MANASSAS REGIONAL AIRPORT (HEF)
PART 139 CERTIFICATION & TERMINAL REDEVELOPMENT PROGRAM

DRAFT ENVIRONMENTAL ASSESSMENT

May 4, 2026

This Environmental Assessment becomes a Federal Document when evaluated, signed, and dated by the Responsible FAA Official.

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Responsible FAA Official Date

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1 Introduction and Program Description

This Programmatic Environmental Assessment (PEA) was prepared in accordance with Federal Aviation Administration (FAA) Order 1050.1G, *FAA National Environmental Policy Act Implementing Procedures and the National Environmental Policy Act*[1]*, Department of Transportation (DOT) Order 5610.1D, DOT's Procedures for Considering Environmental Impacts.* The PEA analyzes the possible environmental effects of the proposed *Manassas Regional Airport (HEF) Federal Aviation Regulation (FAR) Part 139 Certification and Terminal Redevelopment Program ("Program")*.

Manassas Regional Airport ("Airport" or "HEF") is in northern Virginia within the City of Manassas ("City") and Prince William County ("County") (**Figure A1**[2]**; Figure A2)**. The Airport is owned by the City and is operated and managed by the Manassas Regional Airport Commission ("Commission"). HEF is a general aviation (GA) airport and serves a variety of GA operations including single-engine light aircraft used for training and corporate jet aircraft. The Airport occupies 888 acres[3] and consists of two runways, associated taxiways and aircraft parking ramp areas. In addition, HEF has buildings for Fixed Base Operators[4], flight training, aircraft maintenance and other aviation purposes. HEF is currently designed to accommodate routine operations of FAA designated Airplane Design Group (ADG)[5] Group III[6] aircraft (Group III). Runway 16L/34R, the primary runway, is 6,200 feet (ft) long by 100 ft wide. Runway 16R/34L is the secondary runway and measures 3,715 ft in length by 75 ft in width.

The Airport does not currently have scheduled commercial airline operations; however, it is classified in the FAA's National Plan of Integrated Airport Systems (NPIAS) as a reliever airport for Dulles International Airport (IAD), located 16 miles north of HEF, and Ronald Reagan Washington National Airport (DCA), located 27 miles northeast of HEF. As a reliever, HEF's role in NPIAS is to reduce congestion at IAD and DCA, while providing a range of aeronautical services to the GA community[7]. In 2024 HEF had 94,434 aircraft operations making it the busiest GA airport in Virginia[8]. HEF is not presently certified under Part 139[9].

While currently designated as a GA airport, scheduled charter airline service under FAR Part 135 rules[10], Section 308, was provided by Colgan Air for the IBM Corporation at HEF starting in 1971 to shuttle employees to New York City. IBM discontinued that service in 1986 because it was no longer needed

[1] EPA. What is the National Environmental Policy Act. [Online] February 23, 2026. https://www.epa.gov/nepa/what-national-environmental-policy-act

[2] Figures 1 through 5 can be found in the body of this document. Figures "A#" can be found in **Appendix A.**

[3] Federal Aviation Administration. Airport Master Record. [Online] October 30, 2025. [Cited: November 11, 2025.] https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/

[4] Fixed Base Operators provide fuel and servicing to aircraft.

[5] ADG Groups range from Group I (single engine light aircraft) to Group VI (large four engine jet aircraft).

[6] FAA designation "Group III" classifies aircraft based on wingspan and tail height. The characteristics of Group III aircraft are: 1) a wingspan ranging from 79 feet to 118 feet; and 2) a tail height ranging from 30 feet to 45 feet.

[7] RS&H. Manassas Regional Airport Master Plan Update Working Paper 1 Version 6.0. Manassas, Virginia: July 1, 2024.

[8] Federal Aviation Administration. FAA Ops Net. Air Traffic Activity System (ATADS). [Online] [Cited: May 20, 2025.] https://aspm.faa.gov/opsnet/sys/opsnet-server-x.asp.

[9] 14 CFR Part 139, Subpart A – General, Section 139.1 Applicability requires FAA to issue airport operating certificates to airports that: 1) Serve scheduled passenger carrying air carrier operating aircraft configured for more than 9 passenger seats; 2) Serve unscheduled passenger carrying air carrier operating aircraft with at least 31 passenger seats; and that 3) the FAA Administrator requires the Airport to have a certificate.

[10] The FAA grants the authority to operate on-demand, unscheduled air service in the form of Part 135 certificate. Air carriers authorized to operate with a 135 certificate vary from small single aircraft operators to large operators that often provide a network to move cargo to larger Part 121 air carriers.

by the company. Due to population growth in the DC Metropolitan area, the Airport and the City have sought to establish scheduled commercial service[11] at HEF. In the Spring of 2023, the City and the Commission issued a Request for Proposals for a provider to enter into a Franchise Agreement to re-establish commercial service at HEF. AFCO Avports[12] Management ("Avports") was awarded the Franchise Agreement by the City of Manassas, based on Avports' demonstrated ability to initiate airline service at other airports. Avports and the City entered into a Franchise Agreement in July 2023. The Franchise Agreement included the lease of parcels A through F by the City to Avports (**Figure A3; Figure A4**). These parcels currently contain the existing terminal (Parcel A); vacant land north of the terminal (Parcel B); existing Building 13 (Parcel C); the East Apron (Parcel D); the terminal parking lot (Parcel E); and a wooded area (Parcel F) [13].

As part of this agreement, Avports proposed to redevelop and expand the existing terminal building, expand the terminal parking lot, build an economy parking lot, provide support for the reconstruction and strengthening of Runway16L/34R, and construct a new snow removal equipment (SRE) building.

Before commercial service can begin, the FAA must certify that the Airport meets FAA standards and must issue an Airport Operating Certificate under Part 139 to serve scheduled operations. As part of the Part 139 certification process, the FAA would identify airfield[14] safety and standards projects that must be completed before issuance of the certificate.

This PEA was developed by Avion Solutions Group, LLC. All actions described in the PEA, including tables, figures, studies and analyses, were performed by or under the direction of Avion Solutions Group, unless otherwise noted.

This PEA has been prepared pursuant to the National Environmental Policy Act (NEPA) to evaluate potential environmental impacts that may result from changes to the HEF Airport Layout Plan (ALP)[15], which must be approved by the FAA and constitutes the federal action.

This PEA represents FAA's good-faith effort to prioritize documentation of the most important considerations required by the statute within the Congressionally mandated page limits. This prioritization reflects FAA's expert judgment. Any considerations addressed briefly or left unaddressed were, in FAA's judgment, comparatively not of a substantive nature that meaningfully informed the consideration of environmental impacts and the resulting decision on how to proceed.

This PEA represents that FAA has made a good faith effort to fulfill NEPA's requirements within the Congressional timeline; that such effort is substantially complete; that, in FAA's expert opinion, it has thoroughly considered the factors mandated by NEPA; and that, in FAA's judgment, the analysis contained therein is adequate to inform and reasonably explain FAA's final decision regarding the proposed Federal action.

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[11] Commercial service refers to scheduled operations provided by an airline.

[12] Avports, founded in 1927 as a division of Pan American Airways (formerly known as Pan World Services), was acquired by Aviation Facilities Company (AFCO) in 2009. Avports invests in, develops, manages, and operates various airports: commercial and general/corporate aviation airports, passenger terminal facilities, military bases, joint-use airports, heliports, NASA facilities, and spaceports.

[13] Avports' lease agreement states that Parcels A through F are owned by the City though Parcel F is within Prince William County.

[14] The term "airfield" is used herein to describe the paved areas where aircraft operate (runways, taxiways, apron areas, etc.) and the unpaved areas adjacent to the paved areas known as "infield areas".

[15] The ALP serves as a planning tool that depicts both existing facilities and planned development at the Airport. Airports that receive Federal financial assistance must maintain a current Airport Layout Plan.

1.1 PEA Background, Tier Definitions, and Projects

In its September 20, 2023 report on the results of its Preparatory Part 139 Airport Inspection of HEF, the FAA identified the following modifications and improvements at HEF needed to achieve Part 139 certification: construction of an Aircraft Rescue Firefighting (ARFF) building; equipment; personnel training; and Runway 16L/34R signage and lighting. On November 13, 2023, the FAA notified the Airport that it would need an Environmental Assessment (EA) for the following:

1. FAA issuance of Part 139 Airport Operating Certificate;
2. FAA approval of the following ALP changes: expansion of the terminal building; reconfiguration of the terminal apron (East Ramp); and strengthening and widening of Runway 16L/34R and Taxiway Bravo;
3. Connected landside actions (automobile parking, roadway improvements, etc.); and,
4. FAA approval of aircraft operating specifications.

In addition to the FAA Preparatory Part 139 Inspection, the Manassas Regional Airport Master Plan Update[16], conducted by the Airport, identified projects needed to accommodate scheduled commercial service by air carrier aircraft, which typically includes the Boeing 737-800. Although this aircraft falls within the ADG III category based on wingspan and fuselage length, it is larger and heavier than the current aircraft HEF is designed to accommodate, the G-V corporate jet. For comparison, the max takeoff weight of the G-V is 90,500 lbs., whereas the 737-800 max takeoff weight is 174,200 lbs. This means that the airfield pavements (runway, taxiways and aprons) at HEF must be strengthened to accommodate the heavier 737-800 aircraft expected to be used for commercial service.

To address the introduction of heavier aircraft and the Part 139 inspection requirements, the FAA, the Airport, and Avports have identified a Program of 16 projects (described below and in **Appendix B**). Not all of the projects must be completed prior to beginning commercial service. Some of the projects would need to be completed within a five year period (2026-2030) to initiate commercial service beginning in 2026. Those projects that are not needed to initiate commercial service, but that are needed to attain Part 139 certification, and accommodate future growth, can be completed over a longer term, from 2032 to 2036.

Based on FAA Order 1050.1G, a programmatic environmental assessment (PEA) is an acceptable approach to evaluate all of the projects. Pursuant to FAA Order 1050.1G[17], environmental impacts of the proposed projects may be evaluated by grouping those actions based on their common location, characteristics, and timing.. Based on that guidance, the Program consists of 16 projects that are evaluated in two separate tiers:

- Tier 1 projects (Years 2026-2030) have sufficient planning and detailed design completed to support development and construction within the next five years. These projects are necessary for commencement of commercial service. Construction of Tier 1 projects is projected to begin in 2026 after the FAA environmental determination is issued and permits are secured from the responsible agencies. The Tier 1 Projects are expected to be completed within five years. **Table 1-1** presents brief descriptions of the Tier 1 Projects.

[16] RS&H. Manassas Regional Airport Master Plan Update. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf

[17] Federal Aviation Administration. FAA National Environmental Policy Act Implementing Procedures. FAA Order 1050.1G. June 30, 2025. Vols. Section 3 - Efficient Environmental Reviews.

- Tier 2 projects (Years 2032-2036) have conceptual planning completed but detailed design is not yet finalized. For Tier 2 projects, design assumptions are made in this PEA so that potential impacts may be assessed and disclosed. Prior to construction, the FAA may require a reevaluation of these projects to determine if the design assumptions in the Final PEA and environmental determination remain valid and accurate. If the FAA determines that the information is no longer valid and accurate, a supplemental NEPA analysis may be needed once planning of these projects is completed. Construction of Tier 2 projects is projected to begin in 2032. **Table 1-2** presents brief descriptions of the Tier 2 Projects.

For full details of the projects, see **Appendix B**. The project locations are shown in **Figure 1/Figure A5**.

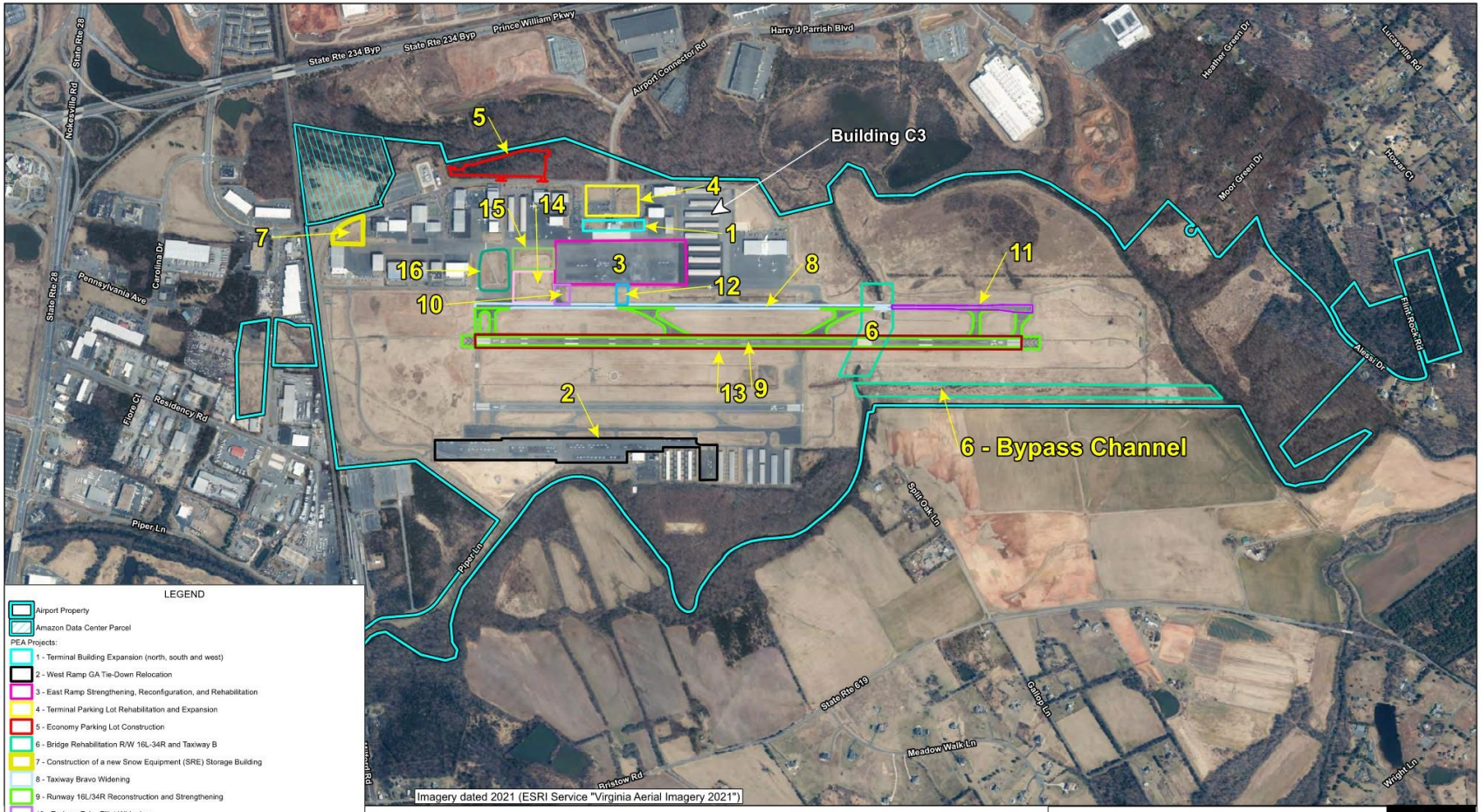
Building C3
6 - Bypass Channel
LEGEND
Airport Property
Amazon Data Center Parcel
PEA Projects:
1 - Terminal Building Expansion (north, south and west)
2 - West Ramp GA Tie-Down Relocation
3 - East Ramp Strengthening, Reconfiguration, and Rehabilitation
4 - Terminal Parking Lot Rehabilitation and Expansion
5 - Economy Parking Lot Construction
6 - Bridge Rehabilitation R/W 16L-34R and Taxiway B
7 - Construction of a new Snow Equipment (SRE) Storage Building
8 - Taxiway Bravo Widening
9 - Runway 16L/34R Reconstruction and Strengthening
10 - Taxiway Echo Fillet Widening
11 - Taxiway B Reconstruction and Strengthening (South of the Bridge)
12 - Construction of a new East Ramp Taxiway
13 - Runway 16L/34R Widening
14 - Aircraft Deicing Pad and Apron Expansion between Taxiways D and E
15 - Construction of new Expanded East Ramp and Taxilane between Taxiways Delta and Echo
16 - Construction of a new ARFF Facility
Project #6 - Bypass Channel
Imagery dated 2021 (ESRI Service "Virginia Aerial Imagery 2021")
0 200 400 Meters
0 500 1,000 Feet
AVION SOLUTIONS GROUP LLC
Figure 1
Manassas Regional Airport (HEF)
Proposed Part 139 Certification and Terminal Redevelopment Project Environmental Assessment
PEA Projects
Project 23-98001.002, Version: 4/19/2026 @ 12:25:32 PM

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Table 1-1: Tier 1 Projects (Years 2026- 2030)

Project #	Project Name	Project Supports	Construction Years	Project Description
1	Terminal Building Expansion (north, south, and west)	Commercial Service	Start 2026 End 2026	The existing 21,000 square foot (SF) terminal at HEF was constructed in 1996[18]. The project would be constructed in two phases. Phase 1 is the construction of a 38,491 SF pre-engineered metal building south of the existing terminal building (**Figure A6**). The Phase 1 terminal interior would contain baggage claim, hold rooms, office space, passenger screening, and restrooms (**Figure A7**). Phase 2 would include 1) construction of a connector building between the existing terminal and the Phase 1 terminal; 2) an extension to the north end of the existing terminal; and 3) an extension on the south side of the Phase 1 terminal (**Figure A7**). The final expanded terminal would be approximately 75,099 SF with seven passenger ground loading positions (gates)[19].
2	West Ramp GA Tie-Down Relocation	Commercial Service	Start 2026 End 2026	To facilitate construction of Project #1, 43 light GA[20] aircraft parking positions (tie-downs) need to be relocated from the East Ramp to the West Ramp (**Figure A8**). Since the West Ramp is already configured for light GA operations, no additional construction would be required to accommodate the aircraft relocated to the West Ramp.
3	East Ramp Strengthening, Reconfiguration, and Rehabilitation	Commercial Service	Start 2026 End 2028	The East Ramp would be repaved to accommodate the terminal expansion (Project #1). The ramp would be sized to accommodate up to seven Airplane Design Group (ADG) III aircraft (Group III) aircraft. The first stage of Project #3 would involve demolition of 840,000 SF of existing asphalt and concrete. The second stage would commence once the expanded terminal is complete and would construct aircraft parking positions adjacent to the terminal gates. There would be no aircraft operations on the East Ramp or on Taxiway Echo during demolition, repaving, and strengthening work because the pavement work would be feature-wide. A bioswale[21] would be constructed at the west side of the East Ramp to meet current storm water requirements (**Figure A6**).
4	Terminal Parking Lot Rehabilitation and Expansion	Commercial Service	Start 2026 End 2026	Only the northwest portion of the existing parking lot is paved, and it has 119 striped parking spaces. This project involves: paving and striping the remaining portion of the parking lot, creating landscaped islands that would delimit the ends of the parking areas; reconfiguring the parking arrangements within the existing paved lot to accommodate design changes; and constructing an underground stormwater detention system. (**Figure A9**). At completion, the expanded parking lot would have capacity for approximately 529 parking spaces, including 11 Americans with Disabilities Act (ADA) accessible parking spaces[22] for a total of 201,151 SF.
5	Economy Parking Lot Construction	Commercial Service	Start 2026 End 2026	The Economy Parking Lot (221,112 SF, 647 parking spaces [13 ADA accessible], shuttle bus station) would be constructed in a currently undeveloped area of the Airport between Wakeman Drive(west), Cannon Branch (east), Harry J. Parrish Boulevard (south), and the Airport Fuel Farm (north) (**Figure A10**). The project would include the construction of an underground stormwater detention system to manage stormwater flow and retaining walls to preserve the Resource Protection Area (RPA) that occurs on the east and south side of Project #5.
6	Bridge Rehabilitation: Runway 16L/34R and Taxiway Bravo	Commercial Service	Start 2026 End 2027	Project #6 would rehabilitate the bridges for Runway 16L/34R and Taxiway Bravo span Broad Run (**Figure A11**). The existing bridges do not have sufficient strength to accommodate routine operations by 737-800 aircraft which are expected to operate in connection with commercial service. The bridges would be strengthened by constructing a Mechanically Stabilized Earth (MSE) wall beneath the runway and taxiway bridges (**Figure A12**). A bypass channel would be used to divert waters from Broad Run during construction See **Appendix C** for a detailed description of construction methods for this project.
7	Construction of a New SRE Building	Commercial Service	Start 2027 End 2028	Project #7 is the construction of a new, larger, multi-use SRE Facility that would provide a facility with adequate space to accommodate two pieces of multifunction snow removal equipment that are planned to be procured by the Airport. The existing building is a mixed use vehicle maintenance building and is not designed for SRE equipment. The new building (150 ft long by 80 ft wide by 30 ft high) is specifically designed for SRE equipment and would also accommodate general airport maintenance equipment. Utility connections include electrical, communications, natural gas, water and sewer service. The SRE would be located in the northeast corner of the Airport on undeveloped land adjacent to Wakeman Drive (**Figure 1/Figure A5**).
8	Taxiway Bravo Widening	Commercial Service	Start 2027 End 2028	Taxiway Bravo is a parallel taxiway, providing aircraft access for the full length of Runway 16L/34R from the East Apron areas (**Figure 1/Figure A5**). Project #8 widens the east and west sides of the taxiway by 10 ft on each side. The taxiway width would increase from 40 ft to 50 ft to meet FAA design standards for 737-800 (Group III) aircraft[23].
9	Runway 16L/34R Reconstruction and Strengthening	Commercial Service	Start 2027 End 2029	Runway 16L/34R is currently 6,200 ft in length by 100 ft in width. The runway pavement has reached the end of its useful life as the last rehabilitation was performed over 20 years ago. This project would reconstruct and strengthen the full length of the runway (approximately 952,000 SF) (**Figure 1/Figure A5)** to accommodate operations by 737-800 aircraft[24]**.** Construction of Project #9 would be done in stages between 2027 and 2029. This project also includes infrastructure improvements: an underground stormwater detention system, electrical, grading, installation of storm drains along the runway, and upgrading runway lighting and airfield signs with light-emitting diode (LED) lights.
10	Taxiway Echo Fillet Widening	Commercial Service	Start 2027 End 2029	Taxiway Echo would be widened from 40 ft to 50 ft to meet 737-800 (Group III) design standards[25]. This project would adjust the fillets to meet these applicable design standards (**Figure 1/Figure A5**) and would add approximately 2,400 SF of new pavement. This would also include the relocation of existing taxiway lights and signs at the intersection of Taxiway Echo and Taxiway Bravo.
11	Taxiway Bravo Reconstruction and Strengthening (south of the bridge)	Commercial Service	Start 2029 End 2030	The Taxiway Bravo pavement has reached the end of its useful life[26]. The pavement would need to be strengthened to support the proposed scheduled commercial service. The taxiway strengthening would encompass both the concrete bridge section that traverses Broad Run and the taxiway south of the bridge section (**Figure A11**). It is assumed that the rehabilitation and strengthening would entail replacement of the taxiway pavement. Runway lights and signs would be upgraded with LED lights meeting FAA design standards[27].

[18] Federal Aviation Administration. Airport Master Record. [Online] October 30, 2025. [Cited: November 11, 2025.] https://www.faa.gov/air_traffic/flight_info/aeronav/aero_data/.
[19] Ground loading involves the use of airstairs, or ground boarding ramps positioned near an aircraft to assist in boarding and deplaning passengers rather than a loading bridge that is physically connected to the terminal building.
[20] Light GA aircraft are typically aircraft with one or two engines that weigh less than 12,500 pounds (lbs.). These types of aircraft are generally used for training and recreational use.
[21] Bioswales are channels designed to concentrate and convey stormwater runoff while removing debris and pollution.
[22] ADA requires two percent accessible spaces for parking facilities with 501-1000 spaces. One in six accessible spaces must be van-accessible; both the terminal lot and the economy lot have four van-accessible spaces.
[23] FAA. Advisory Circular 150/5300-13B. *Airport Design*.[Online] August 16, 2024. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC-150-5300-13B-Airport-Design-Chg1-w-errata.pdf.
[24] RS&H. Manassas Regional Airport Master Plan Update. Section 5.4.2 Near-term Development Projects. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf.
[25] FAA. Advisory Circular 150/5300-13B. *Airport Design*.[Online] August 16, 2024. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC-150-5300-13B-Airport-Design-Chg1-w-errata.pdf.
[26] RS&H. Manassas Regional Airport Master Plan Update. Section 5.4.2 Near-term Development Projects. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf.
[27] FAA. Advisory Circular 150/5300-13B. *Airport Design*.[Online] August 16, 2024. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC-150-5300-13B-Airport-Design-Chg1-w-errata.pdf.

Table 1-2: Tier 2 Projects (Years 2032 to 2036)

Project #	Project Name	Project Supports	Construction Years	Project Description
12	Construction of a new East Ramp Taxiway	Commercial Service	Start 2032 End 2034	To support aircraft flow and efficiency and avoid congestion on the East Ramp, this new taxiway is needed to give pilots and air traffic controllers options for aircraft entering and exiting the East Ramp[28]. This project would be designed for 737-800 (Group III) aircraft. It is located south of existing Taxiway Echo and perpendicular to existing Taxiway Bravo. (**Figure 1/Figure A5**). The new taxiway ramp would measure 265 ft long by 125 ft wide (33,125 SF) graded to drain, with new lighting, signage and marking installed in accordance with FAA design standards[29].
13	Runway 16L/34R Widening	Commercial Service	Start 2033 End 2033	Runway 16L/34R would be widened from 100 ft to 150 ft to accommodate 737-800 aircraft (**Figure 1/Figure A5**)[30]. The 25-ft wide pavement strips added to each side of the existing runway would be tapered to match the elevation of the runway bridge.
14	Construction of an Aircraft Deicing Pad and Apron Expansion between Taxiways Delta and Echo	Part 139 Certification	Start 2033 End 2034	The aircraft deicing pad would be sized to accommodate one 737-800 aircraft at a time (**Figure 1/Figure A5**). The deicing pad and apron expansion area would measure 430 ft long by 330 ft wide (141,900 SF). The apron grades and adjacent surface gradients would be designed in accordance with FAA design standards[31]. The deicing fluid would be captured and collected into a new 1,500 to 2,000 gallon holding tank for disposal off of the Airport.
15	Construction of new Expanded East Ramp and Taxilane between Taxiways Delta and Echo	Commercial Service	Start 2033 End 2036	This project would construct a new taxilane providing access between Taxiway Delta and Taxiway Echo (**Figure 1/Figure A5**). The new taxilane is needed to facilitate the movement of 737-800 aircraft in the East Ramp area[32]. Aircraft would be able to pass north and south on existing Taxiway Zulu without interfering with the aircraft parked on the Fixed Base Operator ramp. The new taxilane would encompass an area of 110,000 SF.
16	Construction of a new ARFF Facility	Part 139 Certification	Start 2035 End 2036	This project is the construction of a new 4-bay ARFF facility on the north side of Taxiway Charlie (**Figure 1/Figure A5**). The building dimensions are proposed to be 100 ft long by 60 ft wide by 30 ft high. Utility connections include electrical, communications, natural gas, water and sewer service

[28] RS&H. Manassas Regional Airport Master Plan Update. Section 5.4.3 Mid-term Development Projects. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf.
[29] FAA. Advisory Circular 150/5300-13B. *Airport Design*.[Online] August 16, 2024. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC-150-5300-13B-Airport-Design-Chg1-w-errata.pdf.
[30] RS&H. Manassas Regional Airport Master Plan Update. Section 5.4.3 Mid-term Development Projects. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf.
[31] FAA. Advisory Circular 150/5300-13B. *Airport Design*.[Online] August 16, 2024. https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC-150-5300-13B-Airport-Design-Chg1-w-errata.pdf.
[32] RS&H. Manassas Regional Airport Master Plan Update. Section 5.4.3 Mid-term Development Projects. 2025. https://flyhef.com/application/files/7517/6002/8994/Master_Plan_2025_Condensed.pdf.

2 Purpose and Need

The purpose of the Program is to provide a commercial service airport that has acceptable Level of Service (LOS) in its facilities and meets FAA design and certification standards. This effort is being proposed by the City to position HEF to accommodate commercial airline service, and not by an airline seeking new markets. The Purpose of the Program is twofold:

- Achieve Part 139 certification at HEF to support scheduled commercial service; and,
- Expand the existing HEF Airport terminal building and associated airside and landside facilities to support scheduled commercial service.

The Program has been initiated by the City, the owner and operator of the Airport, and is specifically intended to utilize the existing airport terminal. Further all proposed improvements would be constructed within existing HEF property boundaries and/or lease areas. The needs are:.

- To safely and efficiently accommodate the projected number of passengers at HEF at an acceptable level of service.
- To meet airfield design standards to accommodate anticipated commercial service.
- To provide efficient and safe terminal roadways and auto parking.
- To construct adequate facilities to support commercial service operations, such as ARFF, deicing pad, and SRE buildings.

Each of these needs are discussed in the following section in greater detail.

2.1 Safely and Efficiently Accommodate the Projected Number of Passengers at HEF at an Acceptable Level of Service (LOS)

The following sections present airport forecasts as well as the terminal LOS analysis used to define an acceptable LOS for the proposed terminal expansion.

Airport forecasts are projections of passenger activity and aircraft operations expected to occur over time at an airport, and these projections are used for airport planning purposes. Forecasts project activity across several metrics, such as, GA operations (both by local and transient[33] aircraft), scheduled commercial aircraft operations, and passenger enplanements[34]. Airports plan, design, build, and maintain airport facilities (i.e. terminals and gates, parking areas and roadways, runways, taxiways and aircraft parking apron areas) to accommodate the forecasted passengers and aircraft operations.

Two forecasts were evaluated in this PEA.

1. Manassas Regional Airport, Master Plan Update, Working Paper 1, Version 6.0, July 1, 2024 – Developed by the Airport in support of the Airport Master Plan[35] ("Master Plan Forecast").
2. Avports Forecast, June 5, 2024 – Developed by Avports in support of the introduction of scheduled passenger service at HEF ("Avports Forecast").

These forecasts can be found in **Appendix D, Attachment 1 and Attachment 2.**

[33] Transient aircraft are operations (landings and takeoffs) performed by aircraft that are based at some other airport.
[34] Enplanement is a passenger boarding an aircraft at an airport that has scheduled passenger service.
[35] The Master Plan forecast was approved by the FAA for use in the HEF Master Plan on August 12, 2024.

The Master Plan Forecast included: 1) projections of GA activity, operations by corporate aircraft, light single and twin-engine aircraft and training flights, and 2) the introduction of scheduled commercial service at HEF. The Master Plan forecast assumed the following:

- Scheduled commercial service starting in 2026, with 0.8 average daily departures, growing to 1.0 average daily departure by 2041;
- Air passengers continue to use existing commercial service airports within the Region (DCA, Richmond International Airport [RIC] and IAD) with a limited portion of those passengers using scheduled carriers at HEF; and
- Passengers using HEF would come from areas within a 15 to 20-mile proximity from the Airport.

