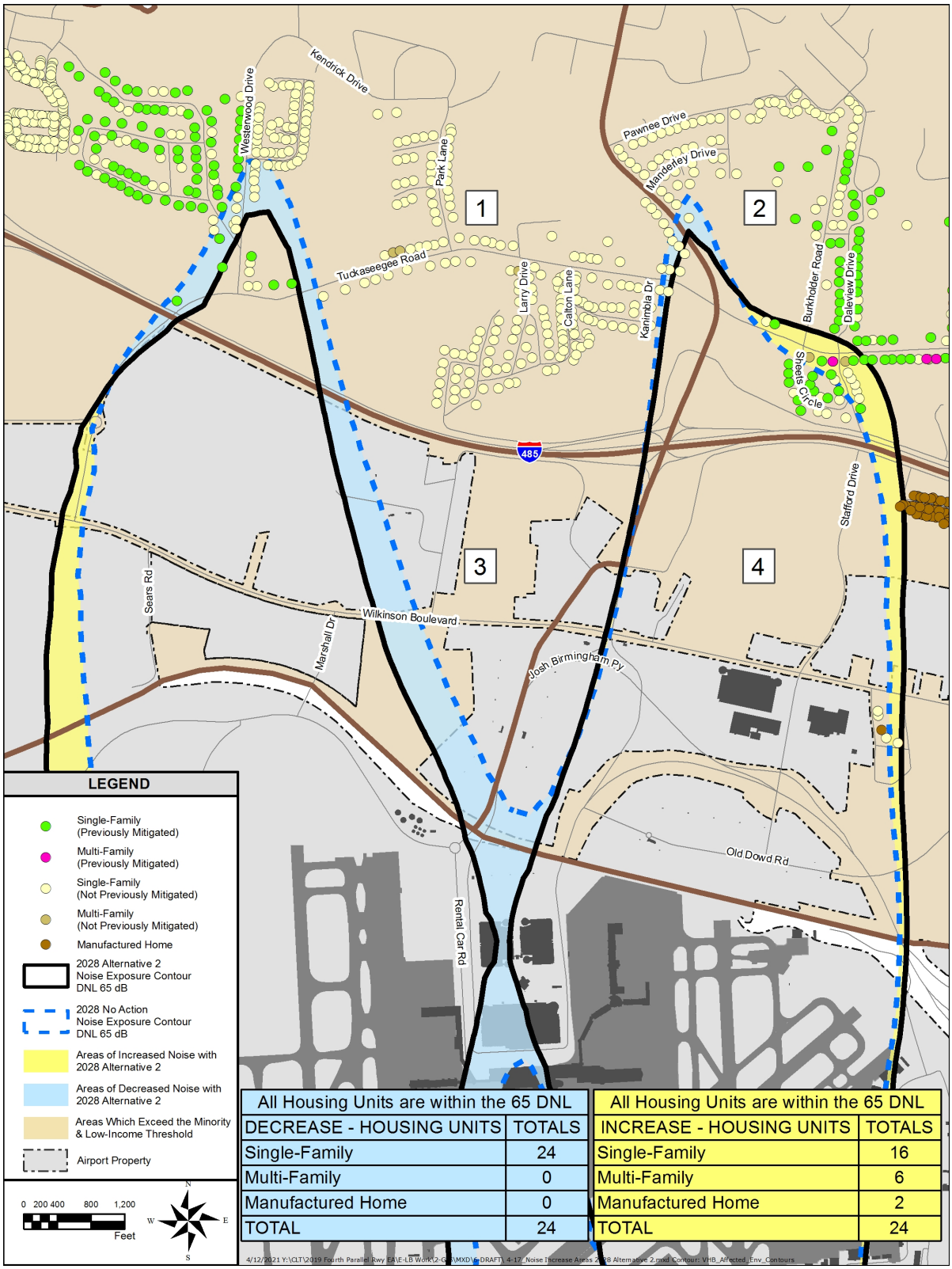
While the 2028 Alternative 2 noise exposure contour would cause an impact to environmental justice populations, there would be 8 fewer total people affected in a minority and low-income census block group as compared to the 2028 No Action Alternative noise exposure contour. Therefore, Alternative 2 would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2028.

Implementation of Alternative 2 would not cause an environmental justice population to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income population.

Children’s Environmental Health and Safety Risks

The Alternative 2 would have the same effects upon children’s environmental health and safety risks as described for Alternative 1 (Proposed Action) in 2028.

EXHIBIT 4-17, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2028 ALTERNATIVE 2 COMPARED TO 2028 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	24
Multi-Family	0
Manufactured Home	0
TOTAL	24

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	16
Multi-Family	6
Manufactured Home	2
TOTAL	24

Source: Landrum & Brown analysis, 2021

4.12.1.4 Alternative 3

Socioeconomic Impacts

The construction and implementation of Alternative 3 would have the same induced growth, disruption to communities, relocation of residences, relocation of businesses, disruption of traffic patterns, and community tax base impacts as Alternative 1 (Proposed Action) in 2028. Therefore, no adverse impacts to businesses would occur as a result of Alternative 3 in 2028.

Environmental Justice

The 2028 Alternative 3 would experience a DNL 1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. However, the DNL 1.5 dB increase was not over a census block group identified as a minority or low-income population. As shown in **Exhibit 4-18,** census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience changes in noise with the 2028 Alternative 3. These census block groups would experience both, increases (shaded in yellow) and decreases (shaded in blue) in noise. The 2028 Alternative 3 would result in 23 housing units experiencing an increase in noise and 22 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour in a minority and low-income census block group, when compared to the 2028 No Action Alternative. As such, there would be an increase of one housing unit exposed to DNL 65+ dB within minority and low-income census block groups when compared to the 2028 No Action Alternative. In addition, eight of the housing units that would experience an increase in noise in the minority and low-income census block groups have previously been mitigated.

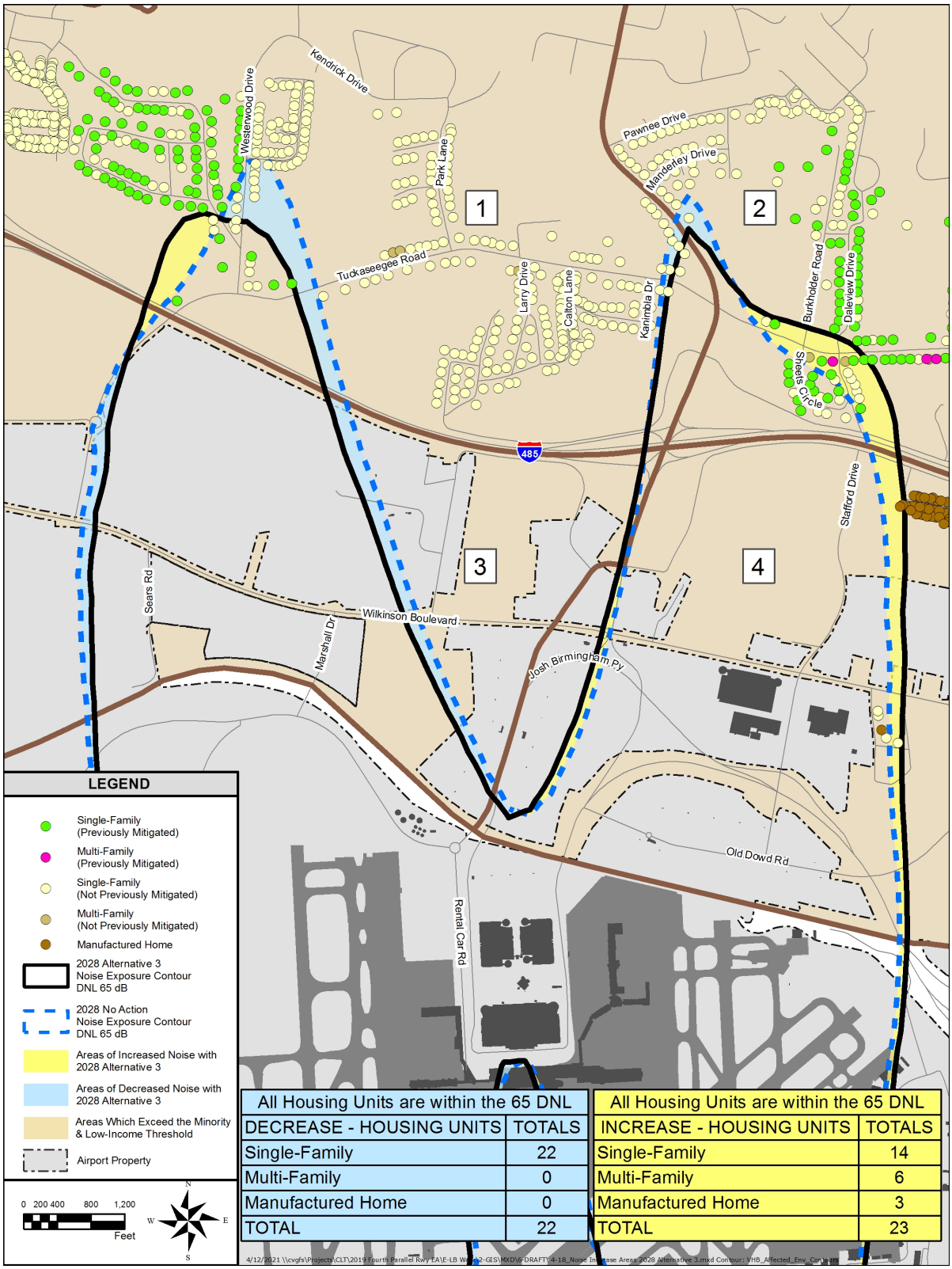
While the 2028 Alternative 3 would cause an impact to housing units in environmental justice communities, there would be only one additional housing unit in a minority and/or low-income census block group as compared to the 2028 No Action Alternative. Therefore, Alternative 3 would not have a disproportionately high and adverse impact on low-income and minority populations.

The 2028 Alternative 3 noise exposure contour would cause an impact to environmental justice populations, as there would be two more total people experiencing an increase in noise in a minority and low-income census block group when compared to the 2028 No Action Alternative noise exposure contour. However, Alternative 3 would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2028. Implementation of Alternative 3 would not cause those populations to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income populations.

Children's Environmental Health and Safety Risks

The Alternative 3 would have the same effects upon children's environmental health and safety risks as described for Alternative 1 (Proposed Action) in 2028.

EXHIBIT 4-18, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2028 ALTERNATIVE 3 COMPARED TO 2028 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	22
Multi-Family	0
Manufactured Home	0
TOTAL	22

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	14
Multi-Family	6
Manufactured Home	3
TOTAL	23

Source: Landrum & Brown analysis, 2021

4.12.2 Future Conditions: 2033

4.12.2.1 No Action Alternative

Socioeconomic Impacts

No physical development would occur in the No Action Alternative in 2033. Therefore, no adverse socioeconomic impacts would occur.

Environmental Justice

Of the 122 housing units within the DNL 65 dB noise exposure contour of the No Action Alternative in 2028, 117 were single-family residences, four multi-family residences, and one was a manufactured home. Similar to the No Action Alternative in 2028, seven of the census block groups that intersect the DNL 65 dB noise exposure contour for the No Action Alternative in 2033 are identified as minority and low-income populations. Therefore, the 2033 No Action Alternative would impact minority and low-income populations.

Children's Environmental Health and Safety Risks

No physical development would occur in 2033 under the No Action Alternative. Therefore, there would be no impacts to children's environmental health and safety not occurring or anticipated to occur already in the 2028 No Action Alternative.

4.12.2.2 Alternative 1 (Proposed Action)

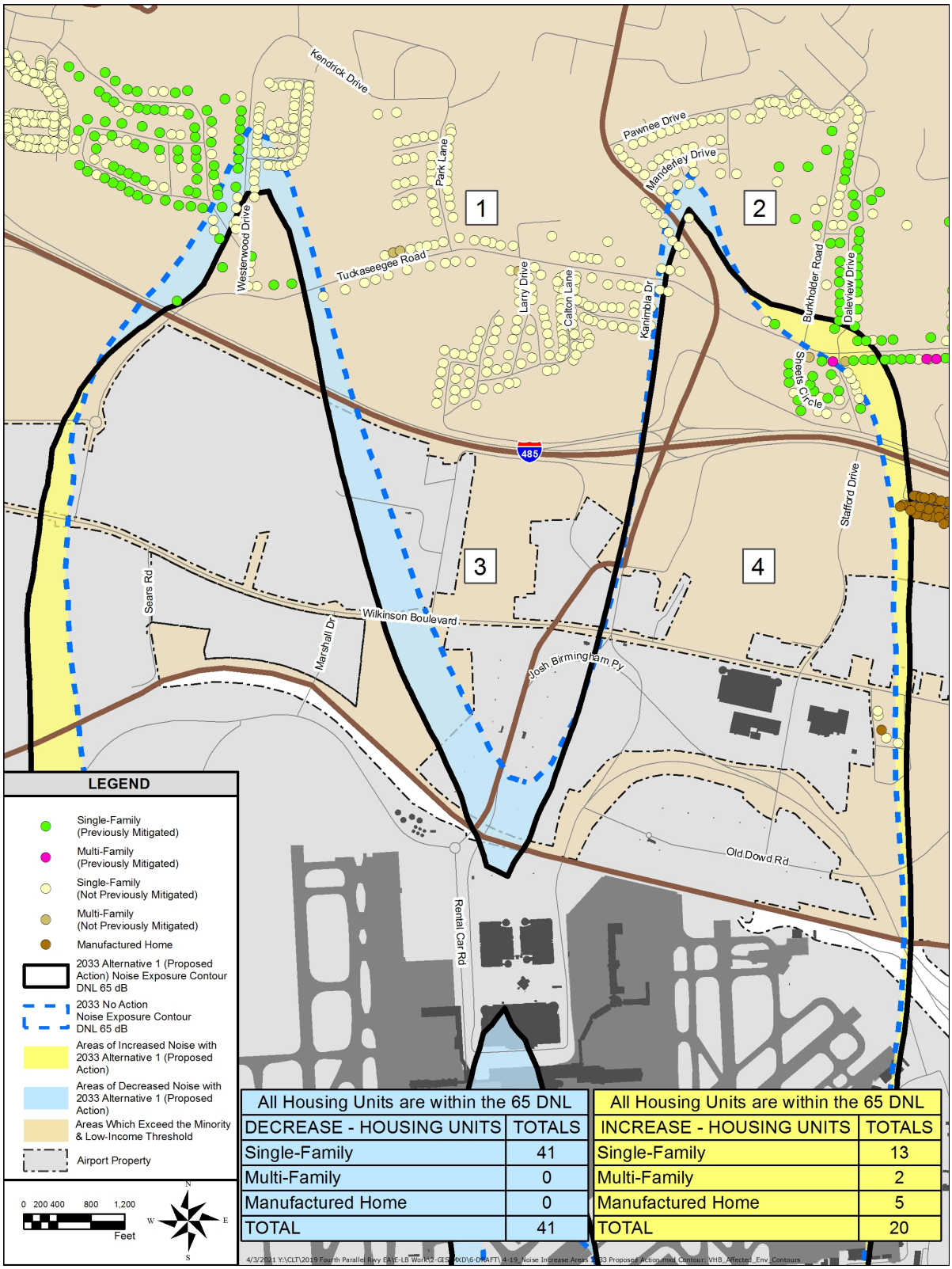
Socioeconomic Impacts

No physical development would occur in Alternative 1 (Proposed Action) in 2033. Therefore, no adverse socioeconomic impacts would occur.

Environmental Justice

The 2033 Alternative 1 (Proposed Action) would not result in a DNL 1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. As shown in **Exhibit 4-19,** census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience changes in noise with the 2033 Alternative 1 (Proposed Action). The 2033 Alternative 1 (Proposed Action) contour would result in 20 housing units experiencing an increase in noise and 41 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour when compared to the 2033 No Action Alternative. As such, there would be a decrease of 21 housing units exposed to DNL 65 dB within minority and low-income census block groups when compared to the 2033 No Action Alternative. In addition, eight of the housing units in the increase area have previously been mitigated. While the 2033 Alternative 1 (Proposed Action) would cause an impact to housing units in environmental justice communities, there would be 21 fewer total housing units in a minority and/or low-income census block group affected as compared to the 2033 No Action Alternative. Therefore, Alternative 1 (Proposed Action) would not have a disproportionately high and adverse impact on low-income and minority populations.

EXHIBIT 4-19, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2033 ALTERNATIVE 1 (PROPOSED ACTION) COMPARED TO 2033 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	41
Multi-Family	0
Manufactured Home	0
TOTAL	41

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	13
Multi-Family	2
Manufactured Home	5
TOTAL	20

Source: Landrum & Brown analysis, 2021

While the 2033 Alternative 1 (Proposed Action) noise exposure contour would cause an impact to environmental justice populations, there would be 65 fewer total people affected in minority and low-income census block groups as compared to the 2033 No Action Alternative noise exposure contour. Therefore, Alternative 1 (Proposed Action) would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2033. Implementation of Alternative 1 (Proposed Action) would not cause those populations to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income populations.

Children's Environmental Health and Safety Risks

Alternative 1 (Proposed Action) in 2033 would have the same effects upon children's environmental health and safety risks as described for Alternative 1 (Proposed Action) in 2028.

4.12.2.3 Alternative 2

Socioeconomic Impacts

No physical development would occur in Alternative 2 in 2033. Therefore, no adverse socioeconomic impacts would occur.

Environmental Justice

The 2033 Alternative 2 would not result in a DNL 1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. As shown in **Exhibit 4-20**, census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience changes in noise with the 2033 Alternative 2. The 2033 Alternative 2 would result in 21 housing units experiencing an increase in noise and 38 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour in a minority and low-income census block group when compared to the 2033 No Action Alternative. As such, there would be a decrease of 17 housing units exposed to DNL 65+dB within minority and low-income census block groups, when compared to the 2033 No Action Alternative. In addition, eight of the housing units that would experience an increase in noise have previously been mitigated.