As shown in **Table 2-1** the Avports Forecast has a more robust projection of scheduled commercial service, aircraft operations and passenger enplanements when compared with the Master Plan Forecast.

The Avports Forecast reflects common commercial airline business practices when initiating commercial service at an airport. An airline typically inaugurates new service at an airport with several daily flights and then increases the number of flights over time as service is established and demand increases. For example, Avelo Airlines initiated commercial service at Tweed New Haven Airport in Connecticut (HVN) to three destinations in its first year (2022) and then expanded service to 17 destinations within the first two years. Over the course of just three years, Avelo grew its operations from six daily departures in 2022 to 17 daily departures in 2025[36]. The Avports Forecast anticipates that the HEF catchment area[37] for potential passengers (**Figure A13**) is greater than the 15 to 20 mile proximity assumed in the Master Plan forecast[38]. The Avports Forecast assumes that passengers using HEF would come from areas within a 45 mile drive from the Airport. The differences between the two forecasts are highlighted in **Appendix D.**

This PEA utilizes the GA forecast contained in the HEF Master Plan because it is reflective of the expected projection of GA activity at HEF (**Appendix D**). For commercial service, this PEA utilizes the Avports Forecast for commercial service projections because it is more reflective of potential airline activity and allows for a more rigorous assessment of the potential impacts.

[36] RS&H. Manassas Regional Airport Master Plan Update Working Paper 1 Version 6.0. Manassas, Virginia: July 1, 2024.
[37] Catchment Area refers to the geographic region from which an airport can reasonably expect to draw commercial air service passengers, influenced by factors such as accessibility, service level, and competition from other airports.
[38] **Appendix D,** Figure 1 provides a comparison of the Passenger Catchment Area for the Master Plan Forecast and Avports' Forecast.

Table 2-1: Comparison of Avports and Master Plan Forecasts: Enplaned Passengers and Commercial Operations and Departures

Year	Avports Forecast			Master Plan Forecast[39]		
	Enplaned Passengers	Commercial Operations	Daily Departures	Enplaned Passengers	Commercial Operations	Daily Departures
2026	584,773	3,978	11	37,100	556	0.8
2027	787,696	5,577	15	37,842	567	0.8
2028	842,794	6,116	17	38,599	578	0.8
2029	974,242	7,142	20	39,371	590	0.8
2030	1,095,635	8,168	22	40,158	602	0.8
2031	1,183,040	8,944	25	40,961	614	0.8
2032	1,210,387	9151	25	41,780	626	0.9
2033	1,238,088	9,361	26	42,616	638	0.9
2034	1,266,042	9,573	26	43,468	651	0.9
2035	1,278,703	9,668	26	44,338	664	0.9
2036	1,291,490	9,765	26	45,224	677	0.9
2037	1,304,405	9,862	27	46,129	691	0.9
2038	1,317,449	9,961	27	47,051	705	1.0
2039	1,330,623	10,061	28	47,992	719	1.0
2040	1,369,705	10,356	28	48,952	733	1.0
2041	1,408,786	10,652	29	49,931	748	1.0

2.2 Terminal Level of Service (LOS) Analysis

The existing 21,000 square foot (SF) terminal at HEF was constructed in 1996[40], intended to support operations for small regional aircraft. The terminal has not been expanded or modernized since original construction. It has no baggage system, no security screening, no passenger concessions, and lacks the necessary security separation on both landside and airside.

A demand/capacity and LOS analysis was conducted for the existing terminal to quantify terminal space needs, identify deficiencies, and define terminal expansion requirements based on the projected number of passengers. LOS standards have been developed by International Air Transport Association (IATA)[41] in terms of space per passenger and wait times. LOS is reported on the following scale (from lowest to highest): Sub Optimum (Red), Optimum (Green), or Over Design (Yellow). An LOS of "Optimum" is acceptable. There are two levels of Optimum – High and Low. The LOS was analyzed for the following four terminal functional areas because these areas tend to create the most congestion and longest passenger wait times if not designed properly:

[39] The Master Plan forecast includes both commercial and GA activity. Only commercial activity is shown on this table for comparison purposes with the Avports forecast. In addition, the Master Plan Forecast covers the period from 2021 to 2041. The Avports Forecast covers from 2025 to 2051. For comparative purposes with the Master Plan Forecast, the Avports forecast is abbreviated to 2041 in this table.

[40] Manassas, VA. Manassas Regional Airport. About Us. [Online] [Cited: October 9, 2025.] https://flyhef.com/about.

[41] IATA. Airport Development Reference Manual, 12th Edition. 2022.

- **Public Departure Hall** is where passengers enter the terminal building and includes passenger processing functions such as ticketing desk/kiosks and baggage check-in.
- **Security Checkpoint** is the area in the terminal that includes TSA security screening facilities and associated queue areas for passenger processing.
- **Holdroom Spaces** are areas within the terminal building providing space for departing passengers to wait for and board flights.
- **Baggage Claim** includes space in the terminal for passengers to meet and greet, space for baggage carts, baggage claim devices, and lost baggage offices.

Table 2-2 shows the IATA LOS guidelines for terminal functional areas in terms of SF per passenger.

Table 2-2: IATA Level of Service Guidelines for Terminal Functional Areas

Passenger Terminal Area Functional Areas	Space Standards (SF per Passenger)			
	Over Design	Optimum (High)	Optimum (Low)	Sub Optimum
Public Departure Hall				
Check-in - Self Service Kiosk	> 19.4	19.4	14.0	< 14.0
Check-in - Bag Drop Desk	> 19.4	19.4	14.0	< 14.0
Check-in - Check-in Desk	> 19.4	19.4	14.0	< 14.0
Security Space	> 12.9	12.9	10.8	< 10.8
Gate Holdrooms	> 16.1	16.1	12.9	< 12.9
Baggage Claim - Narrow Body Aircraft	> 18.3	18.3	16.1	< 16.1

Source: IATA, Airport Development Reference Manual, 12th Edition, 2022

Sub Optimum areas have inadequate space which impedes passenger flow and restricts a terminal's ability to efficiently process passengers. Sub Optimum LOS at one of the four functional areas can result in overall congestion throughout a terminal. For example, a terminal with Optimum public departure hall space but Sub Optimum security space could result in departing passengers being delayed through security, causing passenger back-up into the departures and ticketing areas, resulting in a degradation of the terminal's overall efficiency.

The following sections present the results of the demand/capacity analysis that was conducted for the terminal functional areas and are presented in **Table 2-3**. The Avports commercial operations forecast was used to derive the Design Day Flight Schedule (DDFS)[42] that helped simulate how HEF's facilities would perform under the expected operational demand. Two years were selected for the analysis: 2036 (all proposed projects completed and operational); and year 2041 (operational year plus five years). Passenger demand was calculated based on arrival and departure operations, typical load factors, and an average annual number of passengers starting and ending their travel at HEF (originating/destination). The results of the LOS analysis are shown in **Table 2-3**.

[42] The DDFS is the number of passengers (arrivals and departures) expected to occur at an airport during a typical busy day of the year — not the busiest day, but a realistic average day during the most active (peak) month of any given year.

Table 2-3:Terminal Level of Service Evaluation

Forecast Demand (Passenger Levels)				
	2036 Forecast		**2041 Forecast**	
Annual Passengers	2,582,980		2,817,572	
Peak Hour Originating	793		955	
Peak Hour Checkpoint	793		955	
Peak Hour Boarding	1,407		1,695	
Peak Hour Arriving	722		724	
Annual Enplanements	1,291,490		1,408,786	
2036 Forecast and Level of Service-Existing Terminal				
Functional Area**	**Existing Terminal SF**	**IATA SF/Passenger**	**Actual**	**LOS**
Ticketing Space	0	19.4 to 14	0.0	Sub Optimum
Security Space	0	12.9 to 10.8	0.0	Sub Optimum
Holdroom Space	3,782	16.1 to 12.9	2.7	Sub Optimum
Bag Claim Space	0	18.3 to 16.1	0.0	Sub Optimum
Others*	17,218			N/A
Total Existing	21,000			
2041 Forecast and Level of Service-Existing Terminal				
Functional Area**	**Existing Terminal SF**	**IATA SF/Passenger**	**Actual**	**LOS**
Ticketing Space	0	19.4 to 14	0.0	Sub Optimum
Security Space	0	12.9 to 10.8	0.0	Sub Optimum
Holdroom Space	3,782	16.1 to 12.9	2.2	Sub Optimum
Bag Claim Space	0	18.3 to 16.1	0.0	Sub Optimum
Others*	17,218			N/A
Total Existing	21,000			
2036 Forecast and Level of Service-Proposed Terminal Expansion				
Functional Area	**Proposed Terminal SF**	**IATA SF/Passenger**	**Actual**	**LOS**
Ticketing Space	15,250	19.4 to 14	19.2	Optimum
Security Space	10,260	12.9 to 10.8	12.9	Optimum
Holdroom Space	22,540	16.1 to 12.9	16.0	Optimum
Bag Claim Space	11,552	18.3 to 16.1	16.0	Optimum
Others*	15,497			N/A
Total Proposed	75,099			
2041 Forecast and Level of Service-Proposed Terminal Expansion				
Functional Area	**Proposed Terminal SF**	**IATA SF/Passenger**	**Actual**	**LOS**
Ticketing Space	15,250	19.4 to 14	16.0	Optimum
Security Space	10,500	12.9 to 10.8	11.0	Optimum
Holdroom Space	22,540	16.1 to 12.9	13.3	Optimum
Bag Claim Space	11,552	18.3 to 16.1	16.0	Optimum
Others*	15,257			N/A
Total Proposed	75,099			

* BHS Screening and Make-up, Concessions, Restrooms, Public Meeting areas, Offices, Support and Circulation
** Existing spaces not designed for commercial air traffic
*** Per TSA standards for 180 passengers per hour throughput

As shown in **Table 2-3**, the existing terminal does not provide the functional capability needed for a passenger terminal as there is no space for ticketing, security or bag claim. Applying the IATA LOS standards shows the existing terminal is deficient by 54,099 SF and does not have space to accommodate the functional areas necessary for a modern passenger terminal. In contract, the proposed terminal provides a total of 75,099 SF and meets IATA design standards with an Optimum rating for all functional areas. To support the terminal expansion, GA aircraft parking on the ramp adjacent to the existing terminal would be relocated to the existing West Ramp (**Figure 1/Figure A5**). The projects to address

terminal expansion include Project #1 Terminal Building Expansion (north, south, and west) and Project #2 West Ramp GA Tie-Down Relocation.

2.3 Efficient and Safe Terminal Roadways and Parking

Along with the terminal building expansion, auto parking is a critical element to accommodate passengers. Two projects are needed to increase auto parking to meet the projected passenger demand: Project #4 - Terminal Parking Lot Rehabilitation and Expansion and Project #5 - Economy Parking Lot Construction.

These projects were identified in the Manassas Regional Airport Master Plan Update and Airport Layout Plan (ALP) completed in 2024 and accepted by the FAA in January 2025[43]. These projects are described in detail in **Appendix B**. A detailed traffic analysis was performed to determine the capability of the existing roadway system to accommodate passenger traffic with commercial service at HEF (**Appendix H**). This analysis demonstrated that the roadway system and intersections of Wakeman Drive and Harry J. Parrish Boulevard would provide adequate capacity to accommodate vehicle traffic projections, based on the Avports forecast of passenger activity. The analysis determined an estimated 413 airline passenger vehicles per day would park at the Airport due to commercial service, prompting the need for additional parking at the Airport. Project #4 and Project #5 have a combined 1,176 proposed parking spaces which would accommodate approximately three days of parked airline passenger vehicles.

2.4 The Need for Airfield Design Standards to Accommodate Anticipated Commercial Service Traffic

HEF is currently designed to accommodate routine operations of FAA designated ADG Group III aircraft. This FAA classification system is used in airport planning to determine the geometric standards and separation requirements for runways, taxiways, and aprons. Aircraft in the Group III category include corporate jets and narrow-body[44] commercial service aircraft such as the 737-800. As the Group III classification identifies a range of aircraft sizes, it is common practice to identify a specific aircraft within the specified classification for airport design purposes - this specific aircraft is referred to as the "critical aircraft"[45]. For HEF, the critical aircraft is currently the Gulfstream G-V (G-V) corporate jet[46]. The G-V has been used to design the current airfield dimensions such as runway/taxiway spacing, pavement width, and pavement strength (thickness) at HEF.

However, in order to accommodate aircraft anticipated to be used for commercial service, aircraft larger than the G-V would be needed. It is assumed that commercial service would be accommodated by the 737-800 and this aircraft would be designated as the new critical aircraft. Although the 737-800 is in the same Group III classification as the G-V, the 737-800 has a larger wingspan, longer fuselage length and higher take-off weight[47].The introduction of the 737-800 aircraft would require the strengthening and widening of airfield pavements (runways, taxiways and aprons).

[43] Letter from FAA to Manassas Regional Airport, Dated January 8, 2025.
[44] Narrow-Body Aircraft - Single-aisle commercial jet aircraft typically used for short- to medium-haul routes, with seating for approximately 100–230 passengers.
[45] The critical aircraft is defined by the FAA as the most demanding aircraft (wingspan, fuselage length and approach speed) with 500 or more operations annually at an airport. FAA Advisory Circular (AC) 150/5000-17.
[46] The G-V corporate jet wingspan is 93.5 feet and the fuselage length is 96.5 feet with a max takeoff weight of 90,500 lbs.
[47] The 737-800 wingspan is 117.5 feet and the fuselage length is 129.5 feet with a max takeoff weight of 174,200 lbs.

Because the 737-800 is a larger and heavier aircraft within the Group III category than the current critical aircraft (G-V), the following projects are required to accommodate the 737-800 aircraft: pavement strengthening (Projects #3, #6, #9 and #11) to support the increased weight of the 737-800 aircraft, runway and taxiway pavement widening (Projects #8, #10, and #13) to accommodate the larger size of the 737-800 compared to the current G-V aircraft, construction of new taxiways for efficient commercial operations (Projects #12, #13 and #15).

2.5 The Need for Adequate Facilities to Support Commercial Service Operations, such as ARFF, Deicing Pad, and SRE Buildings

Three of the proposed PEA projects would provide facilities to support commercial service at HEF. Project #7 would enhance the snow removal capability of HEF by providing a dedicated SRE building, Project #14 would provide a dedicated deicing pad suitable for 737-800 aircraft, and Project #16 would support Part 139 certification by providing a dedicated ARFF facility. These projects were identified in the Manassas Regional Airport Master Plan Update and Airport Layout Plan (ALP) and accepted by the FAA in January 2025[48]. These projects are described in detail in **Appendix B**.

[48] Letter from FAA to Manassas Regional Airport, Dated January 8, 2025.

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3 Alternatives Analysis

This Chapter details the range of alternatives identified, the alternatives analysis, and the evaluation process used to select the Preferred Alternative.

3.1 Identification of Initial Alternatives

The initial alternatives are in the bulleted list below and are defined more fully in the following sections.

- **No Action** - HEF would remain as a regional GA airport with no commercial service and no Part 139 certification. The projection of GA aircraft operations contained in the Master Plan would be assumed for future growth and comparison with the Alternatives. The only construction projects that would occur would be those needed to maintain HEF in a state-of-good repair.
- **Alternative #1: General Aviation Only** – This alternative does not include Part 139 certification nor commercial service. It considers only those projects that would support GA operations (Projects #7, #8, and #12) using the GA forecast from the Master Plan.
- **Alternative #2: Commercial Service** – This alternative assumes the Airport would build the 16 projects identified in **Section 1.1** that are needed to achieve Part 139 certification and support commercial service. It uses the Avports Forecast for commercial service plus the GA forecast from the Master Plan.
- **Alternative #3: Use of Another Existing Airport** – This alternative involves the use of an existing airport within the passenger catchment area other than HEF.
- **Alternative #4: New Airport Construction –** This alternative assumes construction of a new airport in the catchment area.
- **Alternative #5: New Terminal at Alternate Location at HEF** – This alternative includes development of new terminal facilities at an alternate location on HEF in place of the existing terminal to address the need for terminal and apron space.

Another alternative considered but dismissed is the Utilization of Other Transportation Modes. HEF is in northern Virginia, 30 miles west of Washington, D.C. Highway access to HEF includes Interstate I-66 and State Routes 234 (Prince William Parkway) and 28 (Nokesville Road). I-66 extends from Washington D.C. west into West Virginia. HEF is accessible by local rail transportation that includes Virginia Railway Express (VRE); the Manassas line runs between Washington D.C. and Manassas. Amtrak also provides intercity rail services between Manassas and Washington, D.C. and also carries travelers from locations throughout the U.S. Rail is only competitive with air travel for distances of 300 miles or less[49]. Intercity rail service provides a competitive alternative to air travel for short-distance markets, but rail service does not eliminate the need for commercial air service, particularly for longer-distance and leisure-oriented travel markets. These other modes of transportation have limited potential to serve passengers and thus cannot replace air travel for persons that need to travel great distances in short time periods. For this reason, this alternative was not carried forward for further evaluation in this PEA.

[49] U.S. Department of Transportation (USDOT). Intercity Passenger Rail and Air Transportation Competition. Washington, DC.

3.2 Alternatives Analysis

Table 3-1 provides a description of the criteria used in the Alternatives analysis. If an alternative considered in this initial analysis met each of these criteria, it was retained for a more detailed environmental evaluation. If the Alternative did not meet these criteria, it would be eliminated from further consideration.

Table 3-1: Alternatives Analysis Criteria

Alternative Analysis Criteria	Alternatives
Fulfills Purpose and Need	Does the alternative fulfill the project objectives as described in Section 2.1?
Accommodate forecast demand at acceptable LOS	Does the alternative accommodate existing and future passenger demand? Does the alternative provide flexibility to accommodate changes in traveler behavior, security, or other operational requirements? Does the alternative provide adequate parking?
Provide airfield suitable for scheduled commercial service	Can the alternative accommodate the projected number of operations without resulting in operational delays? Can the alternative achieve Part 139 certification and accommodation of ADG III aircraft ("Group III") aircraft (737-800)?
Direct roadway connections from off-Airport roads	Does the alternative provide direct access from the existing roadway network without the need for new roadway access to the terminal area and parking?

Descriptions of the Alternatives and the results of the Alternatives Analysis are provided below. **Table 3-2** provides a summary of the evaluation results for each Alternative.

No Action Alternative – HEF would remain as a regional GA airport with no commercial service and no Part 139 certification. This Alternative would result in no new construction or redevelopment of airside and landside facilities nor any accommodation for commercial service. Part 139 Certification would not be achieved. The existing terminal and auto parking would remain unchanged and would continue to operate at the existing site. There would be no capital projects completed except for those needed to maintain state of good repair that are not considered in this PEA (e.g. pavement rehabilitation). The forecast of GA aircraft operations only (not commercial service projections) contained in the Master Plan Forecast would be assumed for future growth and comparison with the Alternatives.

Because DOT Order 5610.1D requires consideration of the No Action Alternative as a baseline, it is carried forward for evaluation in this PEA.

Alternative #1: General Aviation Only – This Alternative is the No Action Alternative plus Project #7, Project #8 and Project #12, in addition to the state of good repair projects. These projects would facilitate continued GA operations at the Airport. Aircraft operations in this alternative would reflect the projections contained in the Master Plan forecast for GA only. There would be no scheduled commercial operations, nor would projects required for Part 139 certification be part of this alternative.

This alternative could not satisfy the Purpose and Need. However, in the event commercial service does not occur, Project #7, #8 and #12 would be constructed to support GA operations. Therefore, this alternative is carried forward for further consideration.

Alternative #2: Commercial Service – This alternative includes all of the 16 projects listed in **Section 1.1** and **Appendix B.** This Alternative would 1) achieve Part 139 certification through the completion of specified projects, and 2) expand the existing Airport terminal building and associated airside and landside facilities to support commercial service. This alternative would expand the existing terminal to 75,099 SF to provide adequate space to accommodate the projected passenger demand at an acceptable LOS and auto parking requirements. For this Alternative, Part 139 certification would be achieved to

accommodate scheduled commercial service. For commercial service to proceed, the terminal, roadways and parking must be upgraded and airfield projects must be completed to accommodate 737-800 aircraft, as shown in **Table 1-1** and **Table 1-2**.

This alternative could satisfy the Purpose and Need and therefore is carried forward for further consideration. This is the Preferred Alternative.

Alternative #3: Use of Another Existing Airport – This alternative involves the use of the existing airports within the passenger catchment area to accommodate the projected passenger demand and scheduled airline service. This alternative considered airfield requirements, availability of existing terminal space with passenger loading gates, holdrooms, security processing, and auto parking space at another existing airport to accommodate the forecasted passenger demand. Any candidate airport would also require adequate airfield capability, to accommodate operations by 737-800 aircraft in accordance with FAA airfield design standards. **Appendix D, Attachment #3** contains a detailed analysis of other existing airports within the passenger catchment area. The analysis found that these airports do not possess the infrastructure needed to support scheduled commercial operations. Further, all the existing airports are outside of the City of Manassas' jurisdiction. Although IAD and DCA do possess the ability to accommodate scheduled commercial service, DCA is currently capacity constrained through the FAA's slot administration program[50] and cannot accept additional flights. IAD is not a viable option because it is currently experiencing LOS constraints in key terminal areas and adding more passengers would contribute to further LOS degradation[51]. In addition, IAD is outside of the City of Manassas' jurisdiction. Therefore, this alternative would not meet the Purpose and Need.

This alternative would not meet the Purpose and Need and is therefore eliminated from further consideration and is not carried forward for further evaluation.

Alternative #4: New Airport Construction - This alternative involves the construction of a new airport within the passenger catchment area to accommodate the future demand at an acceptable LOS. A new airport would require, *at a minimum,* approximately 500 acres of land to support commercial service with a 6,200-ft runway with precision instrument approach procedures, sufficient aircraft parking apron space for 737-800s, terminal space, a roadway network and auto parking areas. The development of a new airport from the planning phase to construction would have a significant cost and potentially would have significant environmental impacts (e.g., land use, noise, air quality). Presently, 500 acres of developable, contiguous land is not available within the City of Manassas as the area is already developed. The planning and development of a new airport likely would take 10 years or more due to the need to select a new airport site, acquire the land (including potential eminent domain efforts that would be disruptive to the community), obtain municipal land use approvals, complete federal environmental reviews, permitting, and construction. The costs of this alternative would be prohibitive.

This alternative would not meet the Purpose and Need and is therefore eliminated from further consideration and is not carried forward for further evaluation.

[50] Federal Aviation Administration. Slot Administration - U.S. Level 3 Airports. [Online] [Cited: November 18, 2025.] https://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/systemops/perf_analysis/slot_administration/slot_administration_schedule_facilitation/level-3-airports.

[51] IAD has a project called the "Terminal/Concourse Redevelopment and Associated Development" to expand concourses and add gates. The new gates are not scheduled to be available until 2030.

Alternative #5: New Terminal at Alternate Location at HEF - This Alternative considers the construction of a new terminal at HEF, other than the existing terminal's location. See **Figure A14** for the evaluation of potential sites on the Airport.

An area on the west side of the Airport was considered. However, this area is currently used for GA operations (flight schools, private aircraft hangars, etc.) and has been identified in the Master Plan for continued GA development. Attempting to develop this area to support scheduled passenger service would conflict with the current plan to continue GA development and activity there. Further, this would require the construction of a new and expanded aircraft parking apron, taxiways suitable for Group III aircraft, and roadways and parking areas for passenger access. Other related supporting functions such as the deicing facility would have to be relocated to the west side of the Airport, further conflicting with light GA activity on the western side of the Airport.

Construction of a new terminal in an area on the east side of the Airport, to the south of the existing terminal, was also examined. This area has been developed for hangars and airport maintenance facilities. Demolishing those facilities would require the relocation and construction of replacement facilities on another area of the Airport. Further south of this area is a large wetland and Broad Run making this area unsuitable for construction of a terminal, parking areas and apron areas.

Areas at the north and south ends of the Airport are not suitable sites for a new terminal due to the Runway Protection Zones[52] for Runway 16L/34R.

This alternative would not meet the Purpose and Need and is therefore eliminated from further consideration and is not carried forward for further evaluation.

Table 3-2 below provides an overview of the screening results and the Alternatives carried forward based on this PEA screening process. Alternatives 3, 4, and 5 were eliminated because they do not fulfill the Purpose and Need of this PEA.

[52] Runway Protection Zone - The area off of the runway end designed to provide a clear area that is free of above ground obstructions and structures to enhance the protection of people and property on the ground. FAA Advisory Circular 150/5190-4B *Airport Land Use Compatibility Planning*

Table 3-2: Alternative Evaluation Results Summary

Alternative	Fulfills Purpose and Need	Accommodate Forecast Demand at Acceptable LOS (Avports Forecast Table 2-1)	Provide Airfield Suitable for Scheduled Air Carrier Operations	Direct Roadway Connections from Off-Airport Roads
No Action	The No Action Alternative does not fulfill the project Purpose and Need as described in **Section 2.1**. It does not accommodate commercial service, nor does it address Part 139 certification. Therefore, this Alternative does not meet the Purpose and Need.	Not Applicable. This Alternative would not include commercial service at HEF, and, therefore, would not include any passenger terminal projects or passenger parking areas to accommodate projected passenger enplanements.	The No Action alternative would not provide suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800 aircraft.	Not Applicable as the roadway connections would remain unchanged for this alternative.
Alternative #1: General Aviation Only	This Alternative does not fulfill the project Purpose and Need as described in **Section 2.1**. It does not accommodate commercial service, nor does it address Part 139 certification. Therefore, this Alternative does not meet the Purpose and Need.	Not Applicable. This Alternative would not include commercial service at HEF, and, therefore, would not include any passenger terminal projects or passenger parking areas to accommodate projected passenger enplanements.	This Alternative would not provide suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800 aircraft.	Not Applicable as the roadway connections would remain unchanged for this alternative.
Alternative #2: Commercial Service	This Alternative fulfills the project Purpose and Need as described in **Section 2.1**. It provides commercial service, and it addresses Part 139 certification. Therefore, this Alternative meets the Purpose and Need.	This Alternative would resolve existing terminal deficiencies for the accommodation of projected passenger enplanements and would provide adequate parking.	This Alternative would provide suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800 aircraft.	The existing roadway connections do provide direct connection from off-airport roads to the terminal and parking areas. The existing roads are adequate and would remain unchanged for this alternative.
Alternative #3: Use of Another Existing Airport	This Alternative does not fulfill the project Purpose and Need as described in **Section 2.1**. It does not accommodate commercial service, nor address Part 139 certification at HEF. Therefore, this Alternative does not meet the Purpose and Need.	Not Applicable. This Alternative would not include commercial service at HEF, and, therefore, would not include any passenger terminal projects or passenger parking areas to accommodate projected passenger enplanements.	With the exception of IAD and DCA, this Alternative would require airfield modifications to provide suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800 aircraft.	With the exception of DCA and IAD, roadway connections would have to be constructed to accommodate the projected passengers.
Alternative #4: New Airport Construction	This Alternative does not fulfill the project Purpose and Need as described in **Section 2.1** It does not accommodate commercial service, nor address Part 139 certification at HEF. Therefore, this Alternative does not meet the Purpose and Need.	Not Applicable. This Alternative would not include commercial service at HEF, and, therefore, would not include any passenger terminal projects or passenger parking areas to accommodate projected passenger enplanements.	This Alternative would require the construction of suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800 aircraft.	This Alternative does not have Direct Roadway Connections from Off-Airport Roads.
Alternative #5: New Terminal at Alternate Location at HEF	This Alternative does not fulfill the project Purpose and Need as described in **Section 2.1** It does not accommodate commercial service, nor address Part 139 certification at HEF. Therefore, this Alternative does not meet the Purpose and Need.	Not Applicable. This Alternative would not include commercial service at HEF, and, therefore, would not include any passenger terminal projects or passenger parking areas to accommodate projected passenger enplanements.	This Alternative would require construction of suitable runway width, taxiways and apron areas to accommodate routine operations by 737-800.	This Alternative does not have Direct Roadway Connections from Off-Airport Roads.

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3.2.1 Alternatives Analysis Summary

The **Alternative #2: Commercial Service** is the Preferred Alternative and is being carried forward for the evaluation of environmental impacts because it meets the Purpose and Need and meets all of the alternative screening criteria:

- Achieves Part 139 certification at HEF to support scheduled commercial service; and expands the existing HEF Airport terminal building and associated airside and landside facilities to support scheduled commercial service;
- Accommodates existing and projected demand including adequate runway width and strengthening, apron and taxiway space to allow efficient operations and accommodate projected aircraft operations by scheduled commercial service aircraft, while complying with FAA safety and design standards;
- Provides a terminal facility to accommodate the projected number of passengers with sufficient gates, holdrooms, passenger processing and concession areas; and,
- Provides efficient and safe terminal roadways and curb frontages within the existing airport boundary to comply with TSA recommendations.

Based on this analysis, and as required by NEPA, the No Action Alternative is advanced. In addition to the **No Action, Alternative #1: General Aviation Only** is also being advanced for further analysis in the event commercial service does not occur. The results of the development alternatives analysis are summarized in **Table 3-3** below.

Table 3-3: Analysis Criteria

Development Options	Fulfills the Purpose and Need	Accommodates Forecast Demand at Acceptable LOS	Airfield Suitable for Scheduled Air Carrier Operations	Direct Roadway Connections from Off-Airport Roads	Carried Forward?
No Action	No	No	No	Yes	Yes[1]
Alternative #1: General Aviation Only	No	No	No	Yes	Yes[1]
Alternative #2: Commercial Service (Preferred Alternative)	Yes	Yes	Yes	Yes	Yes
Alternative #3: Use of Another Existing Airport	No	No	Yes[2]	Yes	No
Alternative #4: New Airport Construction	No	No	No	No	No
Alternative #5: New Terminal Construction Alternate Location	No	No	No	No	No

1. These alternatives are advanced for further review in accordance with NEPA (No Action) and in the event commercial passenger service does not occur (Alternative #1: General Aviation Only).
2. In the HEF catchment area, only IAD and DCA have airfield capability suitable for operations by 737-800 aircraft. The other airports in the catchment area do not. See Appendix D, Attachment #3 for details on the airports within the HEF catchment area.

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4 Affected Environment

This section defines the PEA project areas, identifies environmental resources, and discusses the existing conditions of resources that might be affected by the No Action Alternative, Alternative #1 (General Aviation Only), and Alternative #2 (Preferred Alternative). This information establishes the baseline conditions that are evaluated in **Chapter 5**. Agency Consultation letters and received responses are provided in **Appendix E**. Lists of primary statues, regulations, laws and Executive Orders (EO) related to Environmental Resource Categories are provided in **Appendix F**.