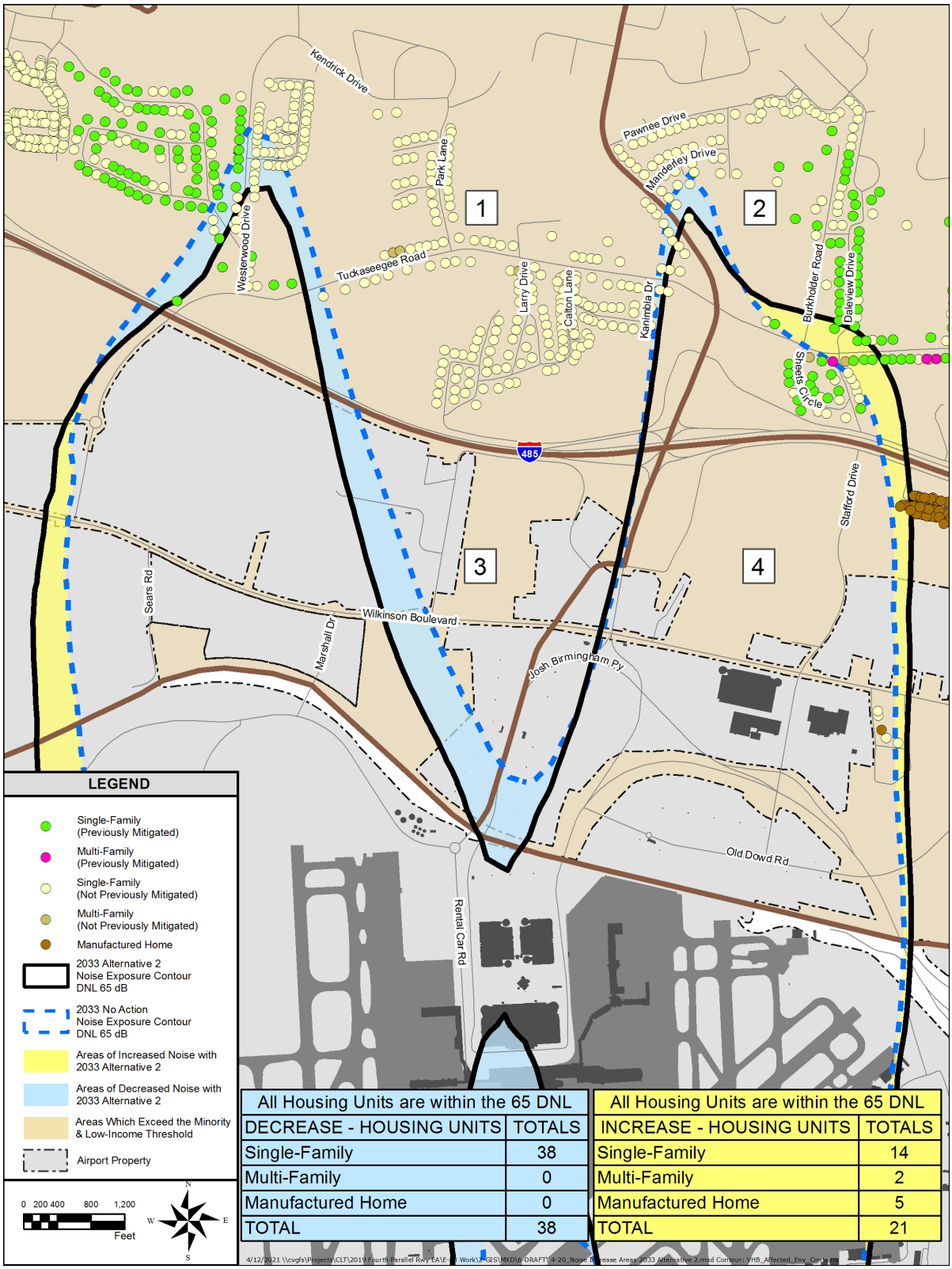
While the 2033 Alternative 2 would cause an impact to housing units in environmental justice communities, there would be 17 fewer total housing units in a minority and/or low-income census block group affected as compared to the 2033 No Action Alternative. Therefore, Alternative 2 would not have a disproportionately high and adverse impact on low-income and minority populations.

While the 2033 Alternative 2 noise exposure contour would cause an impact to environmental justice populations, there would be 54 fewer total people affected in a minority and low-income census block groups as compared to the 2033 No Action Alternative noise exposure contour. Therefore, Alternative 2 would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2033. Implementation of Alternative 2 would not cause those populations to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income populations.

Children's Environmental Health and Safety Risks

Alternative 2 in 2033 would have the same effects upon children's environmental health and safety risks as described for Alternative 2 in 2028.

EXHIBIT 4-20, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2033 ALTERNATIVE 2 COMPARED TO 2033 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	38
Multi-Family	0
Manufactured Home	0
TOTAL	38

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	14
Multi-Family	2
Manufactured Home	5
TOTAL	21

Source: Landrum & Brown analysis, 2021

4.12.2.4 Alternative 3

Socioeconomic Impacts

No physical development would occur in Alternative 3 in 2033. Therefore, no adverse socioeconomic impacts would occur.

Environmental Justice

The 2033 Alternative 3 would experience a DNL 1.5 dB increase over NSF within the DNL 65+ dB noise exposure contour. However, the DNL 1.5 dB increase was not over a census block group identified as a minority or low-income population. As shown in **Exhibit 4-21,** census block groups 1, 2, 3 and 4 are low-income and minority populations (see Section 3.3.11) and are the only minority and/or low-income census block groups that would experience noise exposure changes with the 2033 Alternative 3. The 2028 Alternative 3 would result in 20 housing units experiencing an increase in noise and 36 housing units experiencing a decrease in noise in the DNL 65+ dB noise exposure contour in a minority and low-income census block group, when compared to the 2033 No Action Alternative. As such, there would be a decrease of 16 housing units exposed to DNL 65+ dB within minority and low-income census block groups when compared to the 2033 No Action Alternative. Thirteen of the housing units that would experience an increase in noise in the minority and low-income census block groups have previously been mitigated.

While the 2033 Alternative 3 would cause an impact to housing units in environmental justice communities, there would be a decrease in 16 housing units in a minority and/or low-income census block group affected as compared to the 2033 No Action Alternative. Therefore, Alternative 3 would not have a disproportionately high and adverse impact on low-income and minority populations.

The 2033 Alternative 3 noise exposure contour would cause an impact to environmental justice populations. However, there would be 48 people experiencing a decrease in noise in a minority and low-income census block group when compared to the 2033 No Action Alternative noise exposure contour. Therefore, Alternative 3 would not have a disproportionately high and adverse effect on minority and/or low-income populations in 2033. Implementation of Alternative 3 would not cause those populations to suffer more than the non-minority and non-low-income population. In addition, the noise impact would not be appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority and non-low-income populations.

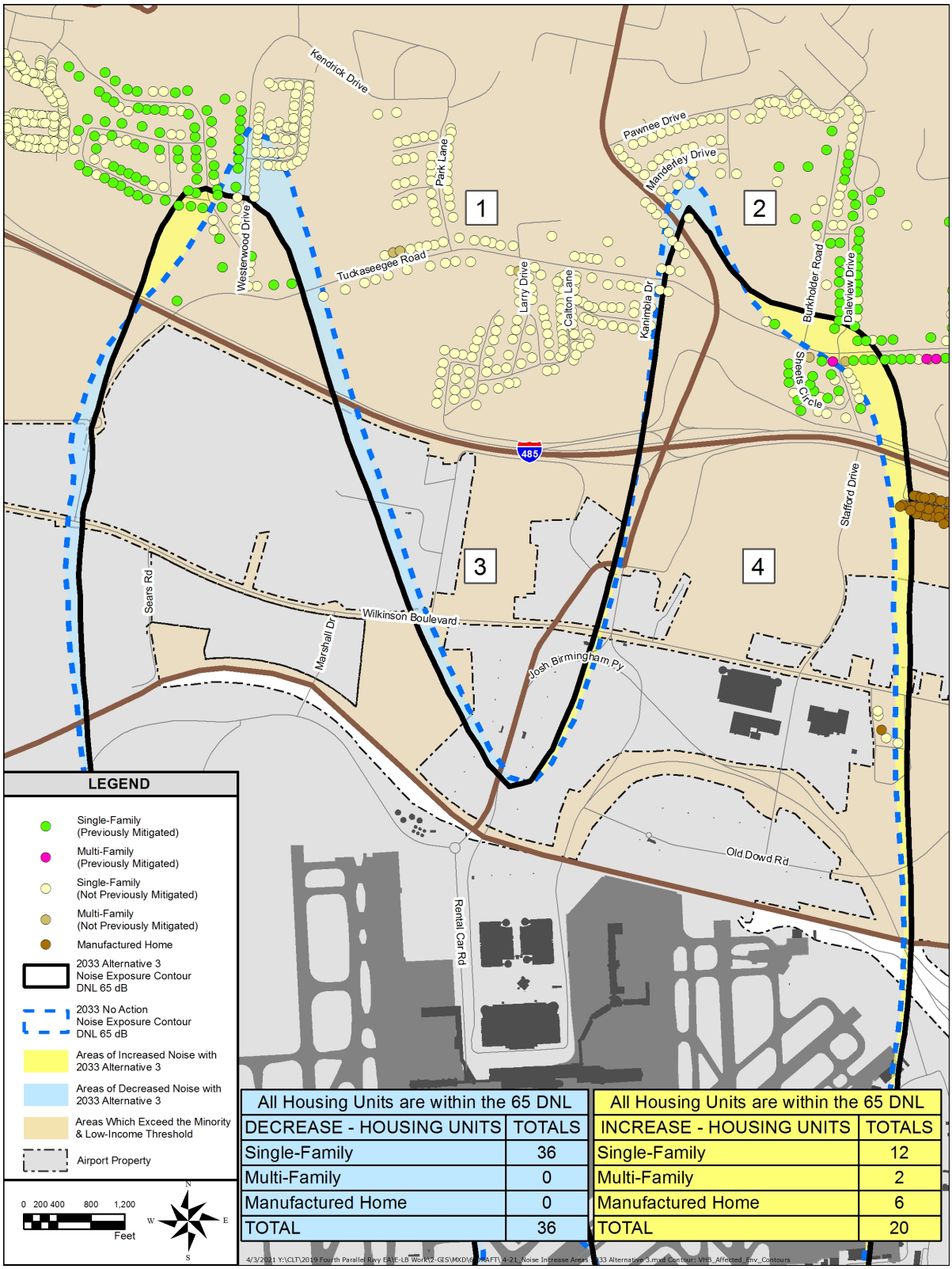
Children's Environmental Health and Safety Risks

The Alternative 3 would have the same effects upon children's environmental health and safety risks as described for Alternative 1 (Proposed Action) in 2033.

4.12.3 Mitigation, Avoidance, and Minimization Measures

No significant socioeconomic, environmental justice or children's environmental health and safety risk impacts would occur with the implementation of Alternative 1 (Proposed Action) or it's alternatives. Temporary impacts to off-airport traffic would occur during construction of Alternative 1 (Proposed Action) and Alternatives 2 and 3. A construction management plan would be prepared which, based on the selected contractor(s) haul plan, would specify hours of operation, haul routes, and similar controls. It is expected that such a plan would be consistent with normal contracting practices. Minimization measures would be implemented, such as signal timing modifications and lane utilization changes, to prevent LOS impacts during construction.

EXHIBIT 4-21, CHANGE IN MINORITY AND LOW-INCOME POPULATION AREAS 2033 ALTERNATIVE 3 COMPARED TO 2033 NO ACTION ALTERNATIVE



All Housing Units are within the 65 DNL	
DECREASE - HOUSING UNITS	TOTALS
Single-Family	36
Multi-Family	0
Manufactured Home	0
TOTAL	36

All Housing Units are within the 65 DNL	
INCREASE - HOUSING UNITS	TOTALS
Single-Family	12
Multi-Family	2
Manufactured Home	6
TOTAL	20

Source: Landrum & Brown analysis, 2021

4.13 Visual Effects (including light emissions)

Visual effects deal broadly with the extent to which the proposed action or alternative(s) would either: 1) produce light emissions that create annoyance or interfere with activities; or 2) contrast with, or detract from, the visual resources and/or the visual character of the existing environment.

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. Factors to consider that may be applicable to visual effects include, but are not limited to:

4.13.1 Light Emissions Effects

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

- The degree to which the action would have the potential to create annoyance or interfere with normal activities from light emissions; and
- The degree to which the 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.

4.13.2 Visual Resources and Visual Character Effects

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 consider:

- The degree to which the 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 action would have the potential to contrast with the visual resources and/or visual character in the study area; and
- The degree to which the 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.

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 No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3.

4.13.3 Future Conditions: 2028

4.13.3.1 No Action Alternative

Light Emissions

No physical development would occur in the No Action Alternative in 2028. Therefore, no light emission impacts would occur.

Visual Resources and Visual Character

No physical development would occur in the No Action Alternative in 2028. Therefore, no visual impacts would occur.

4.13.3.2 Alternative 1 (Proposed Action)

Light Emissions

As part of Alternative 1 (Proposed Action), additional runway, taxiway and airfield lighting would be required to support the proposed fourth parallel runway and its taxiways. The new runway would be equipped with High Intensity Runway Lights (HIRL) on both the runway edge and centerline. Both ends of the runway would have Touchdown Zone (TDZ) lights. TDZ lights include two rows of light bars located on either side of the runway centerline, normally at 100-foot intervals, extending 3,000 feet along the runway. Each runway end would also have Precision Approach Path Indicator (PAPI) lights. PAPI lights provide pilots with a safe and accurate glide slope on the final approach to the runway. A PAPI aviation light system uses a row of light housing assemblies (LHAs) placed perpendicular to the airport's runway approach path. Both runway ends would have an Approach Lighting System with Sequenced Flashers-Category II (ALSF-II). Approach lighting systems are used in the vicinity of runway thresholds in conjunction with electronic navigational aids to guide approaches to the runways. Approach lighting systems are typically situated atop a series of towers that extend along the runway centerline. Due to the displaced threshold on the Runway 19 end (north end), approach lighting systems would be constructed in the runway pavement. An ALSF-II lighting system extends outward 2,400 feet from the runway threshold along the extended runway centerline, with lights spaced at 100-ft intervals. In addition, any associated future taxiway would be constructed with Medium Intensity Taxiway Lighting (MITL).

The additional airfield lighting required for Alternative 1 (Proposed Action) would not produce light emissions noticeably different to the existing lights, which are currently used to conduct safe airport operations. Additionally, Alternative 1 (Proposed Action) would result in the expansion of existing terminals, taxiways, and the redevelopment of facilities at CLT. Due to the existing light emissions at CLT and the location of the proposed expansion and redevelopment, the light emissions from Alternative 1 (Proposed Action) are not expected to be noticeably different from the Airport’s current lighting.

The closest residential neighborhoods, north (6,200 feet north of the Runway 18C threshold) and south (6,900 feet south of the Runway 36C threshold) of the Airport property, would not experience a change in light emissions because the Airport property has varied topography and is heavily vegetated. Residences would not have a direct line of sight to the new runway, taxiways, terminal expansion, or other airport facilities. The light emissions from implementation of Alternative 1 (Proposed Action) would not be noticeably different to the existing light emissions at CLT. Therefore, the light emission impacts on residences north and south of the Airport would not change and no impacts to light emissions would occur as a result of implementation of Alternative 1 (Proposed Action).

Light emissions during the construction of Alternative 1 (Proposed Action) are not anticipated to cause any impact to the surrounding areas as most of the construction would occur during daytime hours. Therefore, no significant impacts from light emissions would occur.

Visual Resources and Visual Character

Alternative 1 (Proposed Action) includes construction of a new runway located between two existing runways, new taxiways south of the terminal ramp, expansion of existing terminals, and in-kind replacement of Airport facilities. Alternative 1 (Proposed Action) would not contrast with, or detract from, the visual resources and/or the visual character of the surrounding area as all proposed development is consistent with the visual character of the area. The closest residential neighborhoods north and south of the Airport property would not see a change to their views because much of the property has varied topography and is heavily vegetated. Most residences do not have a direct line of sight to runways, taxiways, terminals, or other airport facilities. Alternative 1 (Proposed Action) would not significantly alter, contrast, or obstruct the existing views from residential areas due to the distance and obstacles in the way. In addition, Alternative 1 (Proposed Action) lighting is similar in character to the existing uses at CLT and would not result in a significant change to the surrounding area's visual character. Therefore, Alternative 1 (Proposed Action) would not result in significant impacts to visual resources and visual character.

4.13.3.3 Alternative 2

Light Emissions

Light emissions from Alternative 2 would be the same as those in Alternative 1 (Proposed Action). Therefore, no significant impacts from light emissions would occur.

Visual Resources and Visual Character

The visual characteristics of Alternative 2 would be the same as Alternative 1 (Proposed Action). Therefore, no significant impacts to visual resources and visual character would occur.

4.13.3.4 Alternative 3

Light Emissions

Light emissions from Alternative 3 would be similar to those in Alternative 1 (Proposed Action). Both runway ends would have an ALSF-II. Runway 19 end (north end) would not have a displaced threshold in Alternative 3; therefore, the approach lighting systems would not be constructed in the runway pavement, like Alternative 1 and Alternative 2. Approach lighting systems would be situated atop a series of towers that extend along the runway centerline. Alternative 3 lighting is similar in character to the existing uses at CLT and would not result in a significant change to the surrounding area's visual character. Therefore, Alternative 3 would not result in significant impacts to visual resources and visual character.

Visual Resources and Visual Character

The visual characteristics of Alternative 3 would be the same as Alternative 1 (Proposed Action). Therefore, no significant impacts to visual resources and visual character would occur.

4.13.4 Future Conditions: 2033

No additional physical development would occur in 2033 under the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. Therefore, no additional light emissions or visual impacts would occur for each Alternative in 2033.

4.13.5 Mitigation, Avoidance, and Minimization Measures

Neither Alternative 1 (Proposed Action), nor Alternative 2, nor Alternative 3 would exceed the applicable thresholds of significance for light emissions, visual resources, or visual character; therefore, no mitigation measures are required.