4.1 Aviation Emissions and Air Quality

The National Ambient Air Quality Standards (NAAQS) are federal air quality standards established by the U.S. Environmental Protection Agency (EPA) under the Clean Air Act (CAA). These standards define allowable concentrations of six criteria pollutants in outdoor air to protect public health and welfare: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ozone (O_3)[53], particulate matter (PM)[54], and sulfur dioxide (SO_2). The NAAQS consist of primary standards, which safeguard human health, and secondary standards, which protect public welfare. Compliance with NAAQS is achieved through State Implementation Plans (SIPs), and these standards serve as a benchmark in environmental reviews, including NEPA analyses, to ensure that proposed projects do not cause or contribute to violations of air quality requirements. The NAAQS are presented in **Table 4-1. Appendix G** contains the Air Quality Technical Report.

Table 4-1: EPA National Ambient Air Quality Standards (NAAQS)

Pollutant		Primary/ Secondary Standard	Averaging Time	Level	Form
Carbon Monoxide (CO)		Primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		Primary and Secondary	Rolling 3-month average	0.15 μg/m^3	Not to be exceeded
Nitrogen Dioxide (NO_2)		Primary	1 hour	100 ppb	98th percentile of 1-hour daily max concentrations, averaged over 3 years
		Primary and Secondary	1 year	53 ppb	Annual Mean
Ozone (O_3)		Primary and Secondary	8 hours	0.070 ppm	Annual fourth-highest daily max 8-hour concentration, averaged over 3 years
Particle Pollution	$PM_{2.5}$	Primary	1 year	9.0 μg/m^3	annual mean, averaged over 3 years
		Secondary	1 year	15.0 μg/m^3	annual mean, averaged over 3 years
		Primary and Secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years

[53] O_3 is a secondary pollutant, meaning it is formed when other pollutants, primarily nitrogen oxides (NO_x) and volatile organic compounds (VOCs), react with heat and sunlight in the atmosphere. NO_x and VOCs are therefore referred to as O_3 precursor pollutants. Exceedances of O_3 are due to both regional emissions of NO_x and VOCs and to the transport of O_3 from other states.

[54] PM is divided into two particle size categories: coarse particles with a diameter of less than 10 micrometers (PM_{10}) and fine particles with a diameter of less than 2.5 micrometers ($PM_{2.5}$).

Table 4-1: EPA National Ambient Air Quality Standards (NAAQS)

Pollutant		Primary/ Secondary Standard	Averaging Time	Level	Form
	PM_{10}	Primary and Secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		Primary	1 hour	75 ppb	99th percentile of 1-hour daily max concentrations, averaged over 3 years
		Secondary	1 year	10 ppb	annual mean, averaged over 3 years
Source: U.S. EPA, NAAQS Table, https://www.epa.gov/criteria-air-pollutants/naaqs-table.					

4.1.1 Air Quality Designation Status

Under the CAA, areas with measured pollutant concentrations at or below the NAAQS are designated by EPA as being in "attainment" and areas with pollutant concentrations above the NAAQS standards as being in "nonattainment". EPA further categorizes nonattainment areas as extreme, serious, moderate, and marginal based on the severity of the air pollution. The CAA requires states with nonattainment areas to develop a SIP that prescribes mitigation measures and timelines to achieve attainment. When air pollutant concentrations in a nonattainment area are reduced to levels that meet or are below the NAAQS, the EPA re-designates the area as a NAAQS "maintenance area" for a period of 20 years.

4.1.2 CAA Conformity Requirements and NEPA

The General Conformity Rule of the CAA prohibits federal agencies from permitting or funding projects that do not conform to an applicable SIP. This rule is applicable only to areas that are designated as nonattainment or maintenance for a criteria air pollutant. To demonstrate conformity with a SIP, project-related emissions of the applicable nonattainment/maintenance pollutants (and precursors) are compared to *de minimis* level thresholds that are set by the EPA. If the project-related emissions exceed the thresholds, a formal General Conformity Determination is required to demonstrate that the project conforms to an applicable SIP. Conversely, if project-related emissions are below *de minimis* levels the project is presumed to conform to the applicable SIP. The Study Area for project-related emissions includes the PEA project boundaries, construction and operations-related vehicle trips, and aircraft operations up to 3,000 feet which includes the takeoff and landing cycle.

HEF is within Prince William County and the City of Manassas, an area that is currently designated by EPA as "moderate" nonattainment for the 2015 8-hour O_3 standard and as "maintenance" for the 2008 8-hour O_3 NAAQS[55]. Prince William County and the City of Manassas are within the Ozone Transportation Region, an area designated under the CAA in which states work together to reduce ozone pollution that crosses state boundaries. The main purpose is to reduce O_3 and its precursors (NO_x and VOCs) as these pollutants can travel long distances, contributing to regional air quality issues.

Under the CAA's Transportation Conformity Rule, federal funding is restricted for highway or transportation projects that do not conform to an applicable SIP. The proposed projects at HEF are not subject to the Transportation Conformity Rule because the improvements are not Federal Highway Administration (FHWA)/Federal Transit Administration (FTA) funded, nor require the agencies'

[55] EPA. National Area and County-Level Multi-Pollutant Information. Green Book. September 8, 2025.

approval because they are not funded by either of the federal administrations, FHWA and FTA, that are responsible for making conformity determinations under the rule.

4.1.3 Transportation

The roadway network surrounding the Airport primarily serves to connect the Airport, VRE Broad Run Train Station and local businesses to the greater roadway network. A Traffic Study was performed to assess peak hour existing traffic conditions surrounding the airport, as well as to evaluate the potential traffic impacts and can be found in **Appendix H.**

The Traffic Study evaluated traffic delays and queuing at roadway intersections. The Level of Service (LOS) at an intersection is the measure of the quality of traffic flow based on the average amount of delay a driver would typically experience passing through the intersection. LOS ranges from A to F with A indicating little to no congestion or delay and F indicating a failing movement or intersection with severe congestion and delays. LOS from A to D are considered acceptable for urban or suburban areas.

In compliance with Virginia Department of Transportation (VDOT) requirements, the Traffic Study Area is defined as the area that is "within 2,000 feet of [the] site and any roadway on which 10% or more of the new vehicle trips generated by the [proposed project] are distributed – not to exceed two miles"[56].

A map of the Study Area and a description of the roadways within the Study Area are provided in Figure 2-1 and Section 5.2 of the Traffic Study in **Appendix H**, respectively. As detailed in that study, the nine intersections chosen for analysis were based on regional travel patterns, as well as potential for impacts due to Alternative #2 based on the VDOT requirements.

Traffic volumes on the roadways immediately surrounding the Airport tend to be low, with peak volumes of approximately 225 vehicles per hour (vph) or less on weekdays and approximately 100 vph or less on weekends. Traffic volumes on these roadways are almost entirely driven by Airport traffic and, therefore, are subject to peaks in Airport activity. Traffic volumes on roadways further from the Airport that carry other local or regional traffic are higher than roads near HEF and are subject to regional travel patterns and peaks. For example, Prince William Parkway carries over 3,500 vph during the weekday PM peak hour.

All unsignalized intersections within the Study Area currently operate at LOS B or better during the peak hours. The signalized intersection of Prince William Parkway and Clover Hill Road currently operates at overall LOS C during the peak hours. Detailed analysis for existing conditions, including LOS results for overall intersections approaches, and movements, as well as queues can be found in the Traffic Study in **Appendix H.**

There is no pedestrian access to the Airport, and the immediate surrounding roadways do not have pedestrian facilities. Bicycle access is available near the Airport via a bicycle route with shared vehicle/bicycle lanes on Wakeman Drive. The nearest transit access to the Airport is the Broad Run VRE Train Station to the northeast of HEF. There is no nearby bus service that runs to the Airport or the Broad Run VRE Train Station.

Currently, a free surface parking lot with 119 spaces is present in front of the existing terminal at the intersection of Harry J Parrish Boulevard and Wakeman Drive. In addition, individual buildings, hangars, and tenants have limited private parking within their lease areas. Free parking (236 spaces) is

[56] Virginia Department of Transportation. updated Administrative Guidelines for the Traffic Impact Analysis Regulations. Richmond, Virginia: August 2022.

also provided on the west side of Wakeman Drive, north of the Fuel Farm. This lot is primarily used for Airport employees, Airport related businesses, and Fixed Base Operators along Wakeman Drive.

4.2 Biological Resources

Biological resources include flora (plants), fauna (fish, birds, reptiles, amphibians, mammals, etc.), and habitats that may occur within areas potentially impacted by Alternatives #1 and #2. The flora and fauna include state and federally listed threatened and endangered species and the supporting habitats, including rivers, lakes, wetlands, forests, and other ecological communities. For details regarding statues, regulations and EOs related to biological resources, refer to **Appendix I.1**.

To evaluate compliance with the Endangered Species Act of 1973 (16 U.S.C. §1531 et seq.), biological resources were evaluated from March 11 to 14, 2024, June 4 and 5, 2025, and July 7 and 8, 2025. Both a Habitat Assessment Report (**Appendix I.2**) and a Wetland and Stream Delineation Report (**Appendix O.1**) were used to evaluate the current environmental conditions affected by Alternatives #1 and #2 and provide an in-depth discussion of the habitats.

4.2.1 Environmental Setting

The Study Area for biological resources is limited to the 16 PEA Projects (**Figure 1**/**Figure A5**).

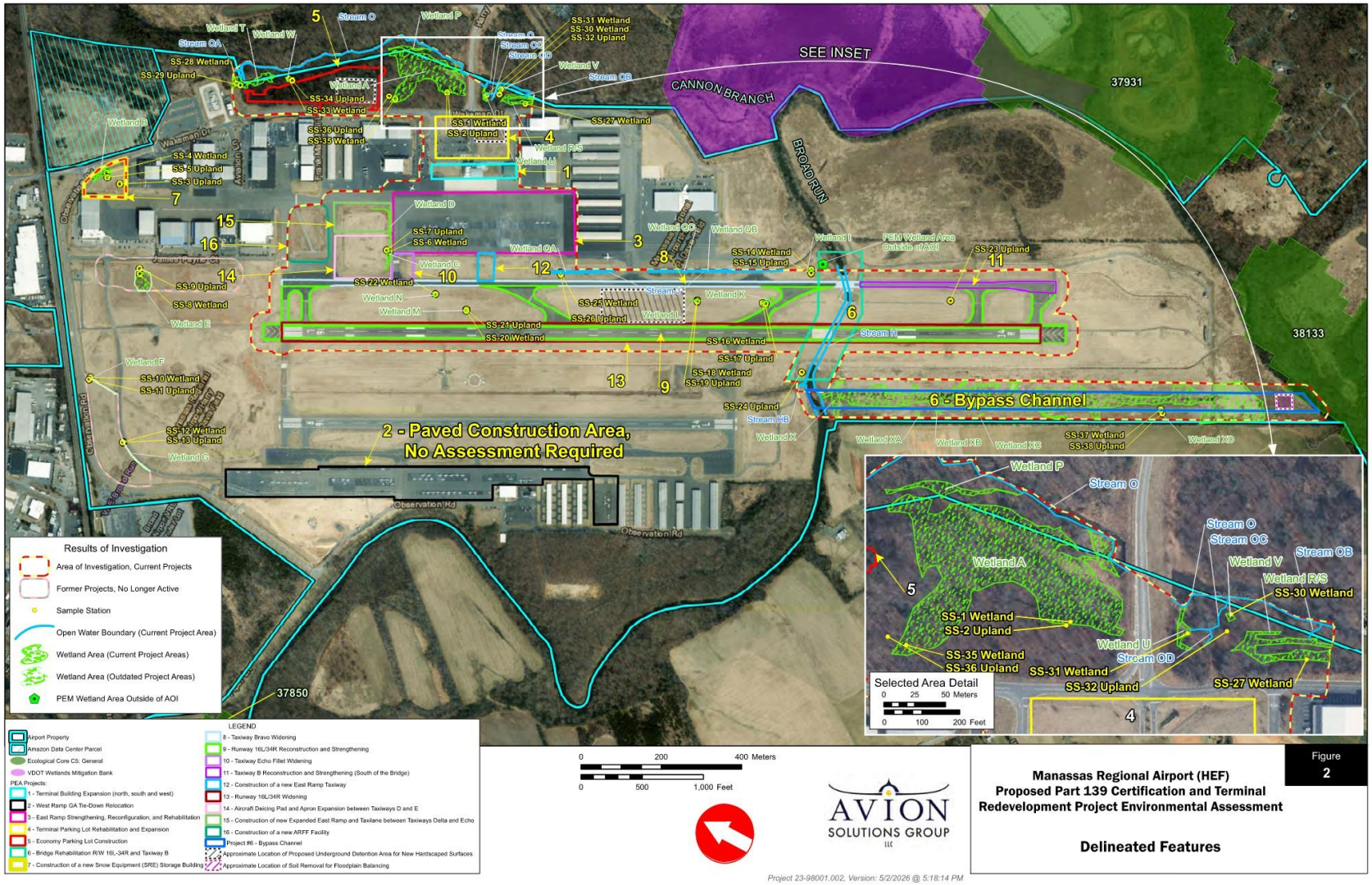
Approximately 75 percent of HEF's 888 acres have been developed with runways, taxiways, roadways, parking lots, and buildings. In between these areas are maintained (mowed) grasslands, forest, small, disturbed wetlands, riverine wetlands, ditches and concrete lined drainage channels interspersed within paved surfaces.

The southern portion of the airfield is maintained by mowing but contains larger swaths of grassland and wetlands. In this area, Broad Run flows to the east and under bridges at Runway 16L/34R and Taxiway Bravo. East of Taxiway Bravo, Broad Run merges with Cannon Branch and the resultant Broad Run flows south then southwest along the Airport's southern boundary.

Federal databases consulted for threatened and endangered species include the National Oceanic and Atmospheric Administration's (NOAA) National Marine Fisheries Service (NMFS) Section 7 ESA mapper and the United States Fish and Wildlife Service's (USFWS) Information, Planning and Consultation (IPaC) database. The NMFS database was reviewed on April 28, 2025 **(**Appendix I**.2)**, and no habitat for NMFS-managed federal species or critical habitats occurs at the Airport.

The IPaC "Official Species List" was reviewed on February 2, 2026 (**Appendix I.2**) and did not identify critical habitats, rare natural communities, or rare plants within the Airport; but included the proposed endangered tri-colored bat (*Perimyotis subflavus*) and proposed threatened monarch butterfly (*Danaus plexippus*). The IPaC also addresses the need for compliance with the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. §§ 703-712) and the Bald and Golden Eagle Protection Act (16 U.S.C. § 668) (**Appendix I.1**).

The Virginia Department of Game and Inland Fisheries information tool (VaFWIS) lists ten threatened and endangered species potentially occurring within a two-mile radius of the center of the Airport **(Table 4-2).**


SEE INSET
CANNON BRANCH
BROAD RUN
37931
38133
37850
2 - Paved Construction Area, No Assessment Required
6 - Bypass Channel
Observation Rd
Results of Investigation
Area of Investigation, Current Projects
Former Projects, No Longer Active
Sample Station
Open Water Boundary (Current Project Area)
Wetland Area (Current Project Areas)
Wetland Area (Outdated Project Areas)
PEM Wetland Area Outside of AOI
LEGEND
Airport Property
Amazon Data Center Parcel
Ecological Core C5: General
VDOT Wetlands Mitigation Bank
PEA Projects:
1 - Terminal Building Expansion (north, south and west)
2 - West Ramp GA Tie-Down Relocation
3 - East Ramp Strengthening, Reconfiguration, and Rehabilitation
4 - Terminal Parking Lot Rehabilitation and Expansion
5 - Economy Parking Lot Construction
6 - Bridge Rehabilitation R/W 16L-34R and Taxiway B
7 - Construction of a new Snow Equipment (SRE) Storage Building
8 - Taxiway Bravo Widening
9 - Runway 16L/34R Reconstruction and Strengthening
10 - Taxiway Echo Fillet Widening
11 - Taxiway B Reconstruction and Strengthening (South of the Bridge)
12 - Construction of a new East Ramp Taxiway
13 - Runway 16L/34R Widening
14 - Aircraft Deicing Pad and Apron Expansion between Taxiways D and E
15 - Construction of new Expanded East Ramp and Taxilane between Taxiways Delta and Echo
16 - Construction of a new ARFF Facility
Project #6 - Bypass Channel
Approximate Location of Proposed Underground Detention Area for New Hardscaped Surfaces
Approximate Location of Soil Removal for Floodplain Balancing
Selected Area Detail
0 25 50 Meters
0 100 200 Feet
0 200 400 Meters
0 500 1,000 Feet
AVION SOLUTIONS GROUP LLC
Project 23-98001.002, Version: 5/2/2026 @ 5:18:14 PM
Figure 2
Manassas Regional Airport (HEF)
Proposed Part 139 Certification and Terminal Redevelopment Project Environmental Assessment
Delineated Features

The brook floater (*Alasmidonta varicosa*) and the yellow lance (*Elliptio lanceolata*) mussel species have been documented previously in Broad Run, within two miles of the Runway 16L/34R and Taxiway Bravo bridge crossings (Project #6); however, they have not been detected within the Airport boundary[57]. In a letter dated August 21, 2025, from the VDCR, concern about the presence of brook floater in Broad Run was noted (**Appendix E**) and subsequently a freshwater mussel survey was conducted in October 2025 (**Appendix I.3** and **Appendix I.4**), resulting in the observation of only non-threatened or endangered mussel species within the Study Area: eastern elliptio (*Elliptio complatanata*) and northern lance (*Elliptio fisheriana*).

In general, bat species utilize caves/mines, trees, structures or bridges for roosting or hibernating. No caves or known overwintering areas (hibernaculum) were noted within 0.5 miles of the Airport. However, trees in Project #5 may be used for roosting/foraging (**Figure 1/Figure A5**). Additionally, the existing culverts/bridges associated with Broad Run (Project #6), and existing Airport structures could be utilized by bat species for roosting.

Habitat for migratory birds is present within the forest associated with Project #5 and the less managed portions of the airfield area associated with Project #6, where grassland bird species may also be present. According to the Center for Conservation Biology mapping portal, a bald eagle nest is located to the northeast of the Airport near the intersection of Wakeman Drive and Wakeman Court. HEF's Airport's Wildlife Hazard Management Plan[58] has also documented this nest. Monarch butterfly may be present in any of these less frequently mowed areas where milkweed (*Asclepias* spp.) is present.

Table 4-2: Virginia Species with Threatened or Endangered Status Associated with the Airport

Common Name	Scientific Name	Status	Class
Bat, little brown	*Myotis lucifugus*	State Endangered	Mammal
Bat, northern long-eared	*Myotis septentrionalis*	Federal Endangered, State Endangered	Mammal
Bat, tricolored	*Perimyotis subflavus*	Federal Proposed, State Endangered	Mammal
Butterfly, monarch	*Danaus plexippus*	Federal Proposed Threatened	Insect/Butterfly
Falcon, peregrine	*Falco peregrinus*	State Threatened	Bird
Floater, brook	*Alasmidonta varicosa*	State Endangered	Mussel
Lance, yellow	*Elliptio lanceolata*	Federal Threatened, State Threatened	Mussel
Shrike, loggerhead and migrant	*Lanius ludovicianus and Lanius ludovicianus migrans*	State Threatened	Bird
Sparrow, Henslow's	*Centronyx henslowii*	State Threatened	Bird
Sturgeon, Atlantic	*Acipenser oxyrinchus*	Federal Endangered, State Endangered	Fish
Source: VaFWIS			

[57] Creek Laboratory, LLC. Survey for Freshwater Mussel Fauna Adjacent to the Manassas Regional Airport in Broad Run, Prince William County, Virginia. 2008.
[58] Manassas Regional Airport. *Wildlife Hazard Management Plan.* 2023.

4.3 Coastal Resources

The Airport's environmental setting is described in **Section 4.2.1.** Coastal Resources include "all natural resources occurring within coastal waters and their adjacent shorelands such as islands, transitional and intertidal area, salt marshes, wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife and their respective habitats"[59]. Of these coastal resources, the Airport contains a segment of Broad Run, wetlands, floodplains, and wildlife with associated habitats. These are discussed in Sections **4.2** and **4.13**. The Airport also contains buildings, structures, and roadways that act as impervious surfaces; historic battlefields; and archaeological sites. The Airport generates light, noise and air emissions, which are further discussed in **Sections 4.1, 4.10,** and **4.12**.

In Virginia, the NOAA, the Virginia Department of Environmental Quality (VADEQ), and the County have roles in administering the Coastal Zone Management Act (CZMA). The Airport is subject to Federal consistency review because it is within the state's Northern Virginia Coastal Planning District. Although there are no estuarine habitats[60] within the Airport nor a direct hydrological connection to Chesapeake Bay or the Atlantic Ocean, the VADEQ requires coordinated review of 12 enforceable policies that could be affected by proposed actions taken on the Airport. Although both the City and the County fall within the Northern Virginia Coastal Planning District geographically[61], the City is not part of the Coastal Zone Program and thus federal consistency review is only required for actions within the County or those that have a "reasonably foreseeable effect on any coastal use or resource"[62]. Thus, only certain PEA projects are subject to this Federal consistency review. As such, two PEA projects are subject to consideration: Project #5 and Project #6. The Federal CZMA Consistency Certification is presented in **Appendix J**, addressing Project #5 and Project #6, as well as further addressing the 12 coastal consistency enforceable policies of concern.

Under Virginia's Chesapeake Bay Preservation Act (CBPA)[63] areas within a 100-foot buffer of tidal wetlands, lands adjacent to perennial water bodies, and non-tidal wetlands that are connected by surface flow and contiguous to perennial water bodies, are designated as "Resource Protection Areas" (RPAs)[64]. Prince William County has adopted the CBPA and has established an RPA buffer around both Cannon Branch and Broad Run. The City of Manassas has not adopted the CBPA. **Figure A24** shows the location of both projects and the Broad Run RPA buffers. Project #5 is wholly located within the County and contains an RPA associated with Cannon Branch. Project #6 would directly impact the waters and subaqueous bed of Broad Run and the downstream segment of Broad Run which routes through the County and is hydrologically connected to further downstream RPA buffers. FEMA, NOAA, VADEQ, and the County were provided consultation packages by FAA and the consultant on August 8, 2025. Responses to those packages were received and are included in Appendix E.

[59] FAA. 1050.1 Desk Reference. [Online] July 7, 2025. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref.
[60] An area where freshwater from a river or stream mixes with salt water from the ocean.
[61] Virginia Department of Environmental Quality. Northern Virginia Regional Commission. [Online] August 6, 2024. https://www.deq.virginia.gov/our-programs/coastal-zone-management/coastal-planning-districts/northern-virginia.
[62] Federal Aviation Administration. FAA National Environmental Policy Act Implementing Procedures. FAA Order 1050.1G. June 30, 2025. Section 4.1.1.1.
[63] Virginia Title 9, Chapter 830
[64] Commonwealth of Virginia. Administrative Code. 9VAC25-830-80. Resource Protection Areas. [Online] https://law.lis.virginia.gov/admincode/title9/agency25/chapter830/section80/.

4.4 Department of Transportation Act Section 4(f) and Land and Water Conservation Fund Section 6(f)

Section 4(f) of the US DOT Act of 1966 (49 U.S.C. § 303(c)) considers the effects of a proposed project on publicly owned parks, recreation areas, wildlife and/or waterfowl refuges of national, state, or local significance; and publicly or privately owned land from a historic site of national, state, or local significance. Historic sites considered in this section are evaluated in detail in **Section 4.7** and are reviewed under Section 106 of the National Historic Preservation Act (NHPA), as amended. The term "historic property" applies to archaeological sites, buildings, structures, objects, districts, landscapes, and tribal cultural properties that are eligible for, or listed in, the National Register of Historic Places.

Under Section 4(f), the FAA cannot approve a transportation project that uses a Section 4(f) property, as defined in 23 Code of Federal Regulations (CFR) § 774.17, unless a determination is made that: 1) there is no feasible and prudent avoidance alternative; and that the proposed project includes all possible planning to minimize harm to the land resulting from such use (23 CFR § 774.3(a)); or 2) the use of the Section 4(f) property, including any measures to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, would have a minimal and insignificant impact on the property (23 CFR § 774.3(b)).

Section 6(f) of the Land and Water Conservation Fund (LWCF) Act of 1965 prohibits the conversion of property acquired or developed with LWCF grant money to nonrecreational purposes without approval from the Department of Interior's National Park Service (NPS). No Land and Water Conservation Fund Section 6(f) funds have been expended within the Airport, immediately adjacent to it, or within the Study Area (defined below). For this reason, Section 6(f) is not considered further.

The Section 4(f) Study Area includes the following:

- The physical footprint of each PEA project – This is defined as the physical area directly affected by the proposed project. This includes the 16 PEA projects.
- A 100-foot buffer area – This is a 100 foot area around each of the 16 PEA projects.
- The Visual Effects Study Area – The visual effects Study Area is the defined spatial area within which a project may be visible and that could alter existing visual conditions, including views from sensitive receptors such as residences, public viewpoints, roadways, parks, and historic or scenic resources. The Study Area is established to evaluate both direct and indirect visual effects, considering factors such as line-of-sight, distance, topography, vegetation, and built features. For this PEA, the Visual Effects Study Area is defined as the Airport Property line.
- The Auditory Effects Study Area – The auditory effects Study Area is the defined spatial area within which project-related noise emissions may be audible and could affect existing acoustic conditions or sensitive receptors. The Study Area is established to assess both direct and indirect noise effects, considering sound propagation, background noise levels, and the location of noise-sensitive land uses. For this PEA, the Auditory Effects Study Area is defined as the 65 DNL Noise Contour[65].

[65] The 65 DNL contour is based on the projected noise emissions associated with aircraft operations related to Alternative #2 for year 2041. See Section 5.10 Noise and Noise Compatible Land Use.

The Section 4(f) Study Areas described above are shown on **Figure A17**[66].

The FAA, in consultation with Virginia Department of Historic Resources (DHR) (**Appendix E**), defined the visual and auditory Study Areas as the Airport property and the full extent of the 65 DNL contour. This is depicted along with battlefields within and adjacent to the Study Area (**Figure A18**) [67]. The 65 DNL (auditory Study Area) extends past the Airport property line (visual Study Area) on the north and south ends of the Airport. The visual and auditory Study Area encompasses 974 acres.

Appendix L contains documents identifying and evaluating historic resources within the direct, visual, and auditory effects Study Areas. Sources reviewed included Virginia Cultural Resource Information System (V-CRIS), Prince William County Historic Sites Index, the Prince William County Greenways Trail Input Story Map, the City of Manassas historic sites list, the Trail System City of Manassas data layer, and the National Register of Historic Places (NRHP). Based on these sources, no park, wildlife or waterfowl refuge intersects or abuts the boundary or construction buffer of the 16 PEA projects.

One historic battlefield, the Manassas Station Operations battle areas (076-5036[68]), directly overlays the PEA projects (**Figure A18**). It is a compound battlefield[69] and captures locations used during the Civil War battles of Bristoe Station, Bull Run Bridge, Kettle Run, Manassas Station Operations, and Union Mills. DHR has determined that this compound resource is potentially eligible for listing on the NRHP. In addition, five Section 4(f) resources are present in the auditory and visual portions of the Study Areas, including the Bristoe Station Battlefield (076-0024), one archaeological site (44PW0729) [70] , and three recreation areas. The Bristoe Station Battlefield (076-0024) is overlain by 076-5036 west of PEA Project #2. It was listed in the Virginia Landmarks Register (VLR) but was subsequently delisted because of loss of setting[71]. Archaeological site 44PW0729 is an Indigenous campsite that has below ground surface features. Such features are hearths and storage pits. The site is eligible for listing on the NRHP[72].

The three recreation areas in the Study Area are segments of the City of Manassas Nokesville Trail, Gateway Trail, and the Prince William County Broad Run Greenway, and Discovery Spur. The Discovery Spur crosses the Study Area on the north side of Route 28, and the Nokesville Spur approaches it from the east. The Nokesville Trail is not yet linked to the Discovery Spur but the linking section (a green and yellow striped line on **Figure A18**) is funded and is projected to be constructed in the foreseeable future. The Gateway Trail originates east of the Study Area close to the City of Manassas Center. It follows Route 28 and then bifurcates to turn west along Observation Road and then south down Wakeman Drive to the Airport terminal parking lot.

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[66] Because the Section 4(f) resources evaluation considers historic properties, the study area boundaries for Section 4(f) and HAAC (**Section 4.7**) are the same. However, Section 106 uses a different term for study area. The term is "Area of Potential Effect" (APE). The acronym "APE" is used in **Section 4.7**.

[67] Day-Night Average Sound Level (DNL) is the metric used in assessing 24-hour cumulative noise exposure from aircraft operations at an airport.

[68] DHR designates architectural and battlefield resources using a seven-number code. The 076- number used here is the code for Prince William County and -5036 is the code assigned to a specific resource from a sequential list when the resource was defined.

[69] A compound battlefield is a location where more than one battle occurred.

[70] Archaeological sites in Virginia are designated using the so-called Smithsonian system. The designators have three parts: 44 (Viriginia is the 44th state on an alphabetical list of states), PW (Prince William County) and 4-digit numeric taken from a sequential list specific to the county.

[71] Virginia Department of Historic Resources. "Virginia's Lost" Delisted Landmarks. VLR On-Line. [Online] https://www.dhr.virginia.gov/historic-registers/076-0024/.

[72] DHR has mandated that any disturbance activities within 20 feet of this site be separated with protective fencing.

While it is noted that there are two planned trails in the Study Area (the Broad Run Greenway on the west and south sides of the Airport and the Airport Spur on the south and east sides of the Airport), these planned segments are dismissed from further consideration as they do not yet exist, are in the planning phase and are currently unfunded.

4.5 Farmlands

Prior to Airport construction in 1964, the land was used for agricultural purposes. Since 1964, the Airport property has been modified repeatedly as Airport operations evolved over the years (**Appendix L.1**). As the PEA projects are confined within the Airport boundary, the Study Area for Farmlands is the Airport. Farmlands include includes pasturelands, croplands, and forests that the United States Department of Agriculture (USDA) Natural Resource Conservation Area (NRCS) consider to be prime, unique, or of statewide or local importance[73]. The current soil classification at the Airport is presented in **Figure A15**.