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

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

1. 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;
2. 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;
3. 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);
4. 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;
5. Promote development of secondary activities or services that would cause the circumstances listed above to occur; or
6. Be inconsistent with applicable state wetland strategies.

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.

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

1. Exceed water quality standards established by Federal, state, local, and tribal regulatory agencies; or
2. 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:

1. Adversely affect natural and beneficial water resource values to a degree that substantially diminishes or destroys such values;
2. 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
3. Present difficulties based on water quality impacts when obtaining a permit or authorization.

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

1. Exceed groundwater quality standards established by Federal, state, local, and tribal regulatory agencies; or
2. 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:

1. Adversely affect natural and beneficial groundwater values to a degree that substantially diminishes or destroys such values;
2. 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
3. Present difficulties based on water quality impacts when obtaining a permit or authorization.

This section presents the analysis of potential impacts to water resources as a result of the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3.

4.14.1 Future Conditions: 2028

4.14.1.1 No Action Alternative

No physical development would occur in the No Action Alternative in 2028. Therefore, no impacts to water resources would occur.

4.14.1.2 Alternative 1 (Proposed Action)

Wetlands

As discussed in Section 3.3.14, wetland delineations have been previously conducted in the DSA. Implementation of the Alternative 1 (Proposed Action) would result in impacts to wetlands and streams within the DSA, identified in **Table 4-31** and shown on **Exhibit 4-22.**

TABLE 4-31, WETLAND AND STREAM IMPACTS - ALTERNATIVE 1 (PROPOSED ACTION)

Stream		
	Linear Feet	**Acreage**
Intermittent	193	N/A
Perennial	7,958	N/A
Total	8,151	N/A
Wetland		
	Linear Feet	**Acreage**
Total	N/A	5.07

Source: Mitigation Assessment for Proposed Impacts, CLT Airport Expansion (SAW-2018-01071), prepared by HDR, January 27, 2020, revised May 1, 2020.

Alternative 1 (Proposed Action) would result in permanent impacts to approximately 8,151 linear feet of streams, consisting of 193 linear feet of intermittent tributary and 7,958.5 linear feet of perennial tributary. Additionally, the Proposed Action would result in permanent impacts to approximately 5.07 acres of wetlands. See Appendix K, *Water Resources*, for more information.

Implementation of Alternative 1 (Proposed Action) would not result in significant impacts to wetlands and streams because compensatory mitigation would be provided. A detailed compensatory mitigation plan would be required to obtain the necessary authorizations to construct Alternative 1 (Proposed Action). With implementation of a mitigation plan to compensate for the losses of wetland and streams resulting from the construction of Alternative 1 (Proposed Action), the environmental impact of Alternative 1 (Proposed Action) would not be significant.

Floodplains

Alternative 1 (Proposed Action) would include development within the 100-year floodplain. Alternative 1 (Proposed Action) would impact approximately 13 acres of a 100-year floodplain designated Zone AE through construction of the proposed holdpad southeast of Runway 18C/36C and the SEAT.[106] 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.

A Conditional Letter of Map Revision (CLOMR) would be submitted to the Federal Emergency Management Agency (FEMA) to demonstrate any modifications to the existing regulatory floodway, Base Flood Elevations (BFEs), or Special Flood Hazard Areas (SFHAs) that would be generated by the construction. After construction, a Letter of Map Revision (LOMR) would be submitted to FEMA to modify the Flood Insurance Rate Map (FIRM) or Flood Boundary and Floodway Map (FBFM), as applicable. Additionally, a Floodplain Development Permit would be required from the local Floodplain Administrator. Construction would not take place without approvals from both FEMA and from the Floodplain Administrator, satisfying both Federal and local requirements. As such, it is anticipated that there would be no significant impact to floodplains due to Alternative 1 (Proposed Action).

Surface Waters

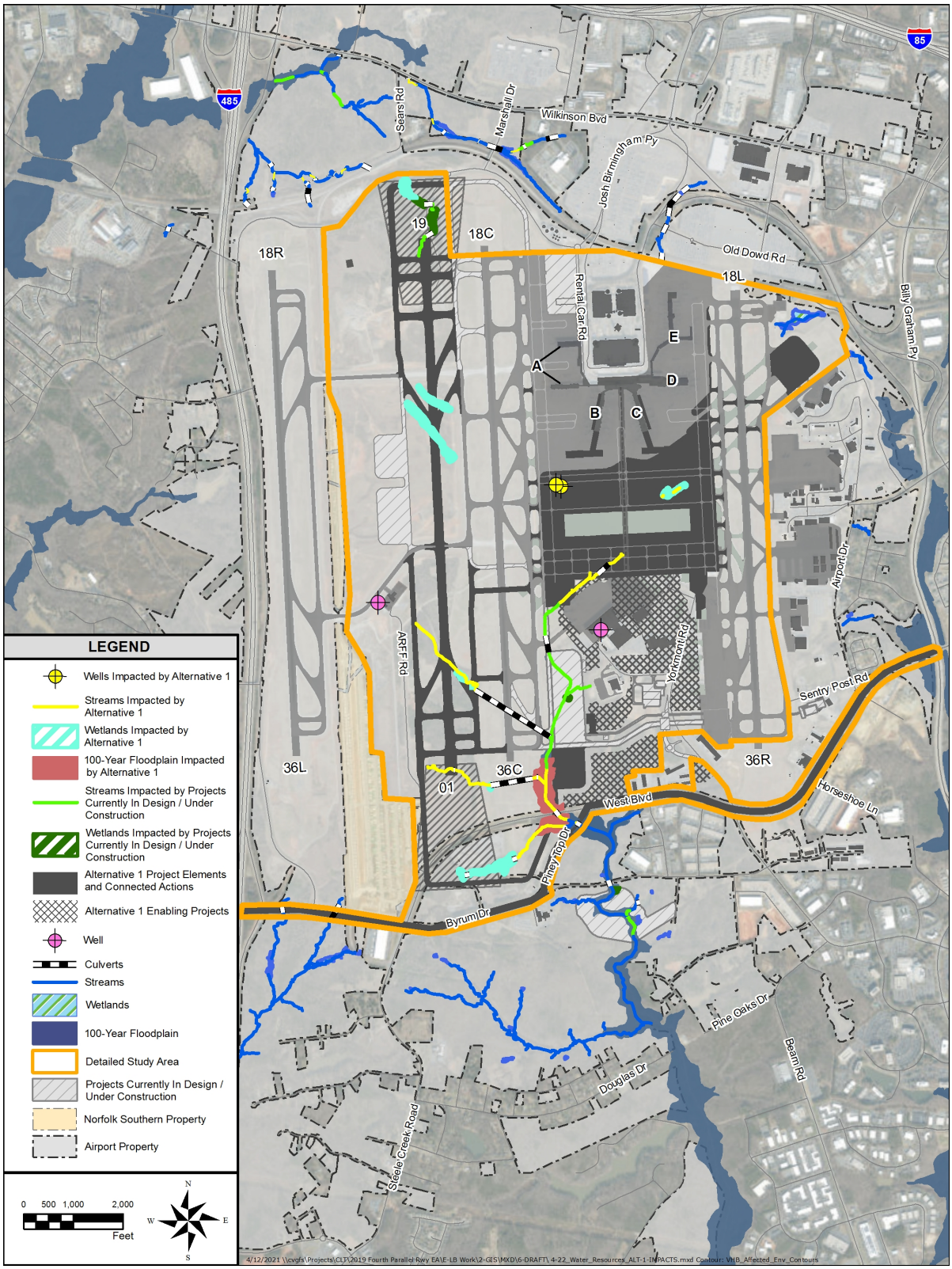
Alternative 1 (Proposed Action) would result in impacts to surface waters. In addition to the impacts to streams and wetlands previously described, the new runway, additional airfield pavement, and development in the south midfield area would result in an increase of approximately 211 acres in impervious surfaces. The increase in impervious surfaces and resulting increase in stormwater runoff would be wholly accommodated by the Airport's stormwater systems. Furthermore, BMPs would be incorporated into the construction of Alternative 1 (Proposed Action), as described in Section 4.16.3. As such, no significant impacts would occur to surface waters as a result of the implementation of Alternative 1 (Proposed Action).

Groundwater

The DSA is in a well-developed area with public water available. As noted in Section 3.3.14, there are four active private wells located within the DSA, however none of the wells are used to supply drinking water. Implementation of Alternative 1 (Proposed Action) would require two of the wells to be abandoned. If an undocumented drinking water well is identified, CLT would ensure that the well is abandoned in accordance to any Federal, state, or local regulations. Furthermore, construction and operation of the proposed development would abide by all applicable regulations related to spill prevention and control regulations to prevent spills from causing significant adverse impacts to groundwater. Therefore, no significant impacts to groundwater are anticipated.

[106] Zone AE is an area inundated by the 1 percent annual chance flooding event.