Farmlands are subject to the federal Farmland Protection Policy Act (7 U.S.C. §§ 4201-4209) (FPPA). The oversight agency for FPPA is USDA NRCS[74]. The applicable state and local agencies are VADEQ and Prince William County. Consultation with the three agencies was initiated on August 4, 2025, and responses were received from USDA NRCS (August 5, 2025, August 6, 2025, and September 2, 2025) (**Appendix E**). On September 2, 2025, USDA NRCS noted that the Airport was within the Urban Area and reiterated it was exempt from FPPA analysis (**Appendix E**). For this reason, it is dismissed from further analysis in this PEA.

4.6 Hazardous Materials, Solid Waste, and Pollution Prevention

The FAA, under 49 CFR § 171.8, defines a *hazardous material* as any substance or material that has been determined to be capable of posing an unreasonable risk to health, safety and property when transported in commerce. *Solid waste* is defined as any discarded material that meets specific regulatory requirements and can include such items as refuse and scrap metal, spent materials, chemical products and sludge from industrial and municipal wastewater and water treatment plants. *Pollution prevention* describes methods used to avoid, prevent or reduce pollutant discharges or emissions through strategies such as redesigning products, altering manufacturing and maintenance processes, and conserving energy. The Study Area consists of the 16 PEA projects plus a wholistic review of HEF and surrounding properties.

4.6.1 Hazardous Materials

A Phase I Environmental Site Assessment (ESA) (**Appendix K**) was conducted to evaluate environmental conditions for 13 of 16 PEA projects with Projects #2, #6 and #11 subsequently added to the PEA and ESA. The ESA also evaluated adjacent and surrounding properties and areas to determine if any current and/or historic uses may have adversely affected subsurface environmental conditions within the Study Area. No hazardous materials or hazardous waste storage or disposal sites are present within or proximate to the PEA project areas evaluated. Individual tenants that occupy hangar spaces at HEF are registered Resource Conservation and Recovery Act (RCRA) hazardous waste generators due to typical maintenance and general aviation activities. Firefighter training exercises are conducted near

[73] Federal Aviation Administration. FAA National Environmental Policy Act Implementing Procedures. FAA Order 1050.1G. June 30, 2025. Vols. Section 3 - Efficient Environmental Reviews.

[74] Federal Aviation Administration. FAA National Environmental Policy Act Implementing Procedures. FAA Order 1050.1G. June 30, 2025. Vols. Section 3 - Efficient Environmental Reviews.

HEF ARFF Building C3 (**Figure 1/Figure A5)**, located approximately 500 feet southeast of the nearest project areas (Projects #1, #3, and #4). Drums of aqueous film-forming foam (AFFF)[75] containing fluoroalkyl surfactants are present inside that building. These surfactants, perfluorooctanesulfonic acids (PFOS), are lab-made chemicals known as per- and polyfluoroalkyl substances (PFAS). These are designated as hazardous substances under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA)[76]. Although not located within or proximate to the PEA project footprints (**Figure 1/Figure A5**), there is documented use of PFAS-containing AFFF used in Airport firefighting operations.

Airport operations require the use of maintenance products and petroleum products for vehicles and aircraft. No maintenance or petroleum storage is present within or adjacent to the PEA project footprints. The HEF Fuel Farm, not located within the PEA project footprints, has thirteen aboveground and underground storage tanks (ASTs/USTs) registered with VADEQ (see the Phase I ESA in **Appendix K)**.

HEF personnel confirmed all former USTs containing petroleum or hazardous materials were removed; municipal records indicate their status as closed in ground. There are currently no known active releases of hazardous substances at HEF and no remediation activities being conducted at HEF. However, according to the Phase I ESA, residual contaminants in soil and groundwater from documented solvent uses and historical petroleum releases (unrelated to existing tanks) may be present within and/or proximate to the PEA project footprints.

As indicated in the Phase I ESA, given the age of existing buildings, they may contain asbestos and electrical components that contain mercury, and polychlorinated biphenyls (PCBs) or lead paint coatings. Project #1 requires demolition or significant alteration of the existing passenger terminal. The terminal was constructed in 1996 and is unlikely to contain asbestos building materials. Subgrade drainage within the PEA project footprints that require modification may contain asbestos piping. Fill material reportedly sourced from off-site has the potential to contain construction and demolition (C&D) debris containing asbestos, lead paint and/or PCBs.

4.6.2 Solid Waste

HEF generates multiple waste streams from the airfield, fixed-based operators, aircraft maintenance hangars, cargo hangars, and concessions. Non-hazardous solid waste generated exclusively at the Airport is handled and carted off-site under contract by American Disposal Services to the Prince William County Municipal Landfill. C&D debris generated at the Airport is recycled off-site in accordance with applicable regulatory requirements. Additional information regarding non-hazardous solid waste generation is provided in the Phase I ESA in **Appendix K.**

4.6.3 Pollution Prevention

Stormwater management acts as a primary pollution prevention strategy by capturing, filtering, and reducing runoff from rain and snowmelt before it carries pollutants into waterways. Pollution prevention is managed by the Airport with a combined Stormwater Pollution Prevention Plan (SWPPP) and Spill

[75] AFFF is a specialized, water-based fire suppressant used in Virginia to extinguish high-hazard, flammable liquid (Class B) fires at military bases, airports, and industrial sites. It works by creating a vapor-sealing barrier but contains persistent perfluoroalkyl and polyfluoroalkyl substances (PFAS), or "forever chemicals" that contaminate groundwater.

[76] The USEPA designated PFOA and PFOS as hazardous substances in a Final Rule added to the Federal Register Volume 89, No. 90, Wednesday May 8, 2024, Rules and Regulations.

Prevention Control and Countermeasures Plan (SPCC), dated June 17, 2020, prepared by the City (provided in the Phase I ESA in **Appendix K**). HEF adheres to an Oil Discharge Contingency Plan (ODCP) dated June 25, 2019, prepared by the City (provided in the Phase I ESA in **Appendix K**) associated with the fuel farm. which meets the requirements of Article 11 of the State Water Control Law of the Commonwealth of Virginia and provides a list of owners/operators of each tank and contingencies in the event of a release.

The discharge of stormwater is managed through Virginia Pollution Discharge Elimination System (VPDES) General Permit #VAR050985 (provided in **Appendix K**). Stormwater runoff is directed to the south through a series of oil-water separators, stormwater swales and ditches and is discharged to Broad Run, Cannon Branch and their tributaries. Quarterly monitoring and reporting requirements are provided in **Appendix K.**

4.7 Historic, Architectural, Archaeological, and Cultural Resources

Historic, Architectural, Archaeological, and Cultural Resources (HAAC) include archaeological sites, buildings, structures, objects, districts, landscapes, and tribal cultural properties. The Area of Potential Effects (APE) for HAAC resources is the same as that used for Section 4(f) Study Area (**Section 4.4**). The Study Area and APE definition is:

- Direct APE: physical footprint of each PEA project; a 100-foot buffer around the footprint of each PEA project
- Indirect APE: Visual Effects delimited by the Airport Boundary and Auditory Effects which is the 65 DNL Noise Contour[77].

The APE Study Area is shown on **Figure A17**. Cultural resources are evaluated under NEPA in conjunction with the National Historic Preservation Act of 1966 (NHPA), as amended. However, state and local cultural resource laws also must be considered under NHPA. For HEF, the state authority is the Virginia Department of Historic Resources (DHR), Division of Review and Compliance. Consultation packages were provided to DHR, the County, the City and the Indigenous Nations (Catawba Indian Nation, Chickahominy Indian Tribe, Delaware Nation, and the Pamunkey Indian Tribe).

Of this group, DHR, the County, and the Catawba Indian Nation responded (**Appendix E**). The response from the Prince William County Planning Office (September 22, 2025) noted the County would participate in consultation concerning Section 106 as they are a Certified Local Government. The County also requested any visual and noise impact studies on potential effects on the Bristoe Station and Kettle Run Battlefields. The Catawba Indian Nation (October 2, 2025; November 21, 2025) responded that the Nation had no specific concerns "with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas." The Nation did request that they be notified if any Indigenous objects or human remains were found during the "ground disturbance phase of this project."

Background and literature reviews were conducted in 2024 and 2025 for historic sites (**Appendix L.1** and **Appendix L.2**) and a viewshed assessment (**Appendix L.3**). In response to DHR comments, a review of all archaeological work in the Direct APE was conducted (**Appendix L.1**). Seven

[77] The 65 DNL contour is based on the projected noise emissions associated with aircraft operations related to Alternative #2 for year 2041. See Section 5.10 Noise and Noise Compatible Land Use.

archaeological investigations within and adjacent to the Airport boundaries were identified in the background and literature review. A total of 28 archaeological sites within or adjacent to the Airport were found. Of the total, only six sites (44PW0011, 44PW0012, 44PW0013, 44PW0014, 44PW0015, and 44PW0729)[78] are within the direct or indirect APEs. Five of the sites, 44PW0011 through 44PW0015, were identified in 1978 (**Appendix L.1** and **Appendix L.2**). These five sites are on the east side of the Airport in locations that are now fully developed. The sixth site, 44PW0729, was found in 1994 on the west side of the Airport in a grassy area to the west of Project #2. The prior investigations and archaeological sites are detailed more fully in Tables 2 and 3 of the Cultural Resources Due Diligence Review in **Appendix L.2.**

No buildings/structure surveys have been completed within the Airport's boundary according to the Virginia Cultural Resource System (V-CRIS) survey plots and property listings. There are no buildings and structures in the PEA Study Area that meet the 50-year threshold for inclusion in the NRHP. As shown in **Section 4.4**, locations associated with Bristoe Station Battlefield (076-0024) and the Manassas Operations battle areas (076-5036) are present.

4.8 Land Use

This section describes the existing land use of the area in and around HEF. The Study Area for Land Use includes the entirety of the Airport plus a surrounding radius of ½ mile which encompasses both the City of Manassas and Prince William County. Applicable County and City zoning in the Study Area are shown in **Figure A19**. The Airport makes up approximately 24.5 percent of the land within the Study Area and is zoned for Airport use. Other larger zoning districts within the Study Area include agricultural (34.3 percent of the land within the Study Area), planned business districts (10.4 percent), and heavy industrial areas (9.8 percent) and light industrial areas (8.3 percent).

The Agricultural district surrounds the southern and western half of the Airport. Areas to the east, west and north of HEF are zoned as Planned Business District Heavy and Light Industrial. Industrial/Transportation zoning districts are located adjacent to the Airport, to the northwest, north and east, with a small pocket to the east next to the Planned Business District. There is one Suburban Residential district located on the east side of the Airport, to the east of Prince William Parkway, and a Planned Mixed Residential district next to the Heavy Industrial district to the northwest of the Airport.. General Business districts are located to the north of the Airport.

Major transportation routes include Route 28, (Nokesville Road), which runs east-west along the north end of the Study Area, and Route 238 (Prince William Parkway) which runs north-south on the east side of the Study Area and crosses Nokesville Road at a grade-separated interchange. The VRE runs east-west directly to the north of the Airport, and the Broad Run Train Station is located across from the northwest corner of the Airport to the south of the Railroad tracks, between Observation Road and Piper Lane.

Industrial and business activities occur on the north and east side of the Study Area. The residential area to the east, parallel to Prince William Parkway, generally consists of a suburban development with four detached single-family dwellings per acre. There is one day care, the Nanda Learning Center, which is

[78] Archaeological sites are designated in Virginia using the Smithsonian system. Using that system, the DHR has created the site's alphanumeric. 44PW0729 'translates' as 44 (Virginia, the 44th state in the alphabetical listing of states), PW (Prince William County), and 0729 (the 729th site in PW county).

located within the Study Area, adjacent to Pennsylvania Avenue between Nokesville Road and Carolina Dr (**Figure A19**). There are no other schools, places of worship, playgrounds, or other similar places of interest that would be sensitive to Land Use changes within the Study Area. **Appendix M** provides additional information regarding Land Use.

4.9 Natural Resources and Energy Supply

Natural resources (e.g., water, asphalt, aggregate, etc.) and energy use (e.g., fuel, electricity, etc.) at an airport are a function of the needs of aircraft, support vehicles, airport facilities, support structures, and terminals. Airport personnel and tenants regularly use consumable materials to maintain the airport. Those materials may include asphalt, concrete, aggregate for sub-base materials, various metals associated with such maintenance, and fuels associated with the operation of aircraft and vehicles.

Energy use at the Airport includes electricity, natural gas, aircraft fuel, and equipment fuel. Electricity is required to operate facilities (e.g., terminal building, hangars, airfield lighting). Fuel is used for aircraft (Jet-A and Avgas), aircraft support vehicles/equipment (gasoline and diesel), and Airport maintenance vehicles/equipment (gasoline and diesel). Electrical power is provided by the City of Manassas through a cooperative agreement with Dominion Power to the Airport[79]. Washington Gas Company provides natural gas services to the City of Manassas and the Airport.

The 2021 *Manassas Regional Airport Water and Sanitary Sewer Utilities Improvements Basis for Design Report* noted that the Airport is serviced by off-site potable water suppliers[80]. Water is sourced from the Potomac River and Lake Manassas and is treated at either Fairfax Water's *James J. Corbalis, Jr.* Water Treatment Plant or the City of Manassas' water treatment plant. The City of Manassas Utilities Department provides water and Prince William County Service Authority provides sewer services (**Figure A20** and **Figure A21**).

None of the natural resources the Airport uses or has used are in rare or short supply.

4.10 Noise and Noise Compatible Land Use

The FAA issued Title 14, Part 150 of the Code of Federal Regulations (14 CFR 150--*Airport Noise Compatibility Planning*) to provide a process for identifying, evaluating and addressing land uses that are not compatible with aircraft noise. These land use compatibility guidelines form the basis of the FAA's NEPA noise impact evaluation. The land uses in the vicinity of HEF are depicted in **Figure A19**. To adequately capture the effects of aircraft noise, the Noise Study Area includes the immediate airport environs, where aircraft flight paths are aligned with the runways and other potentially affected areas over which aircraft would fly. For aviation noise analyses, the cumulative noise energy exposure of individuals resulting from aviation activities must be established in terms of DNL (Day-Night Average Sound Level). Aircraft DNL values represent the sound exposure produced over a 24-hour period of aircraft activity.

[79] Dominion Energy. Dominion Power Service Areas. [Online] [Cited: February 21, 2026.] https://www.dominionenergy.com/economic-development/virginia/service-area-locator.

[80] Kimley-Horn. Manassas Regional Airport Water and Sanitary Sewer Utilities Improvements Basis of Design Report. 2021.

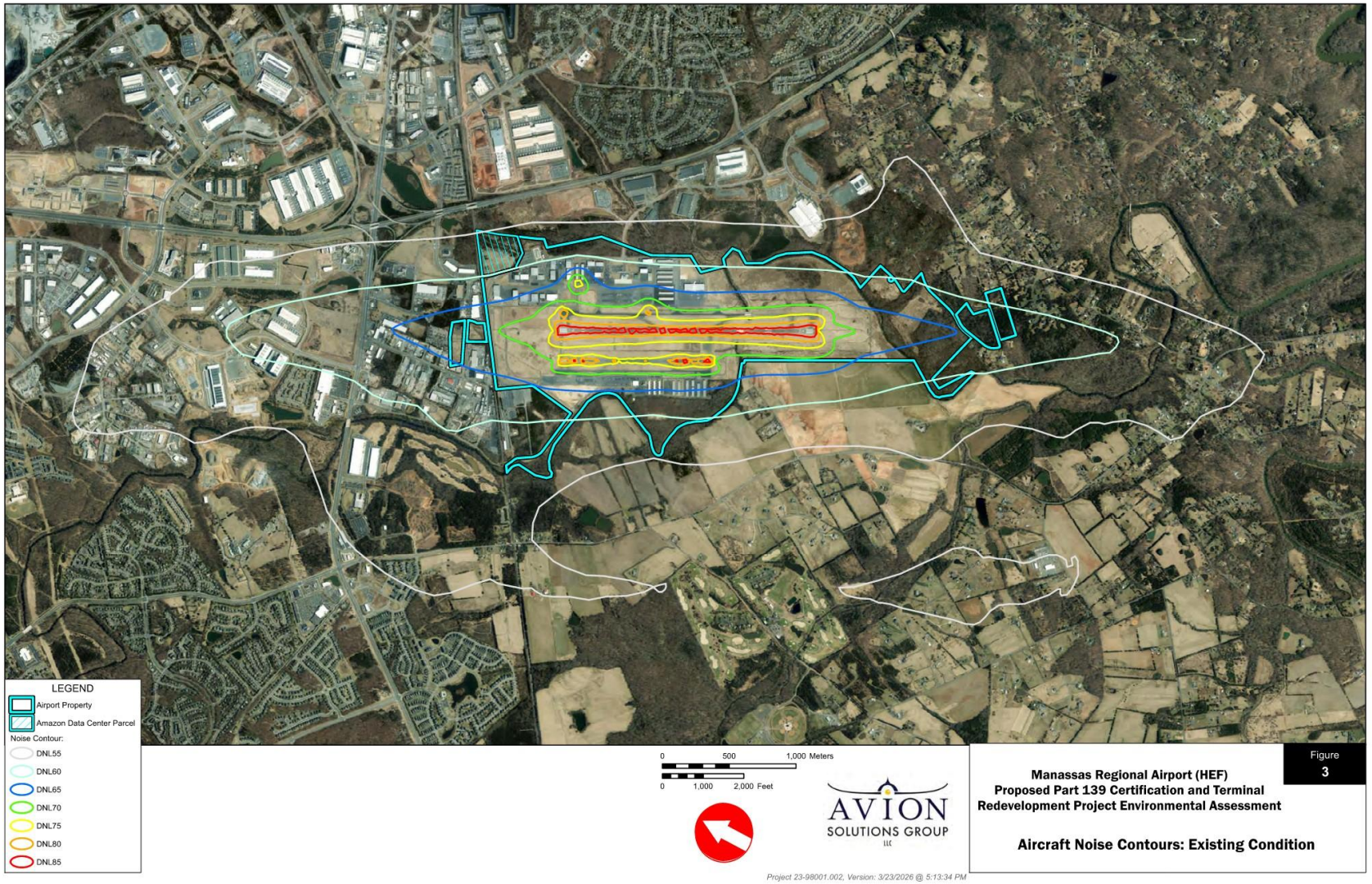
The land uses listed in Appendix A of 14 CFR Part 150 are compatible with aircraft noise below DNL 65 dBA[81]. As shown in Table 1 of the HEF Noise Technical Report (**Appendix N**), noise-sensitive land uses such as residential, mobile home parks, transient lodging, schools, and outdoor music venues are considered non-compatible with aircraft noise exposure of DNL 65 dBA or higher. Other noise-sensitive land uses such as hospitals, nursing homes, churches, auditoriums, and concert halls are compatible with noise exposure of DNL 65 to 75 dBA, provided that appropriate noise attenuation is designed into the building's structure. Commercial, manufacturing, and recreational land (parks, amusement parks, zoos, etc.) are generally less sensitive to noise and are compatible with noise exposure up to DNL 70 dBA without noise attenuation and up to DNL 80 dBA with appropriate noise attenuation.

The FAA's Aviation Environmental Design Tool (AEDT version 3f)[82] model calculates noise exposure for the area around the airport and generates contours of equal noise exposure using the DNL metric. Inputs to AEDT include the number of aircraft operations, the types of aircraft, time of day aircraft operations occur, runway orientation, frequency of runway use by arriving and departing aircraft, routes used by arriving and departing aircraft, the percentage flight routes are used, and the length of flights. These inputs were used to produce DNL 65, 70, and 75 dBA noise contours representing noise exposure for an average annual 24-hour period for conditions at HEF in Year 2023. These existing noise contours are shown in **Figure 3**/**Figure A22**. The 65-70 DNL contour encompasses 164 acres, the 70-75 DNL contour encompasses 73 acres, and the 75+ DNL contour encompasses 63 acres. The methodology and assumptions for the noise analysis, as well as details regarding the existing fleet mix are provided in **Appendix N**.

There are currently no non-compatible land uses or populations exposed to aircraft within the DNL 65 dBA contour. The existing DNL 65 dBA contour is largely confined to airport property with the exception of two acres of non-airport, industrial property located on the north end of Runways 16L and 16R. See **Appendix N** for locations of noise sensitive receptors near the Airport.

[81] dBA - Decibels weighted on the "A" weighted scale. A-weighting is applied to measured sound levels in an effort to account for the relative loudness perceived by the human ear.

[82] AEDT is a software system that models aircraft performance in space and time to estimate fuel consumption, emissions, noise, and air quality consequences.


LEGEND
Airport Property
Amazon Data Center Parcel
Noise Contour:
DNL55
DNL60
DNL65
DNL70
DNL75
DNL80
DNL85
0 500 1,000 Meters
0 1,000 2,000 Feet
AVION
SOLUTIONS GROUP
LLC
Project 23-98001.002, Version: 3/23/2026 @ 5:13:34 PM
Figure
3
Manassas Regional Airport (HEF)
Proposed Part 139 Certification and Terminal
Redevelopment Project Environmental Assessment
Aircraft Noise Contours: Existing Condition

4.11 Socioeconomics, Children's Environmental Health and Safety Risks

This section describes the existing demographics in and around the Study Area as they relate to socioeconomic conditions and children's environmental health and safety risks. The Study Area for Socioeconomics and Children's Health and Safety Risks, presented in **Figure A23,** consists of areas within a 1/2-mile radius of the Airport.

Information from the U.S. Census Bureau was used to quantify various socioeconomic factors related to socioeconomics, including population (**Table 4-3**) and housing and labor (**Table 4-4**). For comparative purposes and to provide a more regional representation of socioeconomic conditions, socioeconomic data is also provided for the City of Manassas, Prince William County, and the Commonwealth of Virginia. The socioeconomics Study Area encompasses 100.3 square miles, has a combined population of 28,604, and an average density of 285.2 people per square mile. In 2022, there were 15,624 individuals employed in the Study Area with an average unemployment rate of 2.7 percent. Housing vacancy rates were approximately 2.1 percent.

Table 4-3: Housing and Labor Force Characteristics (2022)

Area	Housing Characteristics				Labor Force[3]		
	Total Housing Units[1]	Vacancy Rate[1]	Median Household Income[2]	Average Household Size[1]	Population In Labor Force	Total Employed	Unemployment Rate
Commonwealth of Virginia	3,289,776	9.3%	$87,249	2.55	4,570,843	4,373,842	4.4%
Prince William County	152,616	3.8%	$123,193	3.13	266,052	253,905	4.7%
City of Manassas	13,840	3.5%	$110,559	3.07	23,765	22,978	3.3%
Census Tracts that contain the Study Area:	8,762	2.1%	-	3.22	16,057	15,624	2.7%
Census Tract 9013.03	1,515	0.0%	$165,815	3.24	2,986	2,943	1.4%
Census Tract 9013.04	972	2.6%	$128,929	3.41	1,771	1,616	8.8%
Census Tract 9013.05	1,259	6.0%	$181,705	3.33	2,484	2,413	2.9%
Census Tract 9014.09	2,931	2.8%	$128,029	3.24	5,091	5,004	1.7%
Census Tract 9104.02	2,085	0.0%	$148,350	3.04	3,725	3,648	2.1%

Note: Data for each full census tract is included in this assessment, even if only a portion of the census tract is within the ½ mile Study Area radius.
Source: 1) U.S. Census Bureau. "Selected Housing Characteristics." ACS, ACS 5-Year Estimates Subject Tables, Table DP04, 2022
2) U.S. Census Bureau. "Selected Economic Characteristics." ACS, ACS 5-Year Estimates Subject Tables, Table DP03, 2022
3) U.S. Census Bureau. "Age and Sex." American Community Survey (ACS), ACS 5-Year Estimates Subject Tables, Table S0101, 2022

Table 4-4: Population Characteristics (2022)

Area	Population	Area (square mile)	Density (population per square mile)	Total Population Under 18	Percent Under 18
Commonwealth of Virginia	8,624,511	42,775	201.6	1,876,826	21.8%
Prince William County	481,114	348	1,382.5	128,132	26.6%
City of Manassas	42,620	9.9	4,305.1	11,235	26.4%
Census Tracts that contain the Study Area:	28,604	100.3	285.2	6,845	23.9%
Census Tract 9013.03	5,165	1.7	3,038.2	1,412	27.3%
Census Tract 9013.04	3,235	57.0	56.8	742	22.9%
Census Tract 9013.05	4,070	30.4	133.9	790	19.4%
Census Tract 9014.09	9,046	7.4	1,222.4	2,301	25.4%
Census Tract 9104.02	7,088	3.8	1,865.3	1,600	22.6%

Note: Data for each full census tract is included in this assessment, even if only a portion of the census tract is within the ½ mile Study Area radius.
Source: U.S. Census Bureau. "Age and Sex." American Community Survey (ACS), ACS 5-Year Estimates Subject Tables, Table S0101, 2022

Executive Order 13045, Protection of Children from Environmental Health Risks and Safety Risks (62 FR 19885) directs federal agencies to identify and assess environmental health risks and safety risks that may disproportionately affect children. Because existing land uses within ½ mile of HEF are primarily Agricultural, Airport District, Industrial and Business (**Figure A19)**, it is likely that the majority of children reported within the Census Tracts live outside the Study Area. Risks to children's environmental health and safety may result from products or substances that a child may ingest or be exposed to, such as food, drinking or recreational waters, air, or soil and are considered in air quality, hazardous materials, solid waste and pollution prevention, noise and water resources. Areas of particular concern for these children's risks include residential areas, schools, day-care facilities, children's health clinics and recreational facilities. There is one day-care, the Nanda Learning Center, which is located within the Study Area, adjacent to Pennsylvania Avenue between Nokesville Road and Carolina Drive. This facility is outside the 65 DNL contour and is therefore considered compatible with aircraft noise.

4.12 Visual Effects

There are no federal statutes that are specific to visual effects. Some resources that have specific settings which may be affected by changes in their viewsheds or that require control of their ambient lighting are protected under federal, state, or local laws. Such resources may include biological resources; historic resources; Section 4f resources (parks, recreation areas, trails, wildlife/waterfowl refuges); scenic roadways/byways, National Scenic Areas, scenic easements; and Wild and Scenic Rivers,

Visual Effects consider the extent to which the proposed action 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. Recent Airport Categorical Exclusions (CATEX[83,84]), an Environmental Assessment (EA)[85], and the Master Plan Update[86] consider both light

[83] Documented CATEX, Aurora Flight Service Corporation Building Expansion and Parking Lot.
[84] Documented CATEX, Manassas Regional Airport, HEF, Manassas, Virginia, Rehabilitation of Runway 16L/34R.
[85] RS&H. 2018. Final Environmental Assessment, West Corporate Development and East Parcel Development Manassas Regional Airport.
[86] RS&H, 2025. Manassas Regional Airport Master Plan Update, Chapter 6 Environmental Overview.

emissions and visual effects. The Airport's built environment includes linear resources, existing buildings and structures, and aircraft and vehicle parking spaces.

No new types of facilities are being introduced by the PEA projects. However, Light Emission, Visual Resource, and Visual Character effects are considered as they are related to both Section 4(f) and Section 106 HAAC resources. The Study Area and APE for Visual Effects is the same for both Section 4(f) and Section 106 HAAC resources: the footprint of each PEA project, a 100-foot buffer around the footprint of each PEA project, and auditory and visual effects areas (**Figure A17**).

There are Section 4(f) recreation areas and Section 106 historic sites in the Study Area. There are no listed and eligible buildings and structures in the Study Area, but the Study Area/APE can clearly be seen by listed and eligible properties that are located upslope from the Airport in the surrounding highlands. The results of the upslope analyses are presented in the December 19, 2025, viewshed summary (**Appendix L.3**). DHR stated on January 12, 2026 "[T]he FAA has determined that the historic properties within the revised Area of Potential Effects would not be adversely affected by the proposed undertaking and DHR concurs" (**Appendix E**).

4.13 Water Resources

This section discusses water resources including wetlands, floodplains, surface waters (including Wild and Scenic Rivers, streams, rivers, ponds, and lakes), and groundwater within and around the 16 PEA projects. There are no Wild and Scenic Rivers within the Study Areas or within the Hydraulic Unit Code 8 (HUC) watersheds containing Cannon Branch or Broad Run. Therefore, Wild and Scenic Rivers were not analyzed in **Chapter 0**. See **Appendix O.2** for detailed descriptions of statutes, regulations and EOs related to wetlands, floodplains, surface waters and groundwater.

4.13.1 Wetlands

To evaluate compliance with the Clean Water Act of 1972 (33 U.S.C. ch. 23 § 1151) (**Appendix O.2**), the presence of wetlands were evaluated between March 11 and 14, 2024, June 4 and 5, 2025, and July 7 and 8, 2025 (**Appendix O.1**). The Study Area for wetlands is defined as the area of disturbance for each proposed PEA project and is comprised of the delineation area of investigation shown on **Figure 2**/**Figure A16** and an additional 100-foot buffer where wetland locations were documented but not delineated.

Seventeen wetlands totaling 16.2 acres were identified within the Study Area (**Table 4-5** and **Figure 2**/**Figure A16).** Further information regarding the delineated wetlands can be found in the United States Army Corps of Engineers (USACE) Data forms, located in **Appendix O.1.** A VDOT wetland mitigation bank ("VDOT Mitigation Site") is adjacent to the Airport, to the east of the confluence of Cannon Branch and Broad Run (**Figure 2**/**Figure A16**). The Virginia Natural Landscape Assessment (VaNLA) maps two Ecological Core areas (large patches of natural land with at least one hundred acres of interior cover) on the non-airport side of Broad Run (**Figure 2**/**Figure A16**).

The wetlands within the County do not have associated RPAs within the Study Area per correspondence with Prince William County on September 12, 2025 (**Appendix E**). Property within the City does not consider RPAs.

Table 4-5: Wetlands Occurring Within the Study Area

Field Designation	Vegetative Cover	Hydrogeomorphic Position	Acreage	Connectivity/Location
Wetland A	Forest	Riverine	3.050	Non-Isolated/Floodplain of Cannon Branch
Wetland B	Mowed Grass	Depression	0.127	Isolated/Airport Infield
Wetland C	Mowed Grass	Depression/Ditch	0.138	Isolated/Airport Infield
Wetland D	Mowed Grass	Depression/Ditch	0.065	Isolated/Airport Infield
Wetland I	Mowed Grass	Depression/Riverine	0.014	Non-Isolated/Near Taxiway and Broad Run
Wetland K	Mowed Grass	Depression	0.050	Isolated/Airport Infield
Wetland L	Mowed Grass	Depression	0.014	Isolated/Airport Infield
Wetland M	Mowed Grass	Depression	0.007	Isolated/Airport Infield
Wetland N	Mowed Grass	Depression	0.013	Isolated/Airport Infield
Wetland P	Forest	Riverine	0.097	Non-Isolated/Floodplain of Cannon Branch
Wetland Q (QA/B and QC)	Herbaceous	Riverine	0.076	Non-Isolated/Concrete Drainage Swale adjacent to Taxiway
Wetland R/S	Forest	Riverine	0.213	Non-Isolated/Floodplain of Cannon Branch
Wetland T	Herbaceous	Depression/Riverine	0.395	Non-Isolated/Floodplain of Cannon Branch
Wetland U	Herbaceous	Riverine	0.047	Non-Isolated/Floodplain of Cannon Branch
Wetland V	Herbaceous	Depression/Riverine	0.007	Isolated/Floodplain of Cannon Branch
Wetland W	Forest	Depression/Riverine	0.011	Isolated/Floodplain of Cannon Branch
Wetland X (XA, XB, XC and XD)	Herbaceous	Depression	11.9	Non-Isolated/Floodplain and Overflow Channel of Broad Run

4.13.2 Floodplains

According to the FEMA Digital Flood Insurance Rate Maps, approximately 69 acres of the Airport are mapped within the "1 percent annual chance flood" (also known as the 100-year flood) (**Figure A24**) of Cannon Branch and Broad Run. Portions of Projects #2, #6, #8, #9, #12, and #13 occur within the Broad Run 100-year flood area.

4.13.3 Surface Waters

The Airport is in the Middle Potomac-Anacostia-Occoquan Hydrologic Unit Code Watershed (HUC-8 02070010), (**Figure A24**) and is characterized by urban and suburban development. A surface water delineation was completed within the Study Area, (**Appendix O.1)** documenting two major perennial surface waters (Cannon Branch and Broad Run), one minor perennial tributary and five intermittent streams (**Figure 2**/**Figure A16**), totaling approximately 5,455 linear feet of surface water. As described in **Section 4.3**, an RPA buffer of 100 ft extends from Cannon Branch (Stream O) which would be confirmed through a Preservation Area Site Assessment (PASA) with the County. This includes an evaluation of natural resources or sensitive features on a property to ensure protection and regulatory compliance before development. In coordination with the County, the PASA would be submitted prior to construction.

Table 4-6: Surface Waters Within the Study Area

Field Designation	Name	Stream Type	Description	Delineated Length (ft)
Stream H	Broad Run	Perennial	Lower Perennial River	1,170
Stream HB	Unnamed Tributary to Broad Run	Intermittent	Drainage Channel	78
Stream J		Perennial	Concrete Lined Drainage Channel	1,095
Stream O	Cannon Branch	Perennial	Lower Perennial River	2,648
Stream OA	Unnamed Tributary to Cannon Branch	Intermittent	Flows from Wetland T	283
Stream OB		Intermittent	Flows from Wetland R/S	56
Stream OC		Intermittent	Flows from Wetland U	166
Stream OD		Intermittent	Flows from Stormwater Outfall east of Wakeman Drive	56

4.13.4 Groundwater

HEF is not in a Groundwater Management Area in Virginia[87]. No EPA Sole Source Aquifers occur within or near the Airport[88]. Potable water within the Study Area is provided by local utilities as discussed in **Section 4.9.**

Based on the Virginia Department of Health (VDH) Office of Drinking Water (ODW) data, two public water supply wells are present within a one-mile radius of the Airport: one occurring 5,430 feet from Project #2 and the other occurring 6,285 feet to Project #6 (by-pass channel)[89]. Both of the public water supply wells are higher in elevation than any of the PEA projects.

[87] State of Virginia. Administrative Code. 9VAC25-600-20. Declaration of groundwater management areas. [Online] https://law.lis.virginia.gov/admincode/title9/agency25/chapter600/section20/.

[88] United States Environmental Protection Agency. Sole Source Aquifers for Drinking Water. [Online] March 12, 2024. https://www.epa.gov/dwssa.

[89] Virginia Department of Health. Office of Drinking Water. [Online] [Cited: March 19, 2026.] https://www.vdh.virginia.gov/drinking-water/.

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5 Environmental Consequences

This chapter describes the potential impacts of the No Action Alternative, Alternative #1, and Alternative #2 (Preferred Alternative). The No Action and Alternative #1 assume aircraft operations would remain unchanged from the GA activity currently occurring at the Airport. Alternative #1 includes Projects #7, #8, and #12. Alternative #2 includes the 16 PEA projects and the introduction of commercial service and FAA Part 139 certification.

Although Alternative #2 is the Preferred Alternative, the environmental consequences of both Alternatives (#1 and #2) are compared to the No Action Alternative. The environmental consequences are discussed both in terms of construction and operational impacts. Any proposed mitigation measures to reduce the potential for environmental impacts are identified. A summary of the conclusions, permits needed before construction, and measures needed to reduce, avoid, or minimize impacts is provided in **Appendix P**. Agency Consultation letters and responses are provided in **Appendix E**.

Farmlands and Wild and Scenic Rivers were dismissed from further consideration in **Chapter 4**. The NEPA resource categories not dismissed in **Chapter 4** are discussed in **Chapter 5**.

5.1 Aviation Emissions and Air Quality

The air quality analysis adheres to the requirements of FAA Order 1050.1G, and the guidelines outlined in the Aviation Emissions and Air Quality Handbook, Version 4.

The emissions of air/precursor pollutants associated with construction and future operations at HEF were quantified for each alternative. Details regarding assumptions and methodology used to develop the air quality analysis are presented in **Appendix G.**

As described in **Section 4.1**, the proposed improvements at HEF would occur in an area designated as moderate nonattainment and as maintenance for the 2015 and 2008 O_3 standards, respectively. Therefore project-related emissions would be compared to *de minimis* levels for the O_3 precursors NO_X and VOCs. The CAA General Conformity *de minimis* thresholds for NO_x and VOCs, in a moderate nonattainment area inside an Ozone Transportation Region are 100 and 50 tons per year, respectively. Construction and operational emissions inventories were prepared for NO_X and VOCs for Alternatives #1 and #2. Additionally, for disclosure purposes, emissions of all criteria air pollutants are also presented.

5.1.1 No Action Alternative

There would be no increases in emissions for this Alternative because there would be no construction and no changes in aircraft operations.

5.1.2 Alternative #1

Under Alternative #1, there would be no changes in aircraft operations. Therefore, only construction-related emissions would be expected for Projects #7, #8 and #12. Construction would occur in the years 2027, 2028, and 2032 to 2034.

5.1.2.1 Construction Emissions

Construction activities associated with Alternative #1 would involve a variety of emissions sources, including motorized equipment, site preparation, demolition, earth-moving, and material handling.

5.1.2.1.1 Construction Equipment/Vehicle Types, Activity Levels, and Emission Factors

Emissions from motorized construction equipment/vehicle types were divided into two categories: 1) off-road equipment and 2) on-road vehicles. Off-road equipment includes the equipment that is used to move and grade fill materials, install utilities, pave runway/taxiway/apron surfaces, construct buildings, and install other miscellaneous airfield support features (e.g., scrapers, loaders, dozers, cranes). On-road vehicles include trucks for the delivery of raw materials, supplies and equipment, and personal vehicles used by construction workers commuting to and from the project site.

Estimates of construction emissions were quantified using the Airport Construction Emissions Inventory Tool (ACEIT), which provides estimates of emissions data for typical airport construction projects. Project-specific details including project size, type, and construction duration were used to estimate construction activities, types of equipment, vehicles used, operating duration, and vehicle-miles-traveled for each construction year. Emission factors for all off-road equipment (dozers, tractors, loaders, etc.) and on-road vehicles (passenger cars, delivery trucks, etc.) were developed using EPA's Motor Vehicle Emission Simulator model (i.e., MOVES, version 4)[90].

5.1.2.1.2 Fugitive Dust Emissions

Fugitive dust emissions ($PM_{10}/PM_{2.5}$) from land clearing, ground excavation, cut and fill operations, vehicle travel over unpaved roads, and wind erosion of exposed areas were estimated based on the surface area disturbed and expected duration of activity. EPA's compilation of air pollutant emission factors (AP-42) were used along with emission reductions based on expected emissions control measures[91]. Evaporative emissions (VOCs), which occur from the application of hot mix asphalt on areas requiring paving, were estimated based on EPA guidance[92].

5.1.2.2 Operational Emissions

There is no change to operations under this Alternative and therefore no related emissions changes compared to No Action conditions.

5.1.2.3 Summary of Alternative #1 Air Quality Impacts

Alternative #1 construction emissions results for CO, NOx, VOCs, SO2, PM10 and PM2.5 are provided in **Table 5-1** along with the applicable de minimis thresholds for comparison. As shown based on the results of the emissions inventory, Alternative #1 would not generate emissions that exceed the CAA General Conformity *de minimis* thresholds, therefore there are no significant air quality impacts. For more detailed information regarding the breakdown of emissions (**Appendix G**).

[90] United States Environmental Protection Agency. Latest Version of MOtor Vehicle Emission Simulator (MOVES). MOVES and Related Models. [Online] 2024. [Cited: March 20, 2024.] https://www.epa.gov/moves/latest-version-motor-vehicle-emission-simulator-moves.

[91] EPA. AP-42: Compilation of Air Emissions Factors from Stationary Sources. Air Emissions Factors and Quantification. [Online] 2024. [Cited: March 21, 2024.] https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emissions-factors-stationary-sources.

[92] EPA. Guidance on Asphalt Paving. [Online] January 2001. https://www.epa.gov/sites/default/files/2015-08/documents/iii17_apr2001.pdf.

Table 5-1: Alternative #1 Air Pollutant/Pollutant Precursor Emissions Inventory (tons/year)

Year	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC
2027	3.4	0.51	<0.01	0.39	0.05	0.15
2028	3.2	0.47	<0.01	0.39	0.05	0.15
2032	1.9	0.05	<0.01	0.07	0.01	0.02
2033	1.7	0.04	<0.01	0.07	0.01	0.02
2034	1.6	0.04	0.1	0.01	0.02	<0.01
CAA de minimis thresholds	--	*100*	--	--	--	***50***
Exceeds CAA *de minimis*?	--	No	--	--	--	No

Note: 40 CFR Section 93.153(b)(1) (general conformity *de minimis* thresholds).
"**--**" denotes *de minimis* levels do not apply.

5.1.3 Alternative #2

The Alternative #2 construction phase is scheduled to occur from 2026 through 2036 with commercial operations beginning in 2026. Therefore, operational emissions plus construction emissions were analyzed for that timeframe. Only operational emissions were estimated for the future build-out year 2041 as construction would be completed by 2036.

5.1.3.1 Construction Emissions

The construction emissions methodology is described in **Section 5.1.2.1**. Alternative #2 construction emissions were estimated for 2026 through 2036. The construction-related emissions of CO, NO_x, VOCs, SO_2, PM_{10} and $PM_{2.5}$ are included in **Table 5-2** and further detailed in **Appendix G** along with the applicable *de minimis* thresholds for comparison.

5.1.3.1.1 Operational Emissions

Alternative #2 would add aircraft operations at HEF compared to No Action and Alternative #1. Specifically, the aircraft operations reflect the anticipated introduction of commercial service beginning in 2026. In 2026, approximately 11 average daily commercial flights are anticipated, growing to 26 and 29 average daily commercial flights in 2036 and 2041. The general aviation aircraft operations at HEF are not expected to increase as a result of this alternative. Due to these changes, aircraft emissions, auxiliary power units (APUs), and ground support equipment (GSE), were estimated for 2026 through 2036, and the future build-out year 2041. Emissions associated with changes in passenger motor vehicle activities were also estimated for Alternative #2.

The operational emissions inventories for aircraft, APUs, and GSE were prepared using AEDT (version 3f). Operational emissions associated with motor vehicles were estimated using vehicle miles traveled (VMT), and emission factors from MOVES. Emissions are a function of source activity levels (e.g., aircraft operations, VMT) and emission factors (i.e., grams of pollutant per operation, grams per mile) for each source. The emission factors, air quality models, and operational data used to quantify emissions are described in more detail in **Appendix G**. **Table 5-2** includes operational emissions for 2026 through 2036 and 2041. Information regarding total project-related emissions of CO, NO_x, VOCs, SO_2, PM_{10} and $PM_{2.5}$ along with the applicable *de minimis* thresholds for comparison can be found in **Appendix G**.

5.1.3.2 Summary of Alternative #2 Air Quality Impacts

The total of the construction and operational emissions results for Alternative #2 for CO, NO_x, VOCs, SO_2, PM_{10} and $PM_{2.5}$ are provided in **Table 5-2** along with the applicable *de minimis* thresholds for comparison. Based on the results of the emissions inventory, Alternative #2 would not generate emissions that exceed the CAA General Conformity *de minimis* thresholds. Therefore, there are no significant air quality impacts. For more detailed information, see **Appendix G**.

Table 5-2: Alternative #2 Air Pollutant/Pollutant Precursor Construction and Operational Emissions Inventories (tons/year)

Year	CO	NO_x	SO_2	PM_{10}	$PM_{2.5}$	VOC
2026	71.6	43.9	3.3	9.6	1.5	5.7
2027	83.0	52.0	4.5	5.4	1.1	6.5
2028	82.5	55.1	5.0	4.1	0.9	6.6
2029	84.3	63.9	5.8	3.9	1.0	7.6
2030	85.6	71.6	6.6	2.8	0.9	8.0
2031	87.3	76.9	7.3	1.1	0.7	8.1
2032	89.4	78.5	7.4	1.2	0.8	8.2
2033	96.5	81.2	7.6	2.8	1.0	9.0
2034	94.5	82.1	7.8	1.7	0.8	8.8
2035	89.7	83.2	7.9	1.3	0.8	8.7
2036	83.1	81.3	7.7	1.3	0.8	8.9
2041[a]	88.4	92.4	8.7	1.3	0.9	9.2
CAA de minimis thresholds	--	*100*	--	--	--	*50*
Exceeds CAA *de minimis*?	--	No	--	--	--	No

Note: 40 CFR Section 93.153(b)(1) (general conformity *de minimis* thresholds).
Criteria pollutants and their precursors include carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO_2), volatile organic compounds (VOCs), and particulate matter with diameters of 10 and 2.5 microns (PM_{10} and $PM_{2.5}$).
Emissions reflect construction and the change between Alternative #2 and the No Action Alternative.
"**--**" denotes *de minimis* levels do not apply.
Motor vehicle emissions were analyzed based on the VMT for peak traffic year 2036 and applied to all years equally.
[a] Only operational emissions occur in 2041, no construction.

5.1.4 Summary of Air Quality Impacts

Changes in emissions associated with Alternative #1 are due to construction only. Changes in emissions associated with Alternative #2 are driven by both construction and the introduction of commercial service. The forecasted operations for Alternative #2 for years 2026 through 2036 and 2041 (**Appendix D, Attachment #2**) are based on conservative estimates of the number of daily operations (i.e., 52 daily arrivals and departures by 2036, and 58 daily arrivals and departures by 2041[93]). Based on the results of the emissions inventories, neither Alternatives #1 nor #2 would generate emissions that exceed the CAA General Conformity *de minimis* thresholds. Therefore, both Alternatives #1 and #2 conform with the approved SIP (**Appendix G**). As a result, there are no significant air quality impacts for either Alternative

[93] 52 daily arrivals and departures is equivalent to 26 landings and 26 takeoffs. Likewise, 58 daily arrivals and departures is equivalent to 29 landings and 29 takeoffs.

#1 or #2 and no further action is required to meet the requirements of the General Conformity Rule, and no additional analysis is needed at this time.

5.1.5 Reduction, Avoidance, and Minimization Measures

Because emissions are below the applicable *de minimis* thresholds, mitigation measures are not required for air quality. However, standard construction best management practices to minimize emissions may include reducing construction equipment idling, maintaining equipment in good working order, implementing dust control measures, and maintaining efficient construction scheduling.

5.1.6 Transportation

Alternative #2 would result in changes to the traffic demand and travel patterns in the vicinity of the Airport due to the introduction of commercial service. A Traffic Impact Study was performed to evaluate and identify potential impacts to the transportation network related to Alternative #2 and is included in **Appendix H.** The study includes a detailed analysis of the No Action and Alternative #2, assumptions, methodology, and results. Analysis is provided for weekday AM, weekday PM, and Saturday Midday under 2024 Existing conditions, 2036 (build Year) No Action and Alternative #2 operational conditions, and 2041 (build year plus five) No Action and Alternative #2 operational conditions. A construction analysis is also provided for the peak year of construction traffic activity, 2027, for Alternatives #1 and #2 and compared to 2027 No Action conditions.

The FAA has not established significance thresholds for traffic levels but suggests considering traffic to determine whether an alternative has the potential to disrupt traffic or substantially reduce LOS on roadways serving the airport or nearby communities[94]. As discussed in **Section 4.11**, LOS from A to D are considered acceptable for urban or suburban areas.

5.1.6.1 No Action Alternative

Under the No Action condition, the Airport would generate no new traffic due to PEA project construction or operations. In 2027, all unsignalized intersections within the Study Area are expected to operate at overall LOS A during the peak hours. Increases in queuing compared to existing conditions would be negligible. The intersection of Prince William Parkway and Clover Hill Road would operate at overall LOS C during the AM peak hour and D during the PM peak hour.

Prince William County has approved a diverging diamond interchange (DDI)[95], to be constructed by 2030, in place of the existing traditional signalized intersection at Prince William Parkway and Clover Hill Road, to improve safety and operations (**Appendix E**). It is unrelated to the Airport and the County has indicated it will be constructed regardless of whether the PEA projects are implemented. The DDI is included in the 2036 and 2041 No Action Traffic Analysis.

In 2036 and 2041, all unsignalized intersections would operate at LOS B or better. The new signalized DDI intersections would operate at LOS B or better during the peak hours. A detailed discussion of the No Action traffic analyses and results is presented in **Appendix H, Section 6**.

[94] FAA. 1050.1 Desk Reference. [Online] July 7, 2025. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref.

[95] A DDI is a roadway configuration where traffic on the cross street briefly shifts to the opposite side of the road as it passes through the interchange, allowing left turns onto ramps without opposing traffic. This design reduces conflict points and improves safety and traffic flow compared to conventional interchanges.

Bicycle and transit access would not change and there would continue to be no pedestrian facilities. There are no expected impacts to parking in the No Action conditions, with all Airport parking accommodated in existing on-airport lots.

5.1.6.2 Alternative #1

5.1.6.2.1 Construction

Peak construction activities due to Alternative #1 would temporarily impact traffic operations due to truck and construction worker vehicle trips to and from the Airport. The peak construction year, 2027, the year that would generate the most construction traffic, was analyzed to evaluate the short-term effects of construction traffic and to determine the potential for impacts to the roadway network.

Under 2027 Alternative #1 construction conditions, unsignalized intersections would operate at overall LOS B or better during the peak hours, similar to No Action conditions. The signalized intersection of Prince William Parkway and Clover Hill Road would operate at overall LOS D during the AM and PM peak periods. Vehicle traffic delays would increase by less than eight seconds, and the 95th percentile queues[96] would be accommodated within existing available lane storage. Traffic generated due to Alternative #1 construction would not substantially impact traffic operations or reduce overall LOS at this intersection. The increase in delay would be temporary in nature because construction traffic would decrease after 2027. A detailed discussion of the 2027 construction traffic analyses and results is presented in **Appendix H, Section 9**. Maintenance and Protection of Traffic Plans would be developed during the design phase to help control, minimize or mitigate any potential disruptions to the traveling public during construction. It is expected that traffic operations would be monitored and any measures implemented would be coordinated with the construction schedule to minimize impacts to the traveling public.

5.1.6.2.2 Operations

Alternative #1 would not generate any traffic and does not include any changes to the roadways. Therefore, there would be no changes in traffic volumes or the roadway network when compared to No Action nor any impacts to traffic operations.

5.1.6.3 Alternative #2

Alternative #2 includes changes to traffic volumes, traffic patterns, and Airport access. Project #4 would modify access to the terminal and terminal parking lot. The terminal loop road would be converted from two-way to one-way, counterclockwise, and would provide terminal building and parking lot access. The parking lot would also remain accessible via the driveway across from Harry J. Parrish Boulevard (**Figure A9**). The Economy Parking Lot in Project #5 would have two stop-controlled driveways along Wakeman Drive. (**Figure A10**). These access modifications are anticipated to be completed by 2026 and are therefore included in 2027 Alternative #2 Construction and 2036, and 2041 Alternative #2 operational analyses. **Appendix B** provides additional project details.

5.1.6.3.1 Construction

During construction, truck and construction worker trips to and from the Airport would temporarily impact traffic operations. The peak construction year, 2027, was analyzed to evaluate the short-term effects of construction traffic and to determine the potential for temporary impacts to the roadway network. The 2027 Alternative #2 Construction analysis includes 2027 No Action volumes, 2027

[96] The 95th percentile queue represents the queue length that is expected to be exceeded during no more than five percent of a peak period and is often used to size lane storage to minimize the likelihood of queued vehicles blocking other lanes.

construction vehicle trips, and vehicle trips related to Airport Operations (according to the Avports Forecast, HEF would have 15 arriving and 15 departing flights daily in 2027). In 2027, there would be 590 vehicle trips (422 in and 168 out) during the AM peak hour and 831 vehicle trips (303 in and 528 out) during the PM peak hour. Detailed trip generation, volume maps showing Construction increments, 2027 project increments, and 2027 Construction totals are included in **Appendix H.**

During construction, all unsignalized intersections would operate at acceptable LOS B or better during the peak hours, which is considered acceptable for traffic operations. The signalized intersection of Prince William Parkway and Clover Hill Road would be temporarily impacted during the AM and PM peak hours. With signal timing modifications, including adjustments to the signal cycle length and shifting seconds of green time from one intersection approach to another, the intersection would operate at LOS D, which is considered acceptable for traffic operations. The 95th percentile queues would be accommodated within existing available lane storage.

During the PM Peak hour, the Prince William Parkway and Clover Hill Road intersection operation would substantially degrade from an LOS D to LOS F, even with signal timing modifications. However, all 95th percentile queues would be accommodated within the existing available lane storage, minimizing the chances of queued traffic spilling into active lanes and blocking operation. Detailed explanations of the analysis and results are included in **Appendix H, Section 7.** The impacts due to Alternative #2 construction would be temporary in nature because construction traffic would decrease after 2027. In addition, Maintenance and Protection of Traffic Plans would be developed during the design phase to help control, minimize or mitigate any potential disruptions to the traveling public during construction. It is expected that traffic operations would be monitored and any signal timing modifications implemented would be coordinated with the construction schedule to minimize impacts to the traveling public.

5.1.6.3.2 Operations

Alternative #2 would result in an increase in traffic volumes due to Airport operations. Estimated Airport vehicle trips were generated based on the Avports Forecast for 2036 (build year) and 2041 (build year plus five years). In 2036, there would be 342 vehicle trips (223 in and 119 out) during the AM peak hour, 766 vehicle trips (381 in and 385 out) during the PM peak hour, and 740 vehicle trips (367 in and 373 out) during the Saturday midday peak hour. In 2041, there would be 348 vehicle trips (227 in and 121 out) during the AM peak hour, 761[97] vehicle trips (378 in and 383 out) during the PM peak hour, and 848 vehicle trips (428 in and 420 out) during the Saturday midday peak hour. These trips include Airport employees, Economy Parking Lot shuttle service, and customers who park, rent vehicles, take taxis/rideshares, or would be dropped off or picked up at the Airport. Trip generation and vehicle routing assumptions as well as volume maps are provided in **Appendix H.**

No significant traffic impacts are expected due to Alternative #2. As discussed in **Section 5.1.6.1**, a DDI will be constructed at the intersection of Prince William Parkway and Clover Hill Road that would improve operations and safety at that intersection by 2030. All unsignalized and signalized intersections would be expected to operate at overall LOS B or better during the 2036 and 2041 peak hours. The 95th percentile queues would increase from No Action conditions. However, all queues would be accommodated within the available lane storage. Detailed explanations of the analysis and results for Alternative #2 conditions in 2036 and 2041 are provided in **Appendix H, Section 8**.

[97] A slight decrease in total Alternative #2 increments occurred between 2036 and 2041 in the Weekday PM peak hour due to projected changes in flight schedules.

Alternative #2 would construct additional parking on the Airport property (Project #5, **Figure A9)**. The main terminal parking lot would be expanded from the existing 119 spaces to a total of 529 spaces, including 11 Americans with Disabilities Act (ADA) accessible parking spaces. The Economy Parking Lot would be constructed along Wakeman Drive (Project #4, **Figure A10**). This lot would have 647 parking spaces, including 13 ADA accessible parking spaces, and a shuttle bus station. It is anticipated that shuttle service would be provided, and it is expected to complete one round trip every 15 minutes between the Economy Parking Lot and the main terminal frontage. Combined, there would be 1,176 parking spaces available for visitors parking at the airport, enough spaces to accommodate approximately three days of parked vehicles. The employee lot would remain the same as existing with 236 spaces. All parking needs are expected to be accommodated by on-Airport parking.

5.1.6.4 Summary of Transportation Impacts

Construction of Alternative #1 would not significantly impact the transportation network. Construction for Alternative #2 would result in temporary increases in delay and queuing at the Prince William Parkway at Clover Hill Road intersection.

Alternative #1 operations would not change traffic and therefore would have no impact on the transportation network. Alternative #2 would not significantly impact traffic operations at intersections within the Study Area.

5.1.6.5 Reduction, Avoidance, and Minimization Measures

Since operation of the Alternatives would have no significant impacts on traffic, no reduction, avoidance or minimization measures are required. Construction for Alternative #2 would result in temporary increases in delay and queuing at Prince William Parkway and Clover Hill Road. Maintenance and Protection of Traffic Plans would be developed during the design phase to help control, minimize or mitigate any potential disruptions to the traveling public during construction. It is expected that traffic operations would be monitored and any signal timing modifications implemented would be coordinated with the construction schedule to minimize impacts to the traveling public.

5.2 Biological Resources

According to FAA Order 1050.1G, a project would be considered to have a significant impact on biological resources if the USFWS or NMFS determines it would likely 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 significance threshold for non-listed species.

5.2.1 No Action Alternative

The No Action Alternative would have no new impact on biological resources. No Critical Habitat nor Essential Fish Habitat are noted for the Airport; therefore, no impacts to these resources would occur.

5.2.2 Alternative #1

5.2.2.1 Construction

Alternative #1 projects require earth disturbance and new structures and would be built within areas already heavily mowed and managed for existing Airport operations. As minimal habitat for biological resources occurs in these areas, no significant impacts to biological resources are anticipated due to construction.

5.2.2.2 Operations

No change in operations would occur due to Alternative #1; thus, no significant impacts on biological resources are anticipated.

5.2.3 Alternative #2

5.2.3.1 Construction

Populations of protected species (federal and state), including migratory birds, are impacted by construction projects that remove or alter habitats. This includes the removal of existing trees, shrubs, and/or herbaceous vegetation that the species utilize for feeding, nesting, resting, and cover, and through the introduction of noxious weeds and pests. Similarly, aquatic species can be negatively impacted when water quality or substrate (e.g. stream beds) conditions are altered. Additionally, protected species can be impacted by noise, light pollution, and chemical pollution resulting from spills or sediment pollution from improper stormwater management. Potential chemical pollution impacts are discussed in **Section 5.5** and potential noise impacts are further discussed in **Section 5.9**.

Table 5-3 summarizes the 10 threatened and endangered species that have the potential to occur in the PEA project areas and identifies potential impacts, and remedies. For a species-specific habitat analysis, please see the Habitat Assessment report in **Appendix I.2**.

Table 5-3: Summary of Impacts to Threatened or Endangered Species

Common Name	Scientific Name	Status	Potential Impact	Impact Remedy
Bat, little brown	*Myotis lucifugus*	State Endangered	Permanent loss of habitat due to Project #1 Structure Removal, Project #5 Tree Removal; and temporary loss of habitat due to Project #6 Bridge Rehabilitation	Restrict clearing/structure or bridge disturbance March 15 through November 15 (includes migratory bird avoidance window).
Bat, northern long-eared	*Myotis septentrionalis*	Federal Endangered, State Endangered	Permanent loss of habitat due to Project #1 Structure Removal, Project #5 Tree Removal; and temporary loss of habitat due to Project #6 Bridge Rehabilitation	Restrict clearing/structure or bridge disturbance March 15 through November 15 (includes migratory bird avoidance window).
Bat, tricolored	*Perimyotis subflavus*	Federal Proposed, State Endangered	Permanent loss of habitat due to Project #1 Structure Removal, Project #5 Tree Removal; and temporary loss of habitat due to Project #6 Bridge Rehabilitation	Restrict clearing/structure or bridge disturbance March 15 through November 15 (includes migratory bird avoidance window).
Butterfly, monarch	*Danaus plexippus*	Federal Proposed Threatened	Minimal Habitat for *Asclepias* spp., mainly in Project #6 Bypass Channel	N/A – The action would not jeopardize the continued existence of the species.
Falcon, peregrine	*Falco peregrinus*	State Threatened	None Anticipated	Timing restriction for clearing from February 15 through July 15 for any activities within 600 ft of a nest.
Mussel, Floater, brook	*Alasmidonta varicosa*	State Endangered	Project #6 - Water quality during construction – Recent survey did not detect threatened or endangered species.	N/A – Double-tees* would allow minimum flow and stringent erosion and sediment control measures would be implemented.
Mussel, Lance, yellow	*Elliptio lanceolata*	Federal Threatened, State Threatened	Project #6 - Water quality during construction – Recent survey did not detect threatened or endangered species.	N/A – Double-tees would allow minimum flow and stringent erosion and sediment control measures would be implemented.
Shrike, loggerhead and migrant	*Lanius ludovicianus and Lanius ludovicianus migrans*	State Threatened	Project #6 – Potential Nest Disturbance	Timing restriction for clearing Project #6 from April 1 to August 31.
Sparrow, Henslow's	*Centronyx henslowii*	State Threatened	Project #6 – Potential Nest Disturbance	Timing restriction for clearing Project #6 from April 1 to August 31.
Sturgeon, Atlantic	*Acipenser oxyrinchus*	Federal Endangered, State Endangered	None, Not Present	N/A
*Pre-manufactured, prestressed concrete load-bearing structure consisting of two beam elements and a flat deck that resembles two T-beams connected to each other side by side. This provides a platform on which bridge rehabilitation work can be performed while water flow through Broad Run can continue unabated.				

Bats present within the forested area of Project #5 or utilizing the bridge over Broad Run in Project #6 may be able to relocate to similar habitats that would remain to the east of these projects (but with lower carrying capacity fewer individuals would be supported). For the bridge over Broad Run (Project #6), bats would have the opportunity to repopulate this area when construction is complete. Building 13 is

proposed to be demolished in Project #1[98] and any bats roosting in this area would also need to relocate to new buildings or the adjacent forest. A request for comment and information was submitted to the USFWS Virginia Field Office on August 4, 2025. As "proposed" endangered species are not protected by the "take" prohibitions of Section 9 of the ESA until the final rule to list is published and becomes effective. The USFWS indicated that formal consultation is not required (**Appendix E**), and no further action is necessary while the species remains at proposed status. A Determination Key (DKey) for the tricolored bat is provided in **Appendix I.5**, with a resultant determination of "may affect". Potential impacts to bat species would be avoided by restricting clearing of woody vegetation, structure removal or bridge work between April 1 and November 15. Given this, no significant impacts to the bat populations would occur.