EXHIBIT 4-22, ALTERNATIVE 1 (PROPOSED ACTION) WATER RESOURCE IMPACTS



Source: Landrum & Brown analysis, 2021

4.14.1.3 Alternative 2

Wetlands

Implementation of the Alternative 2 would result in the same impacts to wetlands and streams as Alternative 1 (Proposed Action), as shown in **Exhibit 4-23**. Implementation of Alternative 2 would not result in significant impacts to wetlands and streams because compensatory mitigation would be provided.

Floodplains

Implementation of the Alternative 2 would result in the same impacts to floodplains as Alternative 1 (Proposed Action). Construction would not take place without approvals from both FEMA and from the Floodplain Administrator, satisfying both Federal and local requirements. As such, it is anticipated that there would be no significant impact to floodplains due to Alternative 2.

Surface Waters

Alternative 2 would result in impacts to surface waters. In addition to the impacts to streams and wetlands previously described, the new runway, additional airfield pavement, and development in the south midfield area would result in an increase of approximately 220 acres in impervious surfaces. The increase in impervious surfaces and resulting increase in stormwater runoff would be wholly accommodated by the Airport's stormwater systems. Furthermore, BMPs would be incorporated into the construction of Alternative 2, as described in Section 4.16.3. As such, no significant impacts would occur to surface waters as a result of the implementation of Alternative 2.

Groundwater

Similar to Alternative 1 (Proposed Action), implementation of Alternative 2 would require two of the wells to be abandoned. If an undocumented drinking water well is identified, CLT would ensure that the well is abandoned in accordance to any Federal, state, or local regulations. Furthermore, construction and operation of the proposed development would abide by all applicable regulations related to spill prevention and control regulations to prevent spills from causing significant adverse impacts to groundwater. Therefore, no significant impacts to groundwater are anticipated.

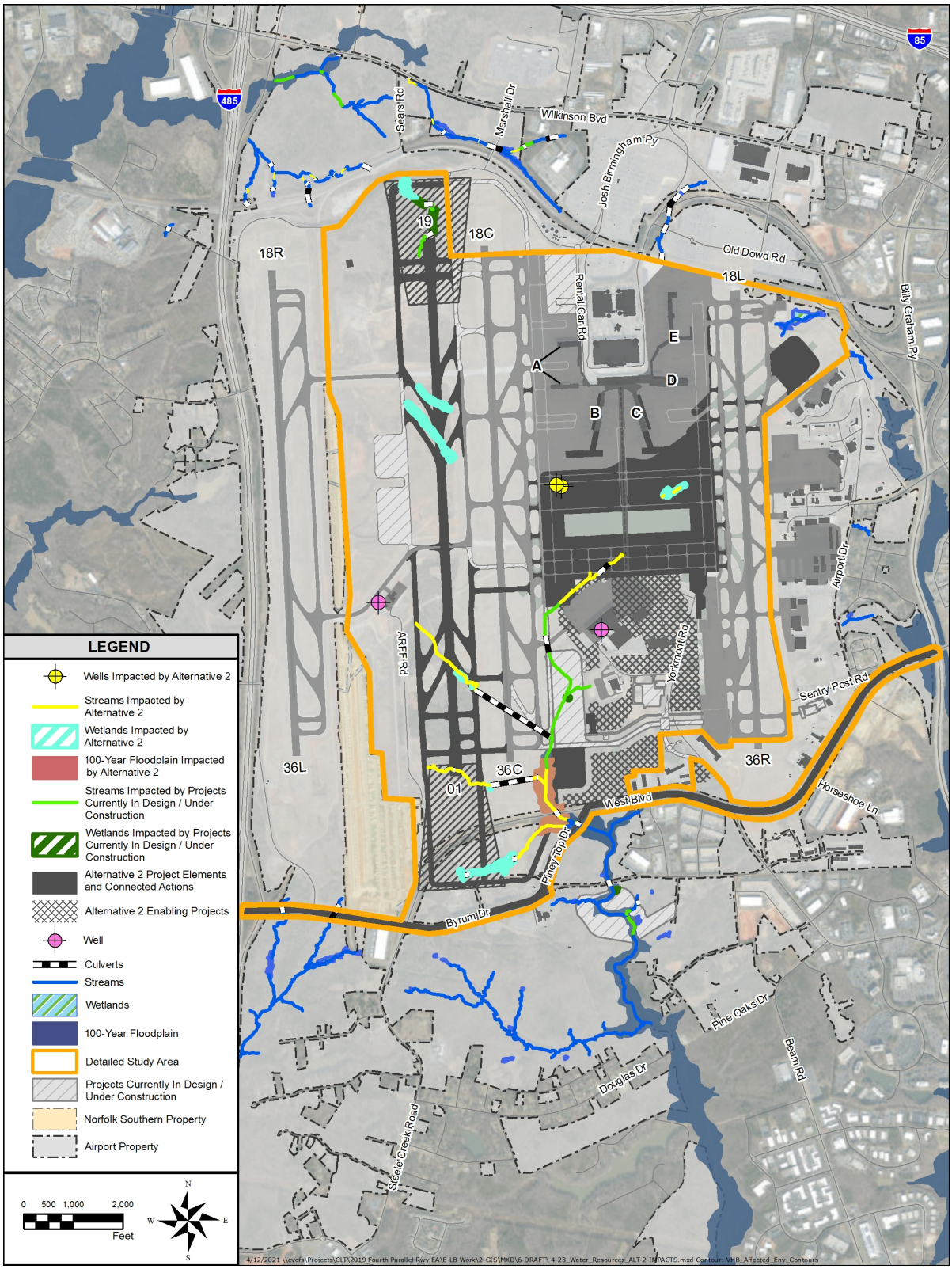
4.14.1.4 Alternative 3

Implementation of the Alternative 3 would result in the same impacts to wetlands and streams as Alternative 1 (Proposed Action), as shown in **Exhibit 4-24**. Implementation of Alternative 3 would not result in significant impacts to wetlands and streams because compensatory mitigation would be provided.

Floodplains

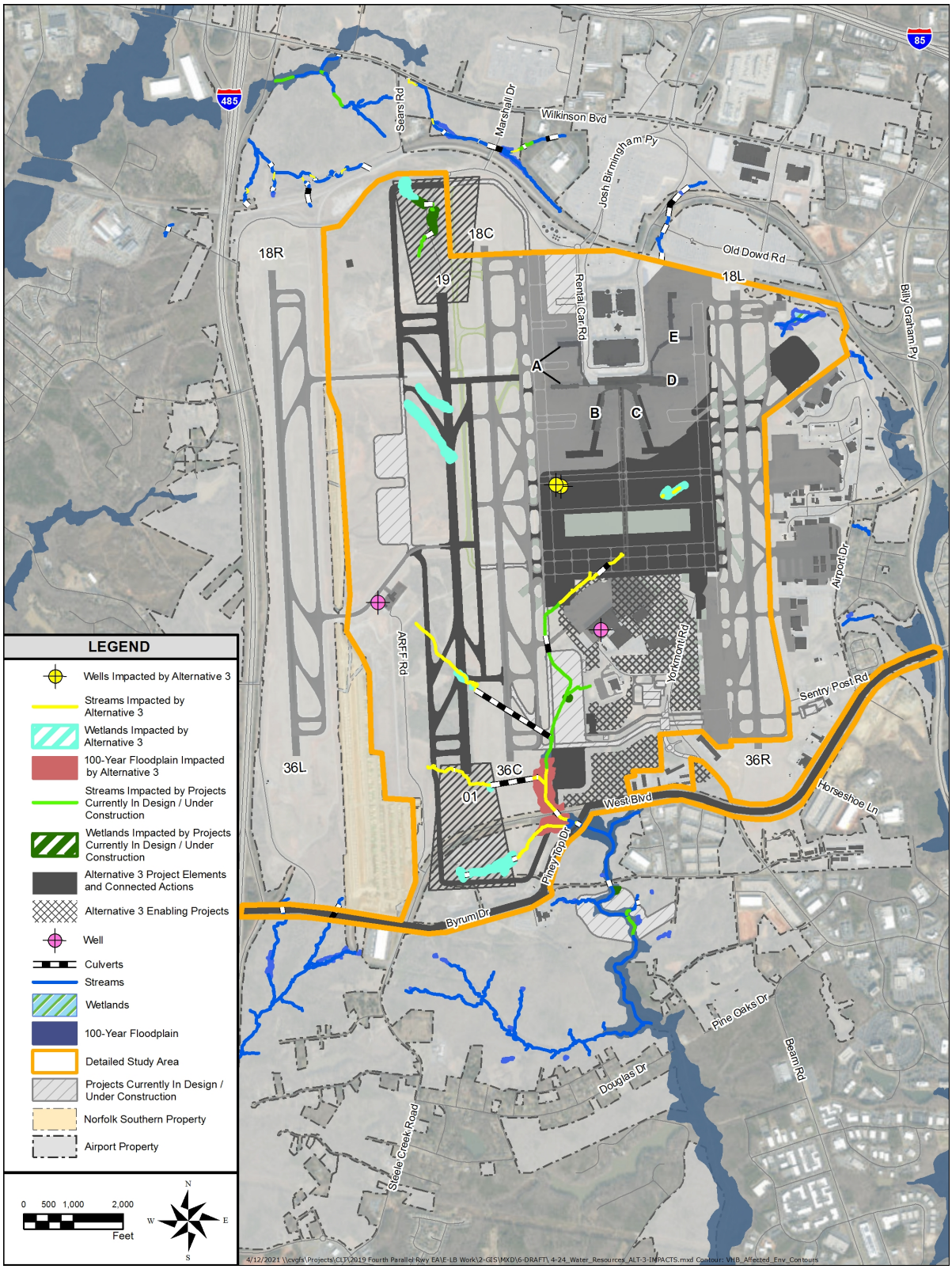
Implementation of the Alternative 3 would result in the same impacts to floodplains as Alternative 1 (Proposed Action). Construction would not take place without approvals from both FEMA and from the Floodplain Administrator, satisfying both Federal and local requirements. As such, it is anticipated that there would be no significant impact to floodplains due to Alternative 3.