The bridge work proposed under Project #6 was developed so that minimum water flow (determined to be 7-8 cubic feet per second [**Appendix I.6**]) would be maintained in Broad Run during construction. This minimum flow is sufficient to preserve the freshwater mussels and avoid impacts on the habitat. During construction, should water flow exceeding the minimum flow occur, the excess would be diverted into the existing bypass channel shown on **Figure 2**/**Figure A16**. **Appendix C** provides a detailed description of the proposed Project #6 construction methods to preserve mussel habitat. Concurrence on this methodology was received from Virginia Department of Wildlife Resources (VADWR) on December 18, 2025 (**Appendix C**). In addition, VADWR requested to have an opportunity to review and comment on the final Project #6 plans before construction to verify the flow monitoring plan. Given this, no significant impacts to the mussel population in Broad Run would occur.

With regards to the MBTA, the PEA projects would disturb a total of approximately 24.3 acres of potential grassland habitat; however, the only PEA project area that experiences infrequent mowing where State protected grassland bird populations (specifically loggerhead shrike and Henslow's sparrow) could be supported is Project #6. Other grassy portions of the Airport are mowed too frequently and kept too short to provide significant habitat (**Appendix I.2**). Migratory birds have the potential to be impacted by the removal of woody vegetation within Project #5 as well as the taller vegetation within Project #6. For these reasons, the restrictions to clearing woody vegetation would occur between March 15 and August 15 to protect migratory and nesting bird species. Given this, no significant impacts to the migratory bird population would occur.

5.2.3.2 Operations

The PEA project areas currently experience noise disturbance and light pollution from existing Airport operations; therefore, bat or bird species that may currently occupy the active airport grounds would be accustomed to these disturbances and further adverse effects are not anticipated to be significant. Additionally, due to the hazard presented by bird strike, wildlife populations on and around the airport are actively minimized where they may pose a threat to aviation[99]. The loss of the 12.4-acre forested area adjacent to Cannon Branch would reduce the contiguous forest in this area from approximately 60 acres to 50 acres, though it would leave approximately 450-500 ft width of forest remaining. Although the loss

[98] Building 13 is currently a mixed use vehicle maintenance building and is not designed for SRE equipment. It will be demolished to support construction of Project #1, and the current functions of Building 13 will be accommodated in the new SRE Building in Project #7.

[99] Manassas Regional Airport. Wildlife Hazard Management Plan. 2023.

of this forest would reduce the overall species carrying capacity and force interior species further inward, it leaves the minimum habitat for general forest interior species[100].

5.2.4 Summary of Biological Resources Impacts

Construction of PEA projects in Alternative #2 could affect bats, grassland and migratory birds. Disturbance to habitat for the bat species noted in **Table 5-3** would result from the removal of trees in Project #5. These bat species could also lose roosting habitat due to the disturbance to Taxiway Bravo and Runway 16L/34R bridges in Project #6, or from structure removal in Project #1. Migratory bird nesting habitat would be affected by the removal of trees in Project #5 and grassland habitat would be temporarily unusable during the re-use of the bypass channel in Project #6. Most other grassy portions of the Airport are maintained too short to provide significant habitat. No impacts to mussel species are anticipated as low-flow conditions would be maintained in Broad Run and construction work would be separated from the water by double-tee structures.

5.2.5 Reduction, Avoidance, and Minimization Measures

To avoid harm to the State listed roosting bat species, the proponent would uphold the timing restriction recommended by the USFWS and thus restrict the clearing of trees and shrubs and the removal or replacement of structures and bridges from April 1 to November 15[101]. Adherence to this restriction would avoid direct impacts to bat species. In the event the seasonal timing restriction cannot be upheld, bat surveys would be conducted in accordance with USFWS Range-wide Indiana Bat and Northern long-eared Bat Survey Guidelines. Results of this survey would be shared with USFWS, and construction would not proceed until effective strategies to avoid harm to listed bat species are formally established.

Impacts to migratory birds would be avoided by further limiting the removal of trees and shrubs between March 15 to August 15 and avoiding mowing areas with taller vegetation (bypass channel associated with Project #6) between April 1 and August 31, unless continuous mowing has occurred prior to April 1 and would continue through August 31. In the event the seasonal timing restriction cannot be upheld, field inspections for nesting migratory and grassland birds would be performed before construction to document evidence of active nesting sites or breeding behavior, in which disturbance to those areas would be avoided. Before tree clearing for Project #5, an evaluation for bald eagle and/or peregrine falcon nests would be performed. In the event a peregrine falcon nest is observed, a timing restriction would be implemented between February 15 through July 15 for any activities within 600 ft of a nest or nestbox[102]. In the event a bald eagle nest is observed, further consultation with the VADWR would take place to evaluate potential impacts.

By utilizing construction methods that would allow the seasonal low-flow of Broad Run to continue, and ensuring proper erosion and sediment controls are utilized, impacts to freshwater mussels would be minimized. BMPs would be utilized to prevent the introduction and spread of noxious weeds and pests during project implementation (**Appendix I**).

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[100] Guide to the Conservation of Forest Interior Dwelling Birds in the Chesapeake Bay Critical Area. Annapolis, MD : Maryland Department of Natural Resources, 2001. p. 58.

[101] United States Fish and Wildlife Service. Virginia Ecological Services Field Office. Northern Long-eared Bat Conservation Measures. [Online] https://www.fws.gov/office/virginia-ecological-services/virginia-field-office-online-review-process.

[102] Virginia Department of Wildlife Resources. Time of Year Restrictions and Other Recommendations. Wildlife Information and Environmental Services. [Online] September 29, 2023. https://dwr.virginia.gov/wp-content/uploads/media/Time-of-Year-Restrictions.pdf.

5.3 Coastal Resources

As noted in **Chapter 4**, consultation was initiated with agencies overseeing CBPA, CZMA, National Marine Sanctuaries and two EOs. Prince William County has adopted the CPBA. Project #5 is within the County and Project #6 may have a foreseeable effect on coastal resources within the County. On September 12, 2025, the County acknowledged that the limit of disturbance for Project #5 falls outside of the Resource Protection Area (RPA) boundary from Cannon Branch. On March 17, 2026, VADEQ confirmed that Project #6 was subject to coastal review as it may have downstream effects in the County. The correspondence and meeting notes resulting from the reviews and discussion are presented in **Appendix E.**

The FAA has not established a significance threshold for coastal resources. However, there are a number of factors that should be considered when determining if there is a significant impact. Specifically, an analysis should consider whether a project would have the potential to:

- Be inconsistent with the relevant state coastal zone management plan(s);
- Impact a coastal barrier resources system unit;
- Pose an impact to coral reef ecosystems;
- Cause an unacceptable risk to human safety or property; or
- Cause adverse impacts to the coastal environment that cannot be satisfactorily mitigated.

5.3.1 No Action Alternative

The No Action alternative assumes that HEF would continue to operate in its current state. Thus, there would be no new construction and no change in operations. The Airport would remain consistent with the current coastal zone management plan and the No Action Alternative would have no additional impact on coastal resources.

5.3.2 Alternative #1

5.3.2.1 Construction

Project #7, Project #8, and Project #12, are outside of the County and therefore there are no foreseeable effects. Thus, construction of Alternative #1 would not result in significant impacts to Coastal Resources.

5.3.2.2 Operations

As noted regarding construction, the Alternative #1 projects do not occur in the County, and the operational impacts of these projects would not affect County coastal resources.

5.3.3 Alternative #2

5.3.3.1 Construction

Alternative #2 projects require earth disturbance, new pavement, and in three cases, new buildings.

Project #5 occurs in the County and is subject to the CBPA. Although Project #6 is not in the County, it would also be subject to the CBPA as it may have foreseeable downstream effects due to construction work in Broad Run. An in-depth discussion of the CZM enforceable policies for consistency are provided in **Appendix J** and are summarized in this section.

No impacts to wetlands are proposed in Project #5 and no effects of Project #6 are anticipated to impact wetlands. Further discussion of wetlands in and around the Airport is in **Section 5.12**.

Project #5 is proximate to an RPA, but was designed to avoid the RPA, with retaining walls constructed between the parking lot and the RPA boundary. Erosion and sediment controls would be installed beyond the retaining walls to further protect the area. No impacts to RPAs are anticipated. The Prince William County Department of Environmental Management accepted this conclusion based on the submitted designs[103]. Construction within Broad Run for Project #6 would take place upstream of where Broad Run enters the County. The construction would adhere to the requirements of the appropriate water encroachment permits from VADEQ and USACE, including erosion and sedimentation control, SWPPP and SPCC plans as well as an ODCP to prevent pollution downstream.

Project #5 occurs within a wooded area that contains wildlife habitat (**Section 4.2**). Project #6 impacts Broad Run, which contains habitat for freshwater aquatic species and has been documented as containing a strong freshwater mussel population (**Section 4.2**). Impacts to wildlife are not anticipated due to the mitigative measure discussed in **Section 5.2**, specifically, implementing time of year restrictions for vegetation removal and maintaining minimum flow in Broad Run.

Operations

Project #5 and Project #6 are not anticipated to have operational effects on coastal resources. The introduction of new impervious surfaces for Project #5 and floodplain encroachment for Project #6 are discussed in **Section 5.12**. Stormwater from the impervious surfaces would be managed pursuant to the Airport's stormwater management permit and would not contribute to point or non-point source pollution for coastal resources. Floodplain encroachment would be mitigated by soil removal (floodplain balancing) in uplands within the bypass channel.

5.3.4 Summary of Coastal Resource Impacts

Permitting for the temporary impacts to Broad Run for Project #6 would be required through VADEQ and USACE. No RPAs are impacted. As such, no impacts to coastal resources are anticipated. The draft CZM consistency certification is enclosed in **Appendix J**. The analysis within the certification resulted in a determination that the activities occurring within and/or potentially affecting the coastal zone are consistent with the enforceable policies of the CZMA.

5.3.5 Reduction, Avoidance, and Minimization Measures

Alternatives #1 and #2 would not result in significant adverse impacts on coastal resources. As discussed in **Section 5.2**, timing restrictions for tree clearing in Project #5 would be implemented to avoid harm to protected wildlife species. Freshwater mussels that occur downstream of Project #6 would be protected by maintaining seasonal low flow water conditions in Broad Run during construction. Protective measures to maintain water quality would be utilized and approved through the VADEQ and USACE water encroachment permits that would be acquired prior to construction. Similar protective measures (retaining walls) would be implemented to prevent adverse impacts from occurring to the RPA adjacent to Project #5's eastern boundary. BMPs would be utilized to prevent the introduction and spread of noxious weeds and pests during project implementation.

[103] Prince William County. September 12, 2025. Email: Prince William County – Environmental Management Division, Environmental Program Manager to Avion Solutions LLC and Davey Resources Group.

5.4 Department of Transportation Act Section 4(f) and Land and Water Conservation Fund Section 6(f)

According to the DOT, two factors much be considered when determining significance of potential impacts to Section 4(f) resources 1) whether the project minimally affects a Section 4(f) resource; or 2) whether the project constitutes a "constructive use" that would impair the Section 4(f) resource. Constructive use occurs when a transportation project does not physically incorporate land from a protected resource but causes impacts that substantially impair the resource's protected activities, features, or attributes. 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"[104]. As noted in **Section 4.4**, there are no Section 6(f) resources in the Study Area. Thus, impacts to Section 6(f) resources are not evaluated.

5.4.1 No Action Alternative

The No Action Alternative assumes that HEF would continue to operate in its current state, with no new construction. Therefore, the No Action Alternative would have no impact on Section 4(f) resources.

5.4.2 Alternative #1

As detailed in the Due Diligence Report (**Appendix L.2**), the ground surface within Project #8 and Project #12 have been previously graded. The Project #7 area is currently an empty lot that was similarly graded. Projects #8 and #12 are consistent with the existing airfield pavement and would not result in changes to viewsheds or auditory conditions. In addition, the December 19, 2025 viewshed summary[105] (**Appendix L.3)** concluded that construction of the new SRE building in Project #7 would have no adverse effect to historic properties due to visual or auditory changes resulting from the proposed undertaking and DHR concurred (**Appendix E**).

5.4.2.1 Construction

The development of the Alternative #1 projects would be in line with existing Airport functions and would not introduce unique elements to the visual or auditory setting within the Study Area. Specifically, the construction actions would be confined to the Airport property, which has been heavily developed, and would not affect existing resources. The only Section 4(f) resources within the Study Area are the existing historic Manassas Station Operations (076-5036). However, given the location of the Alternative #1 projects and previous Airport development, construction activities would have no impact on the historic resource. Based on the foregoing, construction of the Alternative #1 projects would not result in significant impacts on Section 4(f) resources.

5.4.2.2 Operations

Operation of Alternative #1 would not disrupt the Section 4(f) resources identified in the Study Area. The nature of Projects #8 and #12 would be consistent with existing operations and would not affect the visual or auditory setting. Project #7, while introducing new development, would have no impact on the visual or auditory setting, as determined by the FAA with DHR's concurrence. In addition, given the highly developed nature of the Airport, and previous grading within the Study Area, there would be no

[104] FAA. 1050.1 Desk Reference. [Online] July 7, 2025. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref.

[105] Linear Projects or Features are projects such as airfield pavements, aprons, parking lots, roads, etc. that are generally flat with limited vertical development, unlike a building.

effect on the only historic resource, Manassas Station Operations (076-5036). As such, Alternative #1 would have no significant impact on Section 4(f) resources.

5.4.3 Alternative #2

As described in **Section 4.4**, the Section 4(f) resources in the Study Area include three recreational resources (Discovery Spur, Nokesville Trail and Gateway Trail; an archaeological site [44PW0729]) in the Study Area and the two battlefields (**Appendix L**). The potential for impacts related to Projects #7, #8 and #12 would be the same under both Alternative #1 and Alternative #2 and are not discussed further.

Archaeological Site (44PW0729) is a grassy area slightly southwest of Project #2. However, Project #2 has no related construction as it is limited to the relocation of aircraft. Project #2 would not affect Archaeological Site 44PW0729.

As noted in **Appendix L.2**, the Alternative #2 project areas are heavily disturbed, and none retain original, upper soils surfaces. Encountering short-term, Civil War-era camp locations or even objects related to the battle periods is unlikely. Therefore, Alternative #2 would have no physical impact on the historic battlefields in the Study Area.

With regard to visual impacts, the only other new buildings constructed would be the terminal in Project #1 and the ARFF building in Project #16. Both would be less visually intrusive than the existing terminal building. Other, taller buildings would block the line-of-sight views to/from historic and other Section 4(f) resources (**Appendix L.3**). Further, FAA concluded there would be no visual or auditory adverse effects to historic properties and DHR concurred(**Appendix E**).

5.4.3.1 Construction

The Discovery Spur and Nokesville Trail are adjacent to Route 28. The Gateway Trail segments are adjacent to Observation Road and Wakeman Drive. The trails would not be impacted by proposed project construction. Construction of Projects #4 and #5 would occur adjacent to Gateway Trail and measures would be taken to ensure the trail segment on Wakeman Drive is not obstructed during construction. Archaeological Site 44PW0729 is in an unpaved area west of the West Ramp. There would be no construction associated with Project #2; therefore, there would be no impact to this site. As such, construction of Alternative #2 would not result in significant adverse impacts on Section 4(f) resources.

5.4.3.2 Operations

There would be no impacts to Section 4(f) resources by the proposed projects. The trails are established and measures would be taken to avoid impacts to the Gateway Trail segment along Wakeman Drive during construction. Activities in Project #2 are limited to the relocation of aircraft and no construction would occur. Therefore, Project #2 would not affect archaeological site 44PW0729.

5.4.4 Summary of DOT Section 4(f) Impacts

Measures would be taken to ensure the Gateway Trail is not obstructed during the construction of Projects #4 and #5. This would include fencing and appropriate setbacks from the construction sites to the Trail. Further, the Gateway Trail segments would not be altered nor would their settings be changed, as proposed development is consistent with existing development.

The three recreational trails within the Study Area are not managed for noise (**Appendix L.1**) and therefore would not be impacted by potential auditory changes associated with Alternative #1 or Alternative #2. The trails are linear resources that have narrow footprints and the trails would not exceed the elevations of the buildings or other development proposed in Alternatives #1 and #2. While users of

the trails would be able to see the Airport and its buildings and structures, the trails were created after the Airport was constructed and in operation in the mid-1960s.

Given the highly developed nature of the Airport, it is expected that neither Alternative #1 nor Alternative #2 would impact the existing archeological site (44PW0729) within the Study Area.

Neither Alternative #1 nor Alternative #2 would result in a constructive use of the recreational trails or the battlefields within the Study Area. Further DHR concurred that no historic properties would be affected by Alternatives #1 and #2 and there would be no adverse visual or auditory impacts. As such, there would be no physical, constructive, or temporary impacts to the Section 4(f) resources.

5.4.5 Reduction, Avoidance, and Minimization Measures

Alternatives #1 and #2 would not result in significant adverse impacts on Section 4(f) resources. Measures such as fencing and appropriate setbacks from the construction site would be employed during construction to avoid impacts on the use of the trail. Therefore, no reduction, avoidance, and minimization measures are warranted for Section 4(f) resources.

5.5 Hazardous Materials, Solid Waste, and Pollution Prevention

This section assesses the potential environmental impacts arising from exposure to hazardous materials and solid waste generation and presents pollution prevention measures. In addition, this section evaluates whether there are any contaminated sites/facilities on or near the Airport. Reduction, avoidance and mitigation measures to avoid adverse impacts relating to hazardous materials, solid waste and pollution prevention are also described. The FAA has not established a significance threshold for hazardous materials, solid waste and pollution prevention; however, it identifies factors to be considered when evaluating potential environmental impacts as shown in FAA Order 1050.1G[106]. These include:

- Violations of applicable Federal, state, tribal or local laws or regulations;
- Involves a contaminated site (including but not limited to a site identified on the National Priorities List). 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 EIS is not necessarily required if impacts are mitigated below significant levels. If appropriately mitigated, actions within the boundaries of a contaminated site would not have significant impacts;
- Generation of an appreciably different quantity or type of hazardous waste;
- Generation of an appreciably different quantity or type of solid waste or use of a different method of collection or disposal and availability of local disposal capacity; or
- Adverse effects on human health and the environment.

5.5.1 No Action Alternative

Under the No Action Alternative existing Airport operations, including aircraft fueling, solid waste management and airfield maintenance activities, would continue. Since there would be no construction and demolition (C&D) activity, the No Action Alternative would not generate any potentially hazardous building materials or contaminated subsurface soil or groundwater.

[106] Federal Aviation Administration. FAA National Environmental Policy Act Implementing Procedures. FAA Order 1050.1G. June 30, 2025. Exhibit A-1. Significance Determination for FAA Actions.

Based on the foregoing, the No Action Alternative would have no impacts associated with hazardous materials and solid waste. Current pollution prevention measures would be maintained resulting in no impact under the No Action Alternative.

5.5.2 Alternative #1

5.5.2.1 Construction

5.5.2.1.1 Hazardous Materials

Hazardous materials storage on-site would temporarily increase during construction activities. Storage of these materials (petroleum and maintenance products) would conform to all applicable local, state and federal regulatory requirements.

Current and historic use of PFAS-containing AFFF may have affected soil and groundwater at HEF which may be encountered during construction. PFAS are monitored quarterly via HEF's VPDES permit. Recent monitoring shows results below EPA thresholds. Soil sampling for reuse and off-site disposal would follow applicable VADEQ and disposal facility-specific protocols, including testing for PFAS, if required. Any PFAS exceeding EPA thresholds would be disposed of off-site at a landfill permitted to accept PFAS-contaminated material.

Contaminated fill material, residual contaminants in soil and groundwater from petroleum and aviation operations may be present within and/or proximate to the Alternative #1 projects. If encountered, contaminated fill, soil or groundwater would be handled under a Soil and Materials Management Plan (SMMP), and a Construction Health and Safety Plan (CHASP) would be followed to mitigate risks to workers.

In addition, based on the age of the airport, asbestos piping associated with the existing stormwater drainage system located within the Alternative #1 project areas could be encountered. If confirmed, asbestos abatement would be conducted if necessary during any drainage modifications in accordance with a CHASP and applicable regulatory requirements.

5.5.2.1.2 Solid Waste

Alternative #1 would result in a short-term increase of 27,760 CY (or 36,088 tons) of construction solid waste. Contractors would be responsible for disposing of solid waste in accordance with all local, state and federal regulations, including characterizing all C&D debris in accordance with the Commonwealth of Virginia's Solid and Hazardous Waste Management Regulations. C&D debris projections are not yet available; however, contractors would be responsible for providing solid waste projections to local and regional facilities to ensure these facilities are permitted and have adequate capacity to accept the material.

5.5.2.1.3 Pollution Prevention

Stormwater runoff currently generated at HEF is managed through the Airport's stormwater permit (VPDES General Permit #VAR050985, renewed in 2024). Project-specific SWPPPs would be required pursuant to regulatory requirements prior to the start of construction, which would include preventative measures (inlet protection, stockpile management, etc.) to reduce impacts from stormwater runoff. Dewatering may be required for deeper excavations associated with Project #7, which would require compliance with the discharge parameters outlined in the VPDES general permit.

5.5.2.2 Operations

5.5.2.2.1 Hazardous Materials

Under Alternative #1, installation of petroleum and/or chemical USTs or ASTs for Project #7 may be required to store diesel for emergency generators, motor oils or fuels associated with SRE vehicle operations and maintenance. As design progresses based on the needs of the facility(s), any fuel storage would require compliance with applicable regulatory requirements. In addition, expanded SRE operations would increase storage of vehicle and facility maintenance products that require proper storage and handling.

5.5.2.2.2 Solid Waste

Expanded SRE operations (Project #7), would increase the quantity of solid waste anticipated from snow equipment maintenance; however, as aircraft operations would be the same as the No Action Alternative, this increase would be similar to the current maintenance activities. **Section 5.5.5** describes measures to be implemented due to operational increases in solid waste generation.

5.5.2.2.3 Pollution Prevention

An increase in paved and impervious surfaces associated with Alternative #1, as further described in **Section 5.12**, would result in a modest increase in stormwater runoff. Stormwater discharges to surface waters via the drainage network would continue to be managed under VPDES General Permit #VAR050985.

5.5.3 Alternative #2

5.5.3.1 Construction

5.5.3.1.1 Hazardous Materials

Under Alternative #2, impacts would be similar to those described under Alternative #1; however, quantities of stored hazardous materials would be higher given the increased number of PEA projects. Construction activities in Alternative #2 may expose soils and groundwater impacted by PFAS-containing AFFF. A SMMP would be implemented to manage potentially contaminated soil and groundwater (including PFAS), and a CHASP would be followed to mitigate risks to workers.

Only Project #1 includes demolition or alteration of existing buildings. The existing terminal may, although unlikely, contain hazardous building materials including asbestos, PCBs or mercury. Hazardous building materials require abatement as described in **Section 5.5.5**.

5.5.3.1.2 Solid Waste

Alternative #2 would result in a short-term increase in the generation of construction-related waste at HEF including municipal solid waste, C&D debris and excess soil that may require off-site disposal. A total of 85,580 CY (or 111,241 tons) is anticipated. Contractors would be responsible to ensure waste recycling facilities are permitted and have adequate capacity.

5.5.3.1.3 Pollution Prevention

Alternative #2 would require project-specific SWPPPs pursuant to local regulatory requirements prior to the start of construction, which would include preventative requirements to reduce impacts from stormwater runoff. In addition, potential dewatering for deeper excavations associated with Project #1, #7 and #16, would require compliance with the discharge parameters outlined in HEF's VPDES general permit.

5.5.3.2 Operations

5.5.3.2.1 Hazardous Materials

Installation of petroleum and/or chemical USTs or ASTs for Projects #1, #7, and #16 may be required to store diesel for emergency generators, motor oils or fuels associated with operations and maintenance. In addition, an increase in working quantities of maintenance products including household cleaners, paints, thinners and other products is anticipated with the operation of new buildings.

5.5.3.2.2 Solid Waste

An increase of municipal solid waste generation is anticipated; with a larger solid waste stream resulting from the operations of new or expanded buildings associated with Projects #1, #7 and #16. Operational solid waste would continue to be carted off-site to the Prince William County Municipal Landfill.

5.5.3.2.3 Pollution Prevention

Alternative #2 would result in an increase in paved and impervious surfaces as further described in **Section 5.12**, which would result in an increase of operational stormwater discharges to surface waters via the drainage network. These discharges would continue to be managed under VPDES General Permit #VAR050985.

5.5.4 Summary of Hazardous Materials, Solid Waste and Pollution Prevention Impacts

Both Alternatives would result in an increase of solid waste and potentially hazardous materials requiring proper disposal compared to the No Action Alternative. Mitigation discussed below would ensure compliance with applicable regulations and that potential discharges are prevented. Therefore, no significant impacts related to solid waste, hazardous materials or pollution prevention are anticipated due to the construction or operation of either Alternative.

5.5.5 Reduction, Avoidance and Mitigation Measures

The storage of hazardous materials associated with the two Alternatives and the installation of any future USTs, ASTs or petroleum storage would conform to all applicable regulatory requirements. Excavation activities that may encounter contaminated soil or fill would be conducted under a SMMP and CHASP to mitigate impacts to the surrounding community and the environment, and mitigate risks to workers. If dewatering is required for Projects #1, #7 and #16, groundwater would be sampled to determine if treatment is required prior to construction. Groundwater would be handled, treated and discharged in accordance with VADEQ and VPDES permit requirements. All suspected hazardous building materials encountered during the construction of the proposed PEA projects (including historic fill materials, if encountered), would be properly characterized, managed, abated or disposed of in accordance with applicable requirements. Given the use of solvents in airport operations at HEF, if needed, preventative measures may be implemented including the installation soil vapor barriers below new building slabs which would provide protection from a potential vapor encroachment condition. However, a subsurface investigation would be required for Projects #1, #7 and #16 to confirm if mitigation of a potential vapor condition is required. Containment and remedial measures for unintended releases would be addressed in accordance with VADEQ requirements and guidance in the SWPPP, SPCC Plan and ODCP. Operational elements of either Alternative that may include petroleum, chemical, glycol, AFFF storage or other potential hazardous materials would be handled and stored appropriately in accordance with prevailing requirements. Modifications to the existing SPCC, ODCP Plans and VPDES permit would incorporate new operational features subject to requirements of the respective plans and permits. In addition, appropriate BMPs outlined in FAA AC 150/5370-10H would be followed.

Solid waste and C&D debris would be handled by the contractor in accordance with applicable regulations. Projects #1, #7 and #16 would likely result in an increase in municipal solid waste generation under Alternative #2, but such waste would continue to be disposed of off-site to the Prince William County Municipal Landfill.

Agency consultation letters, dated July 31, 2025, were submitted by ASG to the Prince William County Department of Public Works and the VADEQ, who maintain regulatory jurisdiction of HEF with regard to hazardous materials, solid waste and pollution prevention. Correspondence dated August 5, 2025, indicates notice of coordination was circulated from VADEQ to additional departments within the VADEQ and other relevant State agencies for review and comment. As no responses have been received, a follow-up request was submitted by ASG on February 10, 2026; however, no further responses have been received to date from these agencies.

5.6 Historic, Architectural, Archaeological, and Cultural Resources

The FAA has no significance threshold for HAAC but requires consideration consistent with Section 106 of the NHPA of whether the proposed action would have a direct or indirect impact on historic resources. HAACs are present in the Study Area. The resources are discussed in detail in **Appendix L**.

5.6.1 No Action Alternative

Under the No Action Alternative, no demolition or construction activities would occur. Therefore, no impacts to historical, architectural, archeological, or cultural resources would occur.

5.6.2 Alternative #1

The Study Areas for the three Alternative #1 projects, Projects #7, #8 and #12, have already been disturbed from prior demolition and construction activities which lowered, filled, and regraded to depths as great as five feet (**Appendix L.2**). For example, the near surface soils have already been stripped from the proposed SRE building site due to previous Airport development beginning in the 1960s. Similarly, construction actions resulting from the original construction of Taxiway Bravo and the existing East Ramp proper have disturbed the soils in those areas (**Appendix L.2**). As a result of these prior disturbances of soils in the Alternative #1 project areas, there would be no impact.

The viewshed summary considered the viewsheds from the SRE building in Project #7 . (**Appendix L.3**). The SRE building would be 30 ft high, 17 ft lower than the existing terminal (47 ft). Heights of other buildings blocking the viewshed range from 15 ft to 44 ft. Based on the December 19, 2025 viewshed summary (**Appendix L.3**), there would be no visual effects on historic resources located within the Study Area. There would be no adverse effects to historic properties within the Study Area due to visual or auditory changes (**Appendix L.1**).

5.6.2.1 Construction

There would be no construction related effects to historic properties resulting from construction of Alternative #1. If any Native American artifacts and/or human remains are located during ground disturbance, the Catawba Nation would be notified, as requested.

5.6.2.2 Operations

There would be no effects to historic properties resulting from operations of the Alternative #1 projects.

5.6.3 Alternative #2

The only HAAC resources in the Study Area for Alternative #2 are the two battlefields (Manassas Station 076-5036 and Bristoe Station 076-0024) which represent areas of military operations related to six different Civil War battles. No earthworks or other structures made during the battles have been found during any of the archaeological investigations within the Airport. Encountering short-term, Civil War-era camp locations or even objects datable to the battle periods is unlikely during construction because of the disturbance of these project areas that has occurred since the mid-1960s.

For indirect effects, the viewshed summary considered the terminal expansion (Project #1) and the new SRE building (Project #7), and the ARFF building (Project #16). The remaining PEA projects are linear airfield pavements. The new SRE building would be a maximum height of 30 ft. The terminal expansion would be between 21 to 30 ft high and the ARFF building would be 30 ft high. The maximum height of the existing terminal is 47 ft. The blocking buildings range in heights from 15 ft. to 44 ft. The undulating terrain, transportation infrastructure (roadways and railroad) and vegetation were also considered. Based on the viewshed summary, there would be no visual effects on historic resources that are present in the Study Area (**Appendix L.3**). There would be no adverse effects to historic properties within the Study Area due to visual or auditory changes.

5.6.3.1 Construction

There would be no construction related effects to cultural resources resulting from the construction because the project areas have previously been disturbed. If any Native American artifacts and/or human remains are located during ground disturbance, the Catawba Nation would be notified, as requested.

5.6.3.2 Operations

There would be no effects to cultural resources resulting from the operation of Alternative #2 projects because the areas have already been disturbed, and the viewshed would not be impacted.

5.6.4 Summary of Historic, Architectural, Archaeological, and Cultural Resource Impacts

No cultural resources are directly or indirectly affected by Alternatives #1 or #2. As detailed in **Appendix L.2** and **Appendix L.3**, the Airport infield has been altered, and original near surface soils are no longer in place. There are no buildings and structures in the Study Area that meet the 50-year threshold for inclusion in the NRHP. Though battlefields boundaries are present in the Alternative #1 and Alternative #2 direct Study Area, due to prior disturbance and prior archaeological investigations, elements associated with the battlefields have not been encountered within the Study Area. If any Native American artifacts and/or human remains are located during ground disturbance, the Catawba Nation would be notified, as requested. DHR concurred with the FAA that no historic archaeological properties would be affected (**Appendix E**) and no adverse effects to historic properties associated with visual and auditory changes would occur. Based on the foregoing, neither Alternative #1 nor #2 would adversely impact HAAC resources. There would be no adverse effects to historic properties within the APE due to visual or auditory changes.

5.6.5 Reduction, Avoidance, and Minimization Measures

Neither of the Alternatives would significantly impact any HAAC resources. Therefore, no reduction, avoidance nor minimization measures are needed and/or proposed. If any Native American artifacts and/or human remains are located during ground disturbance, the Catawba Nation would be notified.

5.7 Land Use

The areas where the 16 PEA projects would be constructed are currently City-owned and zoned either "IA: Airport District" or "M/T Industrial/Transportation District". The FAA has not established significance thresholds for Land Use and has not provided factors to consider in the determination of significance. Land Use impacts are often dependent on the significance of impacts to other resource categories, such as aircraft noise or socioeconomics. These impacts were evaluated with their relation to Land Use. Impacts related to Noise Compatible Land Use are discussed in **Section 5.9.**

5.7.1 No Action Alternative

Under the No Action alternative, the HEF footprint would remain unchanged, there would be no changes to land use designations at the Airport. The continued operation of the Airport would not restrict or change the adjacent land uses. Therefore, the No Action Alternative would have no impact on land use on or surrounding the Airport.

5.7.2 Alternative #1

5.7.2.1 Construction

Construction of the three Alternative #1 projects, Projects #7, #8, and #12, would take place entirely within Airport property and would remain consistent with the current IA: Airport District Land Use Zoning. They would not require any changes to zoning in and around the Airport.

5.7.2.2 Operations

Airport operations would remain unchanged and therefore would remain consistent with the current IA: Airport District Land Use Zoning.

5.7.3 Alternative #2

5.7.3.1 Construction

Construction of the 16 Alternative #2 projects, other than Project #5, would take place entirely within Airport property within the City and would remain consistent with the current IA: Airport District Land Use Zoning. Construction of Project #5, also within Airport property, but in the County, would occur within the M/T Industrial/Transportation District, on undeveloped land and would remain consistent with the M/T Industrial/Transportation District Zoning. No land acquisition would occur as part of this Alternative. Land Use for Project #5 would change from undeveloped to developed land but would remain consistent with existing zoning and no other impacts to land use would occur with Alternative #2 construction.

5.7.3.2 Operations

Aircraft operations would change as a result of Alternative #2. Proposed Airport operations would remain consistent with the current zoning. Alternative #2 would be compatible with the surrounding land uses and consistent with local plans or laws related to land use and development. Additionally, no land acquisition would occur as part of this Alternative. Land Use for Project #5 would change from undeveloped to developed land but would remain consistent with existing zoning and no other impacts to land use would occur with Alternative #2 operations.

5.7.4 Summary of Land Use Impacts

All Alternative projects would be constructed on Airport property, no land acquisitions would be needed, the land use would not change, and the land use of surrounding areas would not be affected. Therefore, the Alternatives would have no significant impact associated with land use.

5.7.5 Reduction, Avoidance, and Minimization Measures

Since Alternatives #1 and #2 would have no significant impact on land use, no reduction, avoidance or minimization measures are needed and/or proposed.

5.8 Natural Resources and Energy Supply

This section presents the analysis of potential impacts to natural resources and energy supplies as a result of the No Action Alternative and Alternative #1 and Alternative #2. The FAA has not established a significance threshold for natural resources and energy supply in FAA Order 1050.1G. However, the FAA considers whether the Alternatives have the potential to cause demand to exceed available or future supplies of these resources. The Alternatives would comply with federal, state and local building codes provided in **Appendix P**.

5.8.1 No Action Alternative

Under the No Action, the Airport's use of natural materials and their energy resource providers would remain unchanged. No new facilities would be constructed that would consume natural resources or other construction materials. It is expected that small amounts of these materials would be used for general maintenance activities on the Airport.

There would be no increase in demand for electricity, as no facilities or lighting would be constructed. Existing electricity resources would continue to power the existing facilities and accommodate aircraft operations.

There would be no increase in demand for natural gas as no new facilities would be constructed. Natural gas resources would continue to be supplied to the existing facilities.

Aviation fuel demand at the Airport is a function of aircraft operating at the Airport. Aircraft fuel, Jet-A and Avgas[107], is provided to airport users by various Fixed Base Operators[108] on an as-needed basis. No new facilities would be built that would increase the demand for fuel. Current forecasts project growth in general aviation aircraft operations that 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 HEF. 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. GA operations are projected to increase for the No Action Alternative over time, which would result in an increase in fuel usage for GSE. There are adequate support facilities and supplies of Jet-A, Avgas, gasoline and diesel to accommodate the projected demand.

[107] Jet A is used by aircraft with jet engines or turbo-prop engines. Avgas is used by aircraft with reciprocating (piston powered) engines.
[108] Fixed Base Operator provides aircraft fuel and other related services on an airport.

5.8.2 Alternative #1

The Alternative #1 projects would increase the overall energy requirements of the Airport compared to the No Action Alternative. Existing utilities would be extended to serve the proposed SRE building (Project #7). Projects #8 and #12 are pavement projects and energy usage would be limited to airfield lighting and signs that would be served by the existing airfield electrical system.

5.8.2.1 Construction

The proposed construction activities would require use of steel, gravel, sand, aggregate, concrete, asphalt, water, prefabricated building components and other construction materials. These materials are not in short supply in Northern Virginia and consumption of these materials is not expected to deplete or cause a shortage of existing supplies. No unique or rare natural resources are required for construction of this Alternative.

5.8.2.2 Operations

Electricity would be needed to power and light the building and for airfield lighting. The proposed SRE building would replace the existing SRE building. The existing SRE building is 8,000 SF and the proposed SRE building is 12,000 SF, for a net increase of 4,000 SF. The net change in electricity use for the SRE building is minimal and can be accommodated with the existing supply. The new building would utilize energy conservation features. Projects #8 and #12 are both airfield paving projects that in addition to the resources mentioned above, would require the taxiway lighting system to be modified. This would require new electrical cabling, conduits and taxiway lighting fixtures and signs. These materials are in adequate supply.

The SRE building is the only project that would use natural gas. Natural gas use would be limited to building heating and water heating. The change in natural gas use for the net increase of 4,000 SF in SRE building size can be accommodated with the existing supply.

Aviation fuel demand at the Airport is a function of the number of aircraft operations. Growth in aircraft operations at HEF 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 HEF. 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. Similar to the No Action Alternative, there are no commercial operations and only general aviation operations in Alternative #1. These general aviation operations would increase over time, which would result in an increase in fuel usage for GSE. The anticipated fuel use for 2036 and 2041 for Alternative #1 is shown in **Table 5-4** below.

The existing HEF Fuel Farm consists of three 15,000-gallon tanks of Avgas (45,000 gallons total) and six Jet-A fuel tanks with a total capacity of 112,000 gallons. With this level of storage, the existing fuel farm has adequate storage to accommodate growth in general aviation operations. The HEF Fuel Farm also has fuel storage for gasoline (1,250 gallons) and diesel (1,350 gallons) used by GSE and airport maintenance equipment. Given the estimated use, there are adequate supplies of diesel and gasoline.

Table 5-4: Alternative #1 and #2 Daily Fuel Use

Build Year	Alternative #1 Daily Fuel Use (Gallons/Day)				Alternative #2 Daily Fuel Use (Gallons/Day)			
	Jet-A	Avgas	Gasoline	Diesel	Jet-A	Avgas	Gasoline	Diesel
2036	802	347	51	51	5,704	347	181	189
2041	860	374	55	53	6,352	374	204	214
Note that fuel consumption for the No Action and Alternative #1 are the same. It is assumed general aviation operations would be the same for both as there is no commercial service in the No Action Alternative and Alternative #1.								

5.8.3 Alternative #2

Commercial aircraft operations for Alternative #2 would increase fuel use and construction of these projects would increase the overall energy requirements of the Airport compared to the No Action Alternative and Alternative #1.

5.8.3.1 Construction

Alternative #2 proposed construction activities would require natural resources such as steel, gravel, sand, aggregate, concrete, asphalt, water, prefabricated building components and other construction materials. This would be a temporary demand as these materials would only be needed during construction. Furthermore, construction is anticipated to be conducted over a ten year period thereby avoiding a surge in demand of these materials that could occur if the construction period was condensed. These materials are not in short supply in Northern Virginia and consumption of these materials is not expected to deplete or cause a shortage of existing supplies. No unique or rare natural resources are required for construction of this Alternative.

5.8.3.2 Operations

Electricity would be needed to power and light the buildings, aircraft parking apron, parking lots and airfield lighting. This would require the installation and expansion of the existing electrical distribution system with new electrical cabling, conduits and taxiway lighting fixtures. These materials are in adequate supply. For the Terminal, coordination is underway with the City of Manassas to ensure adequate electrical supply is available. **Table 5-5** presents the existing and proposed electrical demand.

Table 5-5: Existing and Proposed Electrical Demand

Facility	Existing Demand (kVA*)	Existing Distribution Capacity (kVA)	Proposed Demand (kVA)	Proposed Distribution Capacity (kVA)
Existing Terminal	56	500	Not Applicable	2,950
Expanded Terminal	Not Applicable		1,516	
SRE Building	351		532	
ARFF Building	Not Applicable		160	
Terminal Parking Lot	56		225	
Economy Parking Lot	Not Applicable		188	
Total	**463**		**2,621**	
kVA stands for kilo volt-amperes				

There would be an increase in demand for natural gas for Alternative #2. Natural gas use would be needed for the Terminal building, SRE building, and ARFF building for heating and water heating purposes. The Terminal building is the most significant user of natural gas and to a lesser extent gas would be provided to the SRE building and the ARFF building. Coordination with the natural gas supplier (Washington Gas Company) has been initiated to account for the proposed addition of boilers, heating equipment, and, in the case of the Terminal, equipment for concessions. The existing natural gas service in the terminal is adequate for the proposed expansion as the terminal was originally constructed for commercial service. There is a network of gas main lines serving the Terminal and along the east side of the Airport. The ARFF building and SRE building have limited natural gas demand, and the existing system is more than adequate to accommodate these two buildings. Therefore, no additional natural gas capacity would be needed.

Aircraft fuel (Jet-A or Avgas) is provided by the Fixed Base Operators as needed by aircraft operators. Growth in aircraft operations at HEF would increase fuel consumption due to the introduction of commercial service, along with general aviation. In addition to aircraft fuel, diesel fuel and gasoline are used to power GSE and other service vehicles at HEF. The fuel requirement for GSE is related to the number of aircraft operations and the amount of time GSE needs to operate. The anticipated fuel use for 2036 and 2041 for Alternative #2 is shown in **Table 5-4**.

The existing HEF Fuel Farm consists of three 15,000-gallon tanks of Avgas (45,000 gallons total) and six Jet-A fuel tanks with a total capacity of 112,000 gallons. With this level of storage, the existing fuel farm has adequate storage to accommodate the introduction of commercial passenger aircraft and growth in general aviation operations. The HEF Fuel Farm also has fuel storage for gasoline (1,250 gallons) and diesel (1,350 gallons) used by GSE and airport maintenance equipment. Given the estimated use, there are adequate supplies of diesel and gasoline. Therefore, an expansion of the fuel farm is not required for Avgas, Jet-A, diesel or gasoline supplies.

5.8.4 Summary of Natural Resources and Energy Supply Impacts

Construction would increase the energy demand at the Airport; however, this increase would be accommodated with the existing utility system for both Alternative #1 and #2. Coordination with local energy suppliers has been initiated and there are no supply issues noted. Utility lines for water, sewer, electrical, gas and communications exist proximate to each site and would be extended from the existing network to support the proposed development without need for extensive trenching. These systems have adequate capacity and, for electrical, the distribution system would be increased to meet the projected demand. The Alternatives would be designed to current energy efficient code requirements and could also include sustainable design elements to reduce energy consumption.

5.8.5 Reduction, Avoidance, and Minimization Measures

No reduction, avoidance or minimization measures have been identified. No unique or rare natural resources were identified to be required for construction of either Alternative. Construction materials would include resources that are typically available in Northern Virginia and would not be expected to exceed current or future supplies. The Alternatives do not exceed any established thresholds of significance; therefore, no mitigation measures are required. The Preferred Alternative would be designed to current energy efficient code requirements and could also include sustainable design elements to reduce energy consumption. These elements may include energy efficient lighting and equipment, water saving features, waste reduction, and sustainable building practices. ACRP Synthesis

10, the *Sustainable Aviation Guidance Alliance Database*[109], and DOAV's *Virginia Airports Sustainability Management Plan*[110] are accepted sources of energy efficiency and sustainable approaches to facility design and operation.

5.9 Noise and Noise Compatible Land Use

This section presents the analysis of aircraft noise exposure and potential construction noise to surrounding communities. The impact of airport-related noise levels on the surrounding areas is presented in terms of the number and type of noise-sensitive land uses located within the noise contours for Alternatives #1 and #2 and the No Action Alternative for both 2036 and 2041. These years were analyzed in accordance with FAA Order 1050.1G, which specifies that an operational impact analysis should be prepared for the year of anticipated project implementation and five years after implementation[111].

A detailed discussion of the methodology and assumptions including the aircraft fleet mix and operations for the No Action and Alternatives #1 and #2 applied for the noise analysis are provided in **Appendix N**. The AEDT calculates noise exposure for the area around the airport and generates contours of equal noise exposure using the DNL metric. For this PEA, equal noise contours for DNL 65, 70, and 75 decibels on the "A" weighted scale (dBA) levels were calculated and represent average-annual day conditions for the future years 2036 and 2041.

A noise impact is significant where there is an increase of DNL 1.5 dBA or more at non-airport owned noise sensitive land uses that are already exposed to DNL 65 dBA under existing conditions or that would be newly exposed to DNL 65 dBA or more. As shown in Table 1 of the HEF Noise Technical Report (**Appendix N**), noise-sensitive land uses such as residential, mobile home parks, transient lodging, schools, and outdoor music venues are considered non-compatible with aircraft noise exposure of DNL 65 dBA or higher.

5.9.1 No Action Alternative

The following discusses the No Action Noise Contours for 2036 and 2041. For the No Action Alternatives, no commercial aircraft are included in the analysis.

5.9.1.1 Construction Noise

There would be no change in construction noise associated with the No Action Alternative.

5.9.1.2 No Action (2036) Noise Exposure Contour (Operations)

The No Action Alternative (2036) aircraft noise contours of DNL 65, 70, and 75 dBA are presented in **Figure A26** and **Figure 6** in **Appendix N.** The DNL 65+ dBA contour encompasses approximately seven acres of non-airport property, most of which is located on industrial land north of Runways 16L and 16R. The remaining portion is located on compatible agricultural land southwest of Runway 34R.

[109] Sustainable Aviation Guidance Alliance. Sustainable Principles and Practice. [Online] http://www.airportsustainability.org/

[110] Virginia Department of Aviation. Technical Report. Virginia Airports Sustainability Management Plan. July 22, 2016 [Online] https://doav.virginia.gov/wp-content/uploads/Files/DocumentLibrary/DOAV_SMP_TechnicalReport.pdf

[111] FAA. 1050.1 Desk Reference. [Online] July 7, 2025. https://www.faa.gov/about/office_org/headquarters_offices/apl/environ_policy_guidance/policy/faa_nepa_order/desk_ref.

There are no non-compatible noise-sensitive land uses within the DNL 65+ dBA contours. Therefore, no significant noise impact is expected from the No Action Alternative.

5.9.1.3 No Action (2041) Noise Exposure Contour (Operations)

The No Action Alternative (2041) DNL 65, 70, and 75 dBA contours are presented in **Figure A27**, and **Appendix N.** The DNL 65+ dBA encompasses approximately nine acres of non-airport property, most of which are located on industrial land north of Runways 16L and 16R. The remaining portion is located on compatible agricultural land southwest of Runway 34R. The No Action (2041) contours retain a similar shape as the No Action (2036) contours but are larger due to the forecasted increase in aircraft operations which would happen regardless of whether the projects occur. There are no non-compatible noise-sensitive land uses within the DNL 65+ dBA contours. Therefore, no significant noise impact is expected from the No Action Alternative.

5.9.2 Alternative #1

There are no changes or increases in aircraft operations associated with Alternative #1 compared to the No Action Alternative.

5.9.2.1 Construction Noise

Because Alternative #1 contains a subset of construction activities of Alternative #2, construction noise impacts are only analyzed for Alternative #2.

5.9.2.2 Alternative #1 (2036) Noise Exposure Contour (Operations)

Because there are no changes in aircraft operations associated with Alternative #1, the results of the Noise Exposure Contour for 2036 are the same as the No Action Alternative.

5.9.2.3 Alternative #1 (2041) Noise Exposure Contour (Operations)

Because there are no changes in aircraft operations associated with Alternative #1, the results of the Noise Exposure Contour for 2041 are the same as the No Action Alternative.

5.9.3 Alternative #2

The following discusses the Noise Contours for 2036 and 2041 for Alternative #2. For details regarding the aircraft fleet mix, see **Appendix N**.

5.9.3.1 Construction Noise

A wide range of construction equipment would be required for the proposed demolition and construction activities in Alternative #2. Noise levels for construction equipment were obtained from the FHWA-approved Roadway Construction Noise Model. International Standards Organization (ISO) 9613-2 methods were used to estimate construction equipment and vehicle traffic noise levels at receptor sites based on the distance from the construction site.

The nearest residential land uses to the project sites were used as the receptor sites as shown in **Figure A28.** The nearest residential land uses are located approximately 2,300 ft to 6,400 ft away from the project sites depending on the receptor site and the locations of the various construction projects on the Airport.

According to Section 58 of the Code of Ordinances of the City of Manassas, construction of public projects is not subject to the maximum permissible exceedances of sound levels associated with construction activities. Additionally, portions of construction would occur in Prince William County. The Prince William County Code of Ordinances also states that “construction of public projects, repair

or maintenance work for such projects, or persons performing work for private or public utilities for the repair of facilities or restoration of services shall not be subject to the levels in the maximum permissible daytime sound pressure levels contained in the ordinance."[112]

Therefore, the sound levels presented in this section of the PEA are for disclosure purposes only. For reference purposes, the maximum permissible daytime sound pressure level is 60 dBA for residential zones in Prince William County for projects that are subjected to this level. The predicted future construction-related noise levels at each noise-sensitive receptor site during the construction period is provided in **Table 5-6.** As shown, Noise Model Predicted Maximum (L_{max}) levels are below 60 dBA.

Table 5-6: Construction Noise Model Predicted Maximum (L_{max}) and Average Weekday L_{eq} Noise Levels at Select Sites

Receptor ID	Location	Construction Generated Noise										
		L_{max}	Average Weekday L_{eq} (dB(A))									
			2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036
1	Townhouses north of the airport	49.8	47.4	46.3	46.7	46.7	43.5	n/a	45.7	47.4	48.3	47.3	47.3
2	Great Oak subdivision east of the airport	52.1	50.1	49.7	49.9	49.9	46.8	n/a	48.0	49.2	49.8	47.6	47.6
3	Residence at Split Oak Lane south of the airport	59.6	44.7	55.8	55.3	55.3	51.6	n/a	48.0	53.3	49.3	44.9	44.9

5.9.3.2 Alternative #2 (2036) Noise Exposure Contour (Operations)

Figure 4/Figure A29 depicts the Future (2036) Alternative #2 DNL 65, 70, and 75 dBA contours. As illustrated, the DNL 65 dBA contour encompasses 87 acres of non-airport property, an increase of 80 acres when compared to the 2036 No Action Alternative contour. The increase in area within the DNL 65 contour is due to the expected introduction of commercial aircraft. North of Runway 16L and 16R most of the land use within the 2036 DNL 65 dBA contour is industrial and open space. Southwest of Runway 34R, the land use within the contour is agricultural but with one residential property located south of the Runway 34R on Alessi Drive. The one residential property is expected to experience an increase in DNL of 4.8 dBA compared to the No Action Alternative and would be newly exposed to DNL 65 dBA. However, with mitigation measures, such as land acquisition or sound insulation, the effects of the aviation noise can be minimized. Changes to the contours, in comparison to the No Action contours, would result from an increase in aircraft operations and a change in the aircraft fleet mix with Alternative #2.

5.9.3.3 Alternative #2 (2041) Noise Exposure Contour (Operations)

Figure 5/Figure A30 depicts the Future (2041) Alternative #2 DNL 65, 70, and 75 dBA contours. The 2041 Alternative #2 DNL 65 dBA contour encompasses 101 acres of non-airport property, an increase of 92 acres when compared to the 2041 No Action Alternative contour. The increase in area that is within the DNL 65 dBA contour is due to the expected increase in commercial aircraft operations. Most of the land within the 2041 DNL 65 dB contour is on industrial land and open space north of Runway 16L and 16R. The remaining area is on agricultural land southwest of Runway 34R and two residential properties south of Runway 34R. The residential properties, one located on Alessi Drive, and the one on Flint Rock Road, would experience an overall increase in DNL of 5.0 dBA and 5.1 dBA compared to the No Action

[112] Prince William Co. Code of Ordinances, Chapter 14 - Noise, Section 14-4 Maximum Permissible Sound Levels, https://library.municode.com/va/prince_william_county/codes/code_of_ordinances

Alternative and would be newly exposed to DNL 65 dBA (**Appendix N**). However, with mitigation measures, such as land acquisition or sound insulation, the effects of the aviation noise can be minimized. Similar to 2036, changes to the contours, in comparison to the No Action Contours, would result from an increase in aircraft operations and a change in the aircraft fleet mix with Alternative #2.

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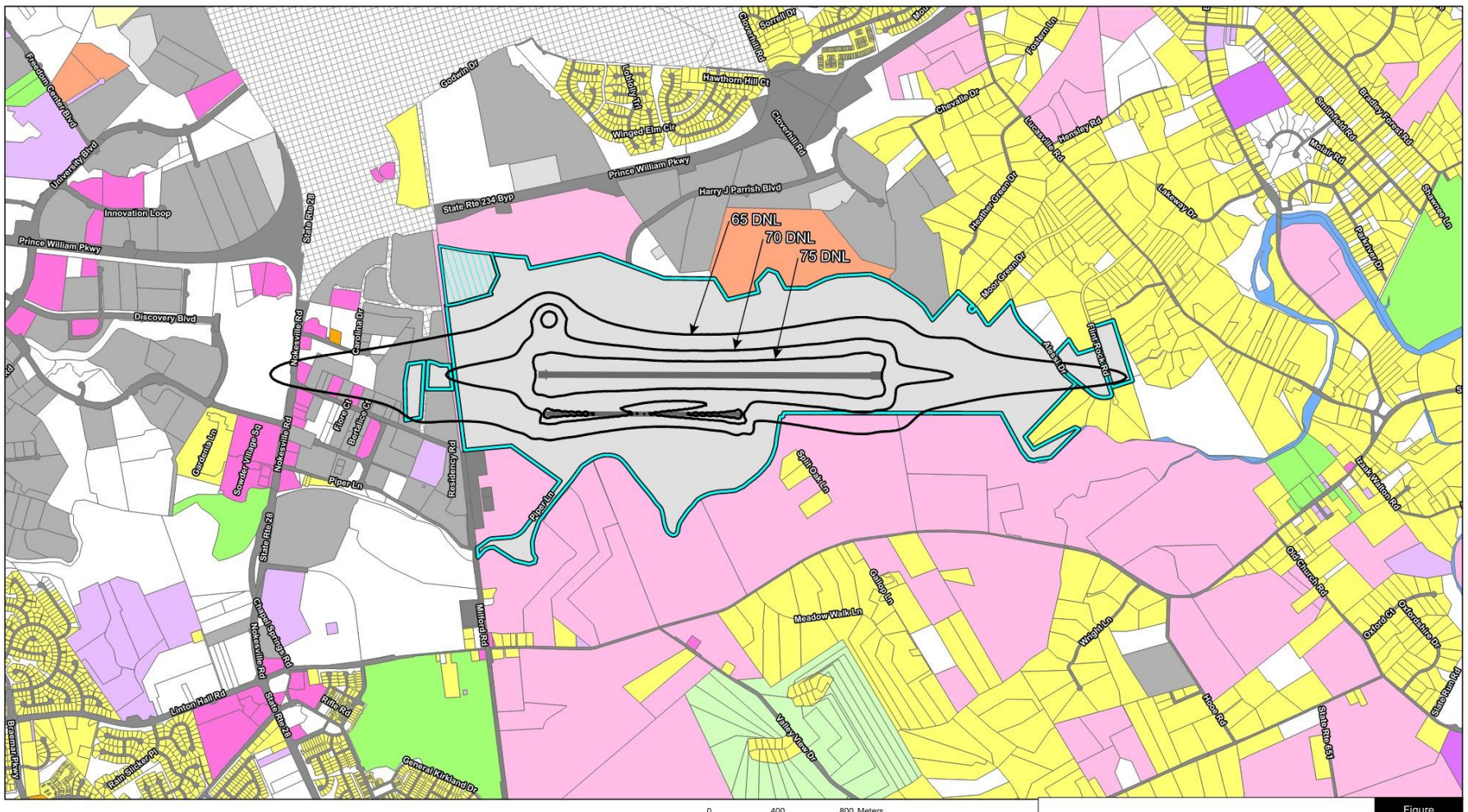

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Figure 4

Manassas Regional Airport (HEF)
Proposed Part 139 Certification and Terminal Redevelopment Project Environmental Assessment

Preferred Alternative – Alternative #2 (2036)
65-75 Noise DNL Contours

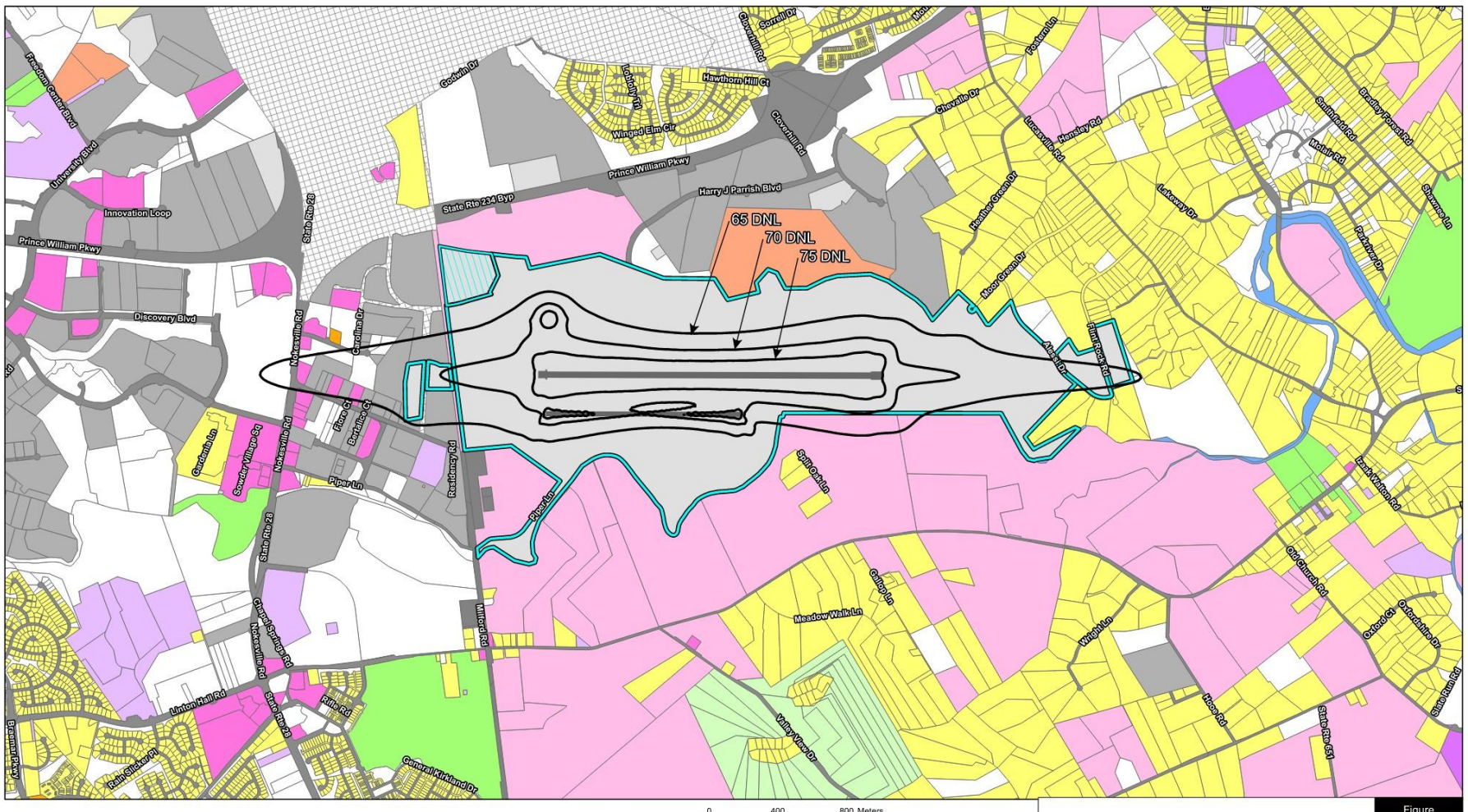

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Figure 5

Manassas Regional Airport (HEF)
Proposed Part 139 Certification and Terminal Redevelopment Project Environmental Assessment

Preferred Alternative – Alternative #2 (2041)
65-75 Noise DNL Contours

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5.9.4 Summary of Noise and Noise Compatible Land Use Impacts

The AEDT model indicates that one residential property would be within the DNL 65 dBA contour in 2036, and two residential properties within the contour in 2041. Neither of the homes are predicted to be within the DNL 65 dBA contours.