EXHIBIT 4-23, ALTERNATIVE 2 WATER RESOURCE IMPACTS



Source: Landrum & Brown analysis, 2021

EXHIBIT 4-24, ALTERNATIVE 3 WATER RESOURCE IMPACTS



Source: Landrum & Brown analysis, 2021

Surface Waters

Alternative 3 would result in impacts to surface waters. In addition to the impacts to streams and wetlands previously described, the new runway, additional airfield pavement, and development in the south midfield area would result in an increase of approximately 155 acres in impervious surfaces. The increase in impervious surfaces and resulting increase in stormwater runoff would be wholly accommodated by the Airport's stormwater systems. Furthermore, BMPs would be incorporated into the construction of Alternative 3, as described in Section 4.16.3. As such, no significant impacts would occur to surface waters as a result of the implementation of Alternative 3.

Groundwater

Similar to Alternative 1 (Proposed Action), implementation of Alternative 3 would require two of the wells to be abandoned. If an undocumented drinking water well is identified, CLT would ensure that the well is abandoned in accordance to any Federal, state, or local regulations. Furthermore, construction and operation of the proposed development would abide by all applicable regulations related to spill prevention and control regulations to prevent spills from causing significant adverse impacts to groundwater. Therefore, no significant impacts to groundwater are anticipated.

4.14.2 Future Conditions: 2033

No additional physical development would occur in 2033 under the No Action Alternative, Alternative 1 (Proposed Action), Alternative 2, or Alternative 3. Therefore, no additional impacts to water resources would occur for each alternative in 2033.

4.14.3 Mitigation, Avoidance, and Minimization Measures

Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 would impact the same amount of waters of the Unities States, totaling 5.07 acres of wetlands and 8,151 linear feet of streams which are subject to Section 404 of the Clean Water Act (CWA). The impacts would require an Individual Permit from the U.S. Army Corps of Engineers (USACE) and provision of compensatory mitigation. The compensatory mitigation would be determined based on final construction plans and coordination with USACE. Compensatory mitigation would be achieved by purchase of stream and wetland credits from the Charlotte-Mecklenburg Storm Water Services Umbrella Stream and Wetland Mitigation Bank. This bank is reserved for City of Charlotte and Mecklenburg County projects and supplies both stream and wetland credits. If there are no stream or wetland credits available from this bank, compensatory mitigation would be accomplished using the in-lieu fee program administered by the NCDEQ. The estimated mitigation requirements for Alternative 1 (Proposed Action), Alternative 2, or Alternative 3 are shown in **Table 4-32**.

TABLE 4-32, MITIGATION REQUIREMENTS FOR WETLAND AND STREAM IMPACTS

Waterbody	Type	Quality	Ratio	Amount	Proposed Credit
Wetland	Wetland	Low	1.5:1	3.46 acres	5.75
Wetland	Wetland	Medium	1.75:1	1.55 acres	2.75
Wetland	Wetland	High	2:1	0.06 acres	0.25
Stream	Intermittent	Low	1.5:1	193 linear feet	289.5
Stream	Perennial	Low	1.5:1	2,430 linear feet	3,645
Stream	Perennial	High	2:1	5,528 linear feet	11,056
			Total Wetland	5.07 acres	8.75
			Total Stream	8,151 linear feet	14,990

Source: Mitigation Assessment for Proposed Impacts, CLT Airport Expansion (SAW-2018-01071), prepared by HDR, January 27, 2020, revised May 1, 2020.

Based on the conversations with the City of Charlotte's Stream and Wetland Mitigation Bank, credits are available for purchase. Formal, final USACE decision regarding compensatory mitigation amount has not yet been issued. Upon USACE approval of the proposed mitigation, the City of Charlotte will finalize negotiations.

As previously discussed, all of the alternatives have the same impacts to wetlands and streams. Therefore, Alternative 1 (Proposed Action) would meet the requirements of Executive Order (EO) 11990, *Protection of Wetlands* and USDOT Order 5660.1A, *Preservation of the Nation's Wetlands*, because there is no less environmentally damaging practicable alternative to constructing Alternative 1 (Proposed Action).

The following measures would be in place to prevent pollution in stormwater runoff:

- A construction National Pollutant Discharge Elimination System (NPDES) permit from NCDEQ and an Erosion and Sedimentation Control (ESC) Plan approved by the City of Charlotte. The ESC Plan would include BMPs that are specific to the construction activities to prevent runoff during construction from affecting waters of the United States.
- The City of Charlotte Aviation Department maintains a Storm Water Management Plan (SWMP) that provides comprehensive guidance for managing stormwater and maintaining water quality. The SWMP provides guidance, including BMPs, for compliance with Federal, state, and local environmental laws and regulations during construction and operations to prevent contamination from runoff.
- A SPCC Plan that defines responses to spills to prevent contamination of receiving waters.

Contractors would be required to comply with all applicable Federal, state, and local laws and regulations, including FAA guidance contained in AC 150/5370-10H, *Standard Specifications for Construction of Airports*, including Item C-102, *Temporary Air and Water Pollution, Soil Erosion and Siltation Control*; AC 150/5320-15A, *Management of Airport Industrial Waste*; and AC 150/5320-5D, *Subsurface Drainage Design*. Additionally, the use of biodegradable and wildlife-friendly sediment and erosion control devices will be considered and utilized, if appropriate. Furthermore, the Airport is subject to the Surface Water Improvement and Management buffers, Water Supply Watershed Buffers, and Post-Construction Buffers as administered and reviewed by the City of Charlotte. Buffer disturbance would be approved and mitigated for appropriately, as needed.

4.15 Cumulative Impacts

This section describes the past, present, and reasonably foreseeable future actions relevant to cumulative impacts. 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 CLT, the impacts could be potentially significant.

Cumulative impacts are defined by the Council on Environmental Quality (CEQ) in 40 C.F.R. § 1508.7 as "The impact on the environment which results 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." Additionally, the CEQ further explained in *Considering Cumulative Effects under the National Environmental Policy Act* that "each resource, ecosystem, and human community must be analyzed in terms of its ability to accommodate effects, based on its own time and space parameters." Therefore, a cumulative effects analysis normally will encompass geographic boundaries beyond the immediate area of the Proposed Action, and a time frame, including past actions and foreseeable future actions, in order to capture these additional effects.

4.15.1 Defining the Cumulative Impact Study Area and Timeframes

The FAA 1050.1F Desk Reference § 15.2 states "The 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." The Cumulative Impact Study Area(s) is consistent with the FAA 1050.1F Desk Reference using the DSA, GSA, and specific study areas identified in Chapter 3, *Affected Environment*, for each resource category.

The projects to be included in the Cumulative Impact analysis were identified through a review of past environmental documents and coordination with the Airport. The past actions are defined as those that were completed within the last five years from 2015 to 2020. Present actions are any other actions that are occurring in the same general timeframe as the proposal. Present actions for this EA are defined as those completed between 2021 and 2024. Reasonably foreseeable future actions are actions that may affect projected impacts of a proposal and are not remote or speculative. Reasonably foreseeable future actions are defined as those planned to be completed between 2025 and 2033, which is in the planning horizon of this EA. This window of time represents a timeframe 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 2033 would be considered speculative. This section identifies those past, present, and reasonably foreseeable future projects.

4.15.2 Past Actions

Past projects are actions that occurred in the past five years and may warrant consideration in determining the environmental impacts of an action. Past projects at the Airport include property acquisition and facility demolition, taxiway rehabilitations, apron expansions, terminal expansions, and parking lot expansions. No significant environmental impacts were identified for any of the projects.

Off-Airport past projects in the GSA include the release of 100 acres of residentially zoned land from the Airport to a private developer to construct an 855,000-square foot warehouse/distribution center, including realignment of Tuckaseegee Road to improve traffic patterns and intersections. The warehouse/distribution center is located north of the Study Area (north of Wilkinson Boulevard and east of I-485).

4.15.3 Present Actions

Present actions are any other projects that are occurring in the same general time frame as the Proposed Action. The following projects are currently under construction or construction is planned to begin during construction of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3.

4.15.3.1 On-Airport Projects

- Terminal Lobby Expansion – This project is adding 191,000 square feet of terminal front and renovating the existing 191,000 square feet. The project is expected to be completed by 2025.
- Concourse E Phase 9 – This project is adding holdroom space for 10 gates in Concourse E. This project is expected to be completed by 2022.
- Central Energy Plant – This project will construct a single-story 89,600 square foot Central Energy Plant on CLT property on a portion of the existing Daily North Parking Lot. The project is scheduled to be completed by 2022.
- Concourse A Phase II – This project includes the construction of one new concourse to the north of the second Concourse A pier to accommodate existing and short-term demand and the paving of apron to the north of the new Concourse A pier (west ramp Phase II). This project is scheduled to be complete in 2024.
- Fuel Farm Expansion PH III – This will be an additional tank to the Fuel Farm. The project is scheduled to be completed by July 2021.
- Runway 18C/36C North End Around Taxiway, Hold Pads, and Associated Facilities – This project includes the construction of an end-around taxiway on the north end of Runway 18C/36C, two hold pads, and associated facilities. This project is scheduled to be completed by October 2024.
- Fire Station 41 Expansion – This is to add additional fire apparatus bays for Fire Station 41 to support the upgraded and expanded fleet for the Air National Guard. The project is to be complete July 2022.
- Deice Pad and South Crossfield Taxiway – The City of Charlotte Aviation Department has identified the need to improve airfield efficiency and to provide a dedicated aircraft deicing location. The project is expected to include construction of a new deice pad; extension of Taxiway F; construction of a new crossfield taxiway to connect Taxiway C and Taxiway E/F; construction of new ramp lighting, taxiway edge and centerline lighting, and additional roadway lighting; and construction of associated stormwater facilities. This project is planned to be complete in June 2024.
- Concourse E Renovation – This project is to renovate sections of E concourse with new floors and lights to make the airport consistent for all terminals. The project is scheduled for February 2022 and to be completed by December 2022.
- Renovation and Expansion of the Customs and Border Facility – This project includes the renovation and expansion of the Customs and Border Patrol facility and the expansion of the terminal level at the D/E Connector. This project is scheduled to begin March 2022 and be completed by 2024.

Potential impacts from these projects include an increase in stormwater runoff due to an increase in impervious surfaces, an increase in solid waste, and temporary construction impacts.

4.15.3.2 Off-Airport Projects[107]

- Alanhurst/Cherrycrest Storm Drainage Improvement Project – The project includes the replacement and rehabilitation of aging infrastructure and providing adequate system capacity in order to reduce flooding throughout the neighborhood. Construction for the project is ongoing and is anticipated to be completed in late 2021.
- Ashley Road Sidewalk – This project includes a new sidewalk on Ashley Road from Greenland Avenue to Alleghany Street. Construction for the project is ongoing and is anticipated to conclude in 2021.

4.15.4 Reasonably Foreseeable Future Actions

Reasonably foreseeable future projects are actions that may affect projected impacts of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3and are not remote or speculative.

4.15.4.1 On-Airport Projects

- Land release for private developments
- General Aviation Hangar development
- Part 150 Noise Compatibility Study Update (Part 150 Update)

4.15.4.2 Off-Airport Projects

- Paw Creek Force Main Replacement (Sewer) – This project will provide for increased capacity at the existing Paw Creek sanitary sewer lift station that runs from Paw Creek at Lake Wylie and across the Airport to Coffey Creek.
- Lynx Silver Line – The project includes a proposed light rail connecting Central Piedmont Community College in the Town of Matthews to Monroe Road and Independence Boulevard through Uptown Charlotte, then along Wilkinson Boulevard to the City of Belmont.
- Sandy Porter Road/South Tryon Street Intersection Improvements – The project includes improvements to the intersection of Sandy Porter Road and South Tryon Street, including additional lanes, medians, bicycle facilities, planting strips, and other amenities.

Potential environmental impacts are unknown for the reasonably foreseeable future projects. However, for purposes of disclosing potential cumulative impacts it is assumed these projects would result in increases in impervious surfaces, which would increase stormwater runoff. In addition, it is assumed these projects would have temporary construction impacts. The Part 150 Update could recommend changes to runway use, flight tracks, and various other land use changes and would seek to identify a preferred nighttime noise abatement runway and. However, it is assumed that a separate NEPA document would be prepared to analyze the potential impacts from the recommendations. It is assumed that no recommendations would be made that result in significant noise impacts.

4.15.5 Cumulative Impact Comparison

Cumulative impacts must be evaluated relative to the direct and indirect effects of Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 for each environmental category. Significant cumulative impacts are determined according to the same thresholds of significance used in the evaluation of each environmental category in the environmental consequences discussion.

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[107] City of Charlotte, *Citywide Projects Portal*. On-line: https://charlottenc.gov/projects/Pages/default.aspx, Accessed February 4, 2021.

For environmental resources where construction and implementation of Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would have no environmental impact, there is no potential for an adverse cumulative environmental impact to occur. Therefore, the following discussion of cumulative impacts discusses only those environmental categories where environmental impacts could result from implementation of Alternative 1 (Proposed Action). Those categories are historic, architectural, archeological, and cultural resources; noise and noise-compatible land use; socioeconomics, environmental justice, and children's health and safety risks; and water resources.

4.15.5.1 Historic, Architectural, Archeological, and Cultural Resources

As discussed in Section 4.10, *Historical, Architectural, Archeological, and Cultural Resources*, all of the alternatives, except the No Action Alternative, would result in an adverse impact to one historical resource. Through formal Section 106 consultation and development of a MOA with the NCSHPO, suitable mitigation options were agreed upon.

Implementation of the alternatives, when 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 historical, architectural, archeological, and cultural resources because each projects would be required to adhere to measures to avoid, minimize, and provide mitigation during implementation of their project. Therefore, implementation of the alternatives, when combined with other past, present, or reasonably foreseeable projects, would not result in significant adverse impacts to historical, architectural, archeological, and cultural resources.

4.15.5.2 Noise and Noise-Compatible Land Use

As discussed in Section 4.13, *Noise and Noise-Compatible Land Use*, Alternative 1 (Proposed Action) and Alternative 2 would not result in significant noise increases, defined as an increase of DNL 1.5 dB or more within the DNL 65 dB contour over noise sensitive land uses. Alternative 3 would result in significant noise impacts. Mitigation measures have been identified for the housing units in the significant increase area of the 2028 Alternative 3 and 2033 Alternative 3 noise exposure contours.

Implementation of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3, when 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 noise and noise-compatible land uses because any significant impact due to noise is required to have its own mitigation measures to minimize impacts during implementation of the project. Therefore, implementation of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3, 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.

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

As discussed in Section 4.14, *Socioeconomics, Environmental Justice, and Children's Health and Safety Risks*, the Alternative 1 (Proposed Action), Alternative 2, and Alternative 3would result in disruptions to local traffic patterns. Through consultation with the local jurisdictions and traffic agencies, mitigation measures will be implemented to reduce impacts. The modeling of future traffic levels for this EA included the anticipated growth in traffic from the other past, present, and future development projects, as well as increases in population. The modeling of future traffic levels for this EA included the anticipated growth in traffic from the other past, present, and future development projects, as well as increases in population. Based on this modeling, three roadway intersections would experience a reduced LOS due to Alternative 1 (Proposed Action), Alternative 2 or Alternative 3. To offset these LOS reductions, the City of Charlotte would implement mitigation strategies such as installation of traffic

signals, intersection modifications, and/or intersection widening. No additional cumulative traffic impacts would be expected because the traffic analyses prepared for this EA included future roadway projects and growth projections into the analysis. Therefore, implementation of Alternative 1 (Proposed Action), Alternative 2, or Alternative 3, when combined with other past, present, or reasonably foreseeable future projects, would not result in significant adverse traffic impacts.

4.15.5.4 Water Resources

As discussed in Section 4.16, *Water Resources*, Alternative 1 (Proposed Action), Alternative 2, and Alternative 3 would result in impacts to streams and wetlands located in the DSA. Coordination with the USACE has determined that a permit under Section 404 of the CWA would be required for construction of all of the alternatives. Permitting under Section 401 of the CWA would also be required. Furthermore, a NPDES permit would need to be obtained.

Coordination with FEMA would also be required, in which a CLOMR would be submitted to demonstrate any modifications to the existing regulatory floodway, BFEs, or SFHAs that would be generated by the construction. After construction, a LOMR would be submitted to FEMA to modify the FIRM or Flood Boundary and FBFM, as applicable. Additionally, a Floodplain Development Permit would be required from the local Floodplain Administrator. Construction would not take place without approvals from both FEMA and from the Floodplain Administrator, satisfying both Federal and local requirements.

The storage volume necessary to attenuate the 100-year onsite surface water flows would be met through the existing detention basins on Airport property downstream from the DSA. Implementation of the alternatives 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 water resources because each of these projects is required to have its own protective measures and permits to avoid and minimize impacts during implementation of the project. The other past, present, or reasonably foreseeable future projects would be required to comply with all existing and future water quality regulatory criteria and permit requirements. In addition, these past, present, or reasonably foreseeable future projects would also be required to develop BMPs that would ensure that concentrations of pollutants of concern do not exceed regulatory criteria. Therefore, there would be no significant cumulative impacts to water resources.

4.15.6 Conclusion

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 alternatives. Therefore, implementation of any of the alternatives would not result in significant cumulative environmental impacts.