Notably, the noise analysis conducted utilizes conservative assumptions that represent worst-case scenarios. This is due to both the forecasted fleet mix assumptions and the inherent modeling assumptions within AEDT. As illustrated in Table 31 (**Appendix N**), in 2036, approximately 35 percent of commercial service are anticipated to be Airbus A320-NEO aircraft, and 12 percent A321-NEO aircraft, both of which are certified as Noise Stage 5, the quietest aircraft noise certification standard currently in effect. In 2041, these proportions increase to approximately 36 percent A320-NEO and 21 percent A321-NEO. However, it is critical to note that AEDT does not include specific noise profiles for the A320-NEO or A321-NEO aircraft. Instead, AEDT applies noise profiles for surrogate aircraft that are louder (certified to Stage 3 and 4 noise standards) and have older generation engines. Consequently, nearly half (47 percent) of the operations modeled in 2036, and more than half (57 percent) of the operations modeled in 2041 are represented by aircraft that are louder than those actually anticipated to operate at the airport. Table 31 (**Appendix N**) presents the noise stages utilized by AEDT compared to the actual certificated noise level. The actual noise stages were obtained from the most up to date source being the European Union Aviation Safety Agency.

Furthermore, AEDT incorporates additional conservative operational assumptions. For example, all departure operations are modeled at 100 percent takeoff power, whereas in practice aircraft typically operate at reduced thrust for the vast majority of departures in order to save fuel, reduce wear and tear on engines and minimize noise.

Based on the use of surrogate aircraft and AEDT's default operational assumptions, the noise modeling results presented in this PEA are conservative.

5.9.5 Reduction, Avoidance, and Minimization Measures

As noted above, with mitigation measures, such as land acquisition or sound insulation, the effects of the aviation noise can be minimized. In addition, according to the FAA 1050.1 Desk Reference, "normal residential construction can be expected to provide a noise level reduction of 20 dBA." This would place the structure under the 45 dBA interior noise threshold, as recommended by the FAA, and considered compatible with aircraft noise. The Airport is committed to reaching out to the two property owners in the future to conduct indoor noise measurements, if commercial service comes to HEF, and operational levels reach the predicted point of potentially causing adverse effects.

5.10 Socioeconomics and Children's Environmental Health and Safety Risks

The FAA has not established significance thresholds for impacts to socioeconomics and children's health and safety risks, but the following are relevant in evaluating impacts: economic activity, employment, income, population, housing, public services, and social conditions. In addition, factors that may be applicable include inducing substantial economic growth, disrupting or dividing an established community, extensive relocation of housing or businesses, disruption of local traffic patterns and significantly reduced levels of service of transportation networks, or changes in the tax base. The evaluation of children's health and safety risks impacts considers similar factors and whether the proposed actions would result in is proportionate impacts to children's health or safety risks.

5.10.1 No Action Alternative

Under the No Action Alternative, current tenants and airport users would continue to use the Airport as they do today. There would be no potential new businesses at the Airport. Therefore, there would be no changes to socioeconomic activity or children's health and safety risks.

5.10.2 Alternative #1

5.10.2.1 Construction

Total estimated construction cost of Alternative #1 is $24.5 million. Construction of the three Alternative #1 Projects (Project #7, #8, and #12) would create temporary jobs and would likely increase expenditures on local services and materials and thus support the local economy. All construction would occur within Airport property and would not impact off-Airport populations or businesses. The transportation network would be impacted by construction traffic; however, these impacts would be temporary, as described in **Section 5.1.6.2.1**

5.10.2.2 Operations

Under Alternative #1, there would be no changes to Airport operations compared to the No Action Alternative and current tenants and airport users would continue to use the Airport as they do today. Hazardous materials, solid waste and pollution prevention measures would all be handled as described in **Section 5.5.2.** There would be no potential new businesses at the Airport as a result of Alternative #1 and no changes to children's health and safety risks.

5.10.3 Alternative #2

5.10.3.1 Construction

The total estimated construction cost of Alternative #2 is approximately $190 million. The 10-year construction period would create temporary jobs and would likely increase expenditures on local services and materials, supporting the local economy. During construction, Alternative #2 would result in generation of solid waste and potentially hazardous materials requiring proper disposal. However, the recommendations discussed in **Section 5.5.5** would ensure that applicable federal, state, or local laws or regulations regarding hazardous materials, solid waste, and pollution prevention would be followed and that potential discharges are prevented or mitigated. In addition, air emissions from construction for Alternative #2 conform with the Virginia's state implementation plan, and therefore, would not adversely impact children's health and safety risks. The transportation network would be impacted by construction traffic; however, these impacts would be temporary and would be minimized with signal timing adjustments, as described in **Section 5.1.6.3.1.**

5.10.3.2 Operations

Under this Alternative, the Airport would not only continue to support existing jobs but would create new jobs through the introduction of commercial service and therefore increase economic activity. Air emissions were evaluated in **Section 5.1.** The net change in operational emissions would be below *de minimis* thresholds for all pollutants. Land use (**Section 5.7**) in the immediate vicinity of the Airport, in particular, the area through which traffic destined to the Airport would be routed, is primarily industrial in nature. The Nanda Learning Center is a day care within the Study Area on Pennsylvania Avenue (shown on **Figure A19**). Based on the traffic analysis (**Section 5.1.6.3**), this location would not be significantly impacted by vehicles traveling to and from the Airport and there would be no expectation of conflicts with children's activities. There are no other parks, playgrounds, schools, daycares within the Study Area. As discussed in **Section 5.5**, HEF is not within an area on the EPA's list of contaminated

sites that warrant further environmental investigation. In addition, none of the PEA project areas, nor any sites identified within a 0.5-mile radius of HEF have hazardous waste cleanup locations at, or within, one mile of the proposed PEA projects, and therefore would not have an impact on children's health and safety risks. Alternative #2 would also comply with all applicable water quality standards. **Section 5.5** discusses hazardous material stored on site and waste management.

5.10.4 Summary of Socioeconomics and Children's Environmental Health and Safety Risks Impacts

Alternatives #1 and #2 would not result in significant and adverse regional socioeconomic impacts. They would not relocate, displace, shift, or negatively impact established neighborhoods, businesses, other economic activity, the community tax base, public services, including utilities, recreational facilities, or educational institutions. The proposed projects are not anticipated to negatively affect property owners or businesses.

Alternatives #1 and #2 would also not result in impacts to children's health and safety risks. While the noise contours are expected to change with the implementation of Alternative #2, all properties with the exception of the outdoor areas of two residential properties are considered compatible with aircraft noise. As described above, overall economic impacts are expected to be positive in nature, including job creation and boosting economic activity. In addition, emissions of air pollutants under both Alternatives #1 and #2 would not adversely impact regional air quality. There are no anticipated adverse impacts to children's health and safety.

5.10.5 Reduction, Avoidance, and Minimization Measures

Since Alternative #1 and Alternative #2 would have no significant negative impacts on socioeconomics or children's health and safety risks beyond those articulated in other impact category sections, no reduction, avoidance nor minimization measures related to this resource category are needed and/or proposed.

5.11 Visual Effects

The FAA specifies factors to consider when evaluating Light Emission effects and Visual Resource and Character Effects. Light Emissions Effects factors are the degree to which the action would have the potential to 1) create annoyance or interfere with normal activities from light emissions; and 2) affect the visual character of the area due to the light emissions, including the importance, uniqueness, and aesthetic value of the affected visual resources. Visual Resources and Visual Character Effects factors are the degree to which the action would have the potential to 1) affect the nature of the visual character of the area, including the importance, uniqueness, and aesthetic value of the affected visual resources; 2) contrast with the visual resources and/or visual character in the Study Area; and 3) to block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations.

Light Emission Effect factors were addressed because some of the PEA projects include airfield lighting, and lighting around buildings and parking lots. Lighting would be in accordance with FAA lighting guidance and standards. The guidance controls the direct impact area for light emissions, defined as the light cone emitted by a light fixture or massed fixture array. Visual Resources and Visual Character Effects also were subjectively considered. The first factor, would the PEA affect the nature of the visual character of the area, is not applicable. Projects #7 and #16 are introducing two new buildings into the

Airport setting and Project #1 is expanding the existing terminal, but all have Airport support functions and do not break the view plane already created by the existing terminal building. The remaining PEA projects are linear in nature. Overall, the PEA projects are not changing the setting or the visual character of the Airport.

Similarly, the PEA projects do not contrast with the visual resources or visual character of the Study Area. The Study Area extends outside of the Airport boundary into light industrial/commercial, agricultural, or dispersed residential settings (**Figure A19**). None of the settings are unique, important, or have high aesthetic value.

The last factor, "to block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations" required analyses that are detailed in **Appendix L.3**. There are Section 4(f) recreation areas and Section 106 historic sites in the Study Area/APE. The analyses focused on whether any of these resources had protected settings and were subject to ambient lighting controls.

5.11.1 No Action Alternative

The No Action Alternative does not change the setting of the Airport or its location, nor would it change the structures and features of the Airport (two runways, taxiways, taxilanes, and ramps, support building and structures, and businesses that provide aircraft services). Therefore, this Alternative would have no visual impacts.

5.11.2 Alternative #1

Projects #8 and #12 are linear projects. Project #7 would change the setting because it introduces a new building and structure into the viewshed. However, views to the project, from the east and south, would be masked by the existing hangars, and the existing railroad to the northeast. Lighting associated with each project would conform to FAA guidance and would be similar to existing lighting at the Airport.

5.11.2.1 Construction

Visual Effects associated with the construction of Alternative #1 would be short-term and confined to the construction area of each Alternative #1 project.

5.11.2.2 Operations

Alternative #1 would alter the viewshed by introducing the new 30 ft high SRE building, widening an existing taxiway, and constructing a new ramp. The viewshed summary indicated that the view of the SRE building to the east and north is blocked by undulating terrain, transportation infrastructure (roadways and railroad) and vegetation. The linear structures would not disrupt the visual character of the Airport because they are consistent with other existing Airport structures, including ramps, taxiways, and runways. Further, FAA concluded there would be no visual or auditory adverse effects to historic properties and DHR concurred (**Appendix E**).

5.11.3 Alternative #2

Alternative #2 would change the setting of HEF by adding Projects #1, #7, and #16, and demolishing Building 13 in Project #1. The terminal expansion in Project #1 would be shorter than the existing terminal. A terrain-based analysis using ground-level imagery identified potential visibility extending well beyond the airport boundary, but did not account for existing standing structures. Light emissions from the new terminal would be managed in the same manner as those of the existing terminal.

Project #5 would require tree removal, which would alter the viewshed for residences east and southeast of the project location. With two exceptions, these residences are outside of the Study Area (**Appendix L.3**). Roads, commercial and light industrial buildings also block views of the projects on the north, east, and south of the Airport. To the west, development is concentrated uphill along Bristow Road (**Appendix L.3**). The area between Bristow Road and HEF's west boundary is agricultural.

5.11.3.1 Construction

Visual effects associated with the construction of Alternative #2 projects would include the demolition of Building 13 in Project #1; the exterior modifications to the existing terminal with the introduction of the terminal extension and walkway also in Project #1; and the introductions of the new SRE building (Project #7) and ARFF building (Project #16).

5.11.3.2 Operations

Alternative #2 would introduce three new buildings into the viewshed (the terminal extension and walkway, and the SRE and ARFF buildings), as well as new linear features including parking lots (Projects #4 and #5), and modifications to existing linear structures including bridges. The viewshed summary found that the view of the new buildings would be blocked by higher buildings, changes in line-of-sight, and view distances (**Appendix L.3**). Lines of sight are blocked by buildings, transportation infrastructure, vegetation, and changes in topography east, north, west, and south of the Airport (**Appendix L.3** for details). The linear structures add to but do not disrupt the visual character of the Airport because they are consistent with other existing Airport structures, including ramps, taxiways, and runways. Further, FAA concluded there would be no visual or auditory adverse effects to historic properties and DHR concurred (**Appendix E**).

5.11.4 Summary of Visual Effects Impacts

Due to the existing light emissions at HEF the light emissions from Alternative #1 and #2 are not expected to be noticeably different from the Airport's existing lighting and would not cause annoyance or disrupt normal activities of the surrounding community. Therefore, lighting from Alternatives #1 and #2 would not significantly increase the overall light emissions due to their type, intensity, and distance from residential areas. Light emissions would be managed for Alternatives #1 and #2 in accordance with FAA lighting standards. Based on the results of the viewshed summary (**Sections 4.3, 4.7,** and **4.12** and **Appendix L)** no historic properties would be adversely affected by Alternatives # 1 or #2. Further, no Section 4(f) recreational areas would be affected by Alternatives #1 or #2.

5.11.5 Reduction, Avoidance, and Minimization Measures

Since Alternatives #1 and #2 would have no significant impacts to visual resources, no reduction, avoidance nor minimization measures related to this resource category are needed and/or proposed.

5.12 Water Resources

This section evaluates the potential impacts of the three alternatives on water resources, including wetlands, floodplains, groundwater and surface water.

Wetlands: In accordance with FAA Order 1050.1G, Exhibit A-1, the FAA considers an action "significant" for wetlands if it would (in general) cause or promote adverse effects on a wetland's functions and values; alter the wetland hydrology; reduce floodwaters retention or storm runoff; adversely affect wildlife and fish habitat or economically important resources; or be inconsistent with applicable state wetland strategies.

Floodplains: An action would be significant if it "would cause notable and adverse impacts on natural and beneficial floodplain values" as defined in Paragraph 4.k of DOT Order 5650.2, by which Federal agencies are directed to "avoid conducting, allowing or supporting actions on the base floodplain unless the agency finds that the base floodplain is the only practicable alternative location."

Surface Waters: An action would be significant if it would "exceed water quality standards established by Federal, state, local, and tribal regulatory agencies; or contaminate public drinking water supply such that public health may be adversely affected."

Groundwater: An action would be significant if it would exceed groundwater quality standards established by Federal, state, local, and tribal regulatory agencies or contaminate an aquifer used for public water supply such that public health may be adversely affected."

5.12.1 No Action Alternative

Under the No Action Alternative, no new impacts to water resources would occur because there would be no new construction and no changes to Airport operations.

5.12.2 Alternative #1

5.12.2.1 Construction

Surface Waters: No surface waters occur in the vicinity of any of the Alternative #1 projects.

Wetlands: A small (0.13-acre) herbaceous wetland (Wetland B) occurs in the area of Project #7 (**Figure 2**/**Figure A16**) and would be permanently removed as part of the project. This wetland provides minimal functions and values with respect to denitrification, sediment retention and biodiversity because it is isolated, regularly mowed and surrounded by active airport operations.

A VADEQ Virginia Water Protection General Permit would be obtained prior to removal of Wetland B. Since more than 0.1 acre of wetlands would be impacted by Project #7, mitigation for the loss of this wetland would be required at a 1:1 ratio (VADEQ/USACE Pre-application Meeting Minutes in **Appendix O.3**). HEF would satisfy this mitigation requirement by purchasing wetland mitigation credits, as has occurred for previous Airport improvement projects[113] through a local mitigation bank. Numerous banks are available in the area to support the purchase of the 0.13 credits required (e.g. the Laws Ford Bank has 4.37 credits available, and the Foggy Bottom Bank has 12.77) (**Appendix O.4**). No federal wetland permits are required due to the isolated nature of the wetland, but an Approved Jurisdictional Determination (AJD) would need to be obtained prior to construction. Because removal of Wetland B would be permitted by VADEQ and mitigation for the loss of this wetland would be secured prior to construction, no significant impact to wetlands would be expected from construction of Alternative #1 projects.

5.12.2.2 Operations

Surface Water: Alternative #1 would increase the area of impervious surfaces at HEF by under four acres. This would cause additional discharges of stormwater to the existing stormwater management system (Airport stormwater permit #VAR050985), and a negligible reduction in water entering the groundwater. Stormwater that currently collects in Wetland B (**Figure 2**/**Figure A16**) would be discharged to the storm sewer after construction of Project #7. Increased impervious surfaces would be mitigated through proposed underground detention systems. The underground detention area would

[113] RS&H, Inc. Final Environmental Assessment - West Corporate Development and East Parcel Development. 2018.

include drainage structures constructed in the airfield infield area between Runway 16L/34R[114] and Taxiway Bravo (**Figure 2**/**Figure A16**). These structures would be sized to accept the expected stormwater volumes and placed and designed to meet FAA standards. This system would be incorporated into the Airport's stormwater permit (**Appendix O.5**).

Floodplains: Projects #8 and #12 are airfield pavement projects that occur within existing and actively used portions of the Airport, immediately surrounding and/or between existing paved surfaces, including runways and taxiways. As the Airport currently maintains airfield operations (runways and taxiways) within, but elevated from, the one percent annual floodplain of Broad Run, no practicable alternatives exist to improve and expand existing airport infrastructure without siting such improvements and expansions in the floodplain. Alternative #1 is at a planning stage of development and advanced engineering designs have not yet been developed; however, at the current level of design, Project #8 and Project #12 would require the placement of fill within the one percent annual chance flood mapped areas (**Figure A24**) to raise surfaces above the base flood elevation. Floodplain impacts due to these projects would amount to 0.2 percent of the flood-mapped areas of the Airport (**Figure A24**).

As a mitigative measure, calculated increases in flood elevations would be offset by soil removal (floodplain balancing) in uplands within the bypass channel (**Figure 2**/**Figure A16**), resulting in no net rise and no increase in the 1 percent annual chance flood elevation. As such, the floodplain changes would not contribute to the loss of human life, would not carry substantial encroachment costs, nor would it result in notable adverse impacts on floodplain values.

A consultation letter was submitted to FEMA, and a response was received on August 20, 2025, (**Appendix E**) stating that guidance from the local floodplain administrator should be followed.

The local floodplain administrator for this portion of the Airport is the City of Manassas. The City of Manassas Engineering Department was contacted and provided a response on March 27, 2026, indicating the proposed development is consistent with the City's Comprehensive Plan and the HEF Master Plan and that floodplain impacts would need to comply with FEMA's National Flood Insurance Program requirements. (**Appendix E**). Necessary Conditional Letter of Map Revisions (CLOMR) would be coordinated with FEMA when those details are available. With the adherence to stormwater management criteria consistent with water quality protection provisions of 9VAC25-875-740 and 9VAC25-875-80 and -260 of the *Virginia Erosion and Stormwater Management Regulations*, in conjunction with following the approved SWPPP, SPCC, and ODCP plans, it is not anticipated the construction of these projects would significantly impact water resources in and around the Airport.

5.12.3 Alternative #2

5.12.3.1 Construction

Multiple wetlands, surface waters and portions of floodplains occur within and surrounding Alternative #2.

Surface Waters: Project #6 would involve the permanent installation of an eight-inch thick Mechanically Stabilized Earth (MSE) wall secured into the channel banks with dowel nails beneath each bridge. Existing rip-rap at the bridges would be removed during construction and replaced afterward. During construction, equipment would need to work within, above and adjacent to the stream. To accomplish

[114] The stormwater detention system will be designed in accordance with FAA Advisory Circular (AC) 150/5300-13b, *Airport Design*, and FAA AC 150/5320-5D *Airport Drainage Design*. The proposed system would be designed to resist loading of the critical aircraft (737-800).

this without impacting water quality, precast concrete double-tees (platforms) would be temporarily installed within the approximately 1,170-foot length of streambed where work would occur. The double-tees would allow the waters of Broad Run to continuously flow as it would during seasonal low-flow conditions, (7-8 cubic feet per second as detailed in **Appendix I.6**) to maintain mussel habitat. A detailed summary of this construction methodology is provided in **Appendix C.**

Wetlands: The bypass channel would be utilized to carry additional flow in excess of the seasonal low-flow, which may exceed the capacity of the double-tees. During these periods of high flow or storm surge, the excess flow would be diverted to the bypass channel, where Wetland X occurs (**Figure 2**/**Figure A16**). When the bypass channel is used for excess flow, Wetland X would be subject to flow. This wetland currently provides the same function during Broad Run's heavy flood events and thus is already adapted to this occasional flow (**Appendix O.1**). Temporary impacts may also occur to offsite portions of Wetland I (**Figure 2**/**Figure A16**), as this area may need to be temporarily disturbed for equipment access during construction. These temporarily impacted wetlands would be restored. The restoration work may include application of a wetland grass seed mix and subsequent monitoring to ensure proper germination, as discussed with USACE and VADEQ during the pre-application meeting (**Appendix O.3**).

As with the permanent removal of Wetland B discussed under Alternative #1, Alternative #2 requires the permanent removal of two additional wetlands for the construction of Project #14 (Wetland C) and Project #15 (Wetland D) (**Figure 2**/**Figure A16**). Wetlands C and D are ditches that channel water from paved surfaces to storm sewer drains. Like Wetland B, these wetlands are isolated, heavily mowed and surrounded by active airport operations and therefore provide minimal wetland functions and values.

Cumulative impacts to wetlands and surface waters (Wetland B, C, and D and Stream H**)** would be permitted through a VADEQ Individual Permit (IP) since overall wetland impacts would exceed two acres. As the overall permanent wetland impacts would exceed 0.1 acres, the loss of the additional 0.33 acres of wetlands would require mitigation at a 1:1 ratio pursuant to VADEQ requirements (**Appendix O.3**). This requirement would be satisfied by purchasing credits through a local mitigation bank, as has been done on previous projects at the Airport[115]. Numerous banks are available in the area to support the purchase of the 0.33 credits required, as noted in **Section 5.12.2.1.**. At the federal level, wetland and surface water impacts would be permitted under a USACE Nationwide Permit (NWP) or State Programmatic General Permit (SPGP), based on final impacts amounts. No USACE Permits would be required for removal of Wetlands C and D, but an AJD would need to be obtained prior to construction. Cumulative wetland and surface water impacts and permitting pathways associated with Alternative #2 are summarized in **Table 5-7**. Further permitting details are discussed in the VADEQ/USACE Pre-Application Meeting Minutes (**Appendix O.3**). Specific conditions of these permits would allow for these temporary and permanent impacts and would outline the conditions required to generate no further water quality issues, including their restoration, in conjunction with adhering to the previously discussed SWPPP, SPCC and ODCP plans, and the existing VPDES permit, etc. With the implementation of these plans, impacts to water resources due to increased runoff are not anticipated and no impacts to water resources are anticipated due to construction.

[115] RS&H, Inc. Final Environmental Assessment - West Corporate Development and East Parcel Development. 2018.

Table 5-7: Impacted Wetlands and Streams

Field Designation	Impact Type	Mitigation Requirement	Federal Permit Required	Acreage (ac) /Length (ft)
Wetland B	Permanent Removal	1:1	AJD	0.13 ac
Wetland C	Permanent Removal	1:1	AJD	0.14 ac
Wetland D	Permanent Removal	None – Below 0.1-acre	AJD	0.065 ac
Wetland I	Temporary	None - Wetland would be restored	NWP or SPGP	TBD
Wetland X	Temporary	None - Wetland would be restored	NWP or SPGP	8.97 ac
Stream H	Permanent Temporary	None: The MSE wall and rip-rap would occur within the existing rip-rap footprint	NWP or SPGP	1,170 ft

The VDOT Mitigation Site and the Ecological Core areas are downstream of this action (**Figure 2**/**Figure A16**); however, there would be no hydrologic impacts because standard low-flow conditions would remain in Broad Run. No impacts are expected to these areas during construction of Alternative #2.

5.12.3.2 Operations

Surface Water: Operational impacts of Alternative #2 would occur from the effects of increased stormwater discharges to the Airport's stormwater system (#VAR050985) due to an increase in impervious surfaces at HEF (approximately 26 acres). Increased impervious surfaces would be mitigated through proposed underground detention systems. The underground detention systems would be constructed in the airfield infield area between Runway 16L/34R[116] and Taxiway Bravo (**Figure 2**/**Figure A16**), at the Economy Parking Lot, and the Terminal Parking Lot. These structures would be sized to accept the expected stormwater volumes and placed and designed to meet FAA standards. This system would be incorporated into the updates to the Airport's stormwater permit (**Appendix O.5**).

Floodplains: Project #5 avoids all regulated floodway areas associated with Cannon Branch (**Figure A24**). Projects #2, #6, #8, #9, #12 and #13 (**Table 5-8**) contain portions that occur within the one percent annual chance flood-mapped areas of Broad Run. All of these are airfield projects, not buildings and as the Airport currently maintains airfield operations (runways and taxiways) within, but elevated from, the 1 percent annual floodplain of Broad Run, no practicable alternatives exist to improve and expand existing airport infrastructure without siting such improvements and expansions in the floodplain.

Alternative #2 is at a planning stage of development and detailed engineering designs are not completed; however, at the current level of design, Project #8, Project #12 and Project #13 would require the placement of fill within the one percent annual chance flood mapped areas (**Figure A28**) to raise surfaces above the base flood elevation. Floodplain impacts due to these projects would amount to 0.32 acres of the flood-mapped areas of the Airport (**Figure A24**). These project areas occur within existing and actively used portions of the airfield, immediately surrounding and/or between existing paved surfaces (runways and taxiways). The proposed projects are similar in nature (airfield pavements) to existing paved surfaces, and these projects are fixed by function due to FAA airfield design standards (runway

[116] The stormwater detention system will be designed in accordance with FAA Advisory Circular (AC) 150/5300-13b, *Airport Design*, and FAA AC 150/5320-5D *Airport Drainage Design*. The proposed system would be designed to resist loading of the critical aircraft (737-800).

to taxiway separation). Therefore, there are no practicable alternate locations for these projects on the airfield.

Table 5-8: Acreage of Program Projects in Flood Mapped Areas

Program Project	1 Percent Annual Chance Flood (acres)	Encroachment
Project #2	0.08	No Encroachment, Existing Paved Surface
Project #6 (MSE wall)	0.004	Floodplain Encroachment – MSE Wall
Project #6 (including the bypass channel)	19.69	Temporary – Floodplain Balancing would Increase Flood Storage
Project #8	0.04	Floodplain Encroachment
Project #9	0.39	No Encroachment, Existing Paved Surface
Project #12	0.12	Floodplain Encroachment
Project #13	0.16	Floodplain Encroachment

The existing 1D steady flow HEC-RAS analysis completed by Walter P. Moore (**Appendix O.5**) for the Project #6 bypass channel has estimated a 0.03-foot impact within the floodplain. This impact and any additional impacts calculated for PEA Projects would be offset by soil removal (floodplain balancing) in uplands within the bypass channel (**Figure 2**/**Figure A16**), resulting in no net rise and no increase in the 1 percent annual chance flood elevation. As such, the floodplain changes would not contribute to the loss of human life, would not carry substantial encroachment costs, nor would it result in notable adverse impacts on floodplain values.

Details of Project #5's avoidance of the Cannon Branch was submitted to Prince William County on September 12, 2025, as this is the only part of the PEA Projects under their jurisdiction. Based on this consultation, Prince William County determined that no further floodplain studies are required (**Appendix E**) but that a Flood Hazard Use Permit must be filed prior to construction. The floodplain administrator for the remaining PEA Projects is the City of Manassas. The City of Manassas Engineering Department was contacted and provided a response on March 27, 2026, indicating the proposed development is consistent with the City's Comprehensive Plan and the HEF Master Plan and that floodplain impacts would need to comply with FEMA's National Flood Insurance Program requirements (**Appendix E**). Necessary Conditional Letter of Map Revisions (CLOMR) would be coordinated with FEMA when those details are available.

With the adherence to stormwater management criteria consistent with water quality protection provisions of 9VAC25-875-740 and 9VAC25-875-80 and -260 of the *Virginia Erosion and Stormwater Management Regulations*, in conjunction with following the approved SWPPP, SPCC, and ODCP plans, it is not anticipated the construction of these projects would significantly impact water resources in and around the Airport.

5.12.4 Summary of Water Resources Impacts

Multiple wetlands, surface waters and portions of floodplains occur within and surrounding the Alternative #2 projects. Impervious surfaces at the airport would increase, but as managed through the underground detention measures and the existing stormwater system, no impacts to water quality are anticipated in surface or groundwater. The elevation data of the public water supply wells suggests that there would be no effect to wells, as they are located west and uphill of the Airport boundary and the PEA projects.

The one percent annual chance floodplain impacts would occur immediately surrounding and/or between existing paved surfaces including runways and taxiways would be offset by floodplain balancing to ensure no net rise in floodplain elevations. All floodway impacts would be coordinated with Prince William County and City of Manassas to ensure their concurrence.

Per the pre-application meetings held with VADEQ and USACE (meeting minutes in **Appendix O.3**), the wetland and surface water impacts would be permitted under a USACE NWP or SPGP and a VADEQ IP. Specifically, three small, isolated herbaceous wetlands (Wetlands B, C, and D) would be permanently filled and would be permitted under the VADEQ IP. Credits would be purchased at a mitigation bank to offset the loss of 0.33 acres of wetland. An AJD would be required for these wetlands via the USACE. Two herbaceous wetlands (Wetlands I and X) would be temporarily impacted when overflow waters from Broad Run are diverted through it so that Broad Run maintains seasonal low-flow conditions during bridge work (Project #6). These impacts would be permitted under the VADEQ IP and would additionally be authorized under a USACE SPGP or NWP, depending on final impact amounts. The placement of dams and/or in-stream double-tees would be temporary impacts also authorized under the VADEQ IP and USACE SPGP or NWP. Specific conditions of these permits would allow for the aforementioned impacts and would outline the conditions required to generate no water quality issues, including but not limited to the previously discussed SWPPP, SPCC and ODCP plans, and the existing VPDES permit, etc. With the implementation of these permits and plans, no significant impacts to water resources are anticipated.

5.12.5 Reduction, Avoidance, and Minimization Measures

The wetland impacts that are proposed would occur in small, low quality wetland areas. As such, these wetlands provide minimal functions and values. Avoidance of the wetlands in these infield areas is not possible because pavement locations are fixed by function and/or no remaining areas that are void of wetlands occur that would allow separation from other pavements (runways and taxiways) subject to FAA design standards.

The impacts associated with the temporary installation of concrete double-tees (Project #6) are proposed to maintain water quality by allowing construction work to be physically separated from the streamflow. Further, no impacts would occur to the VDOT mitigation wetland site or the Ecological Core mapped area as water flow would not be interrupted. The flow diverted into the bypass channel would be the minimum necessary to adequately support maintenance of seasonal low-flow conditions in Broad Run.

Project #5 was designed specifically to avoid the floodplain of Cannon Branch. All other floodplain impacts were minimized as much as possible given the proximity of the Airport to Broad Run and would be offset by floodplain balancing

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6 Abbreviations/Acronyms

ACEIT	Airport Construction Emissions Inventory Tool
AC	Acreage
ACS	American Community Survey
ADA	Americans with Disabilities Act
ADG	Airport Design Group
AEDT	Aviation Environmental Design Tool
AFFF	Aqueous Film-Forming Foam
AJD	Approved Jurisdictional Determination
ALP	Airport Layout Plan
AP-42	Compilation of Air Pollutant Emission Factors
APE	Areas of Potential Effects
APU	Auxiliary Power Units
ARFF	Airport Rescue and Fire Fighting
AST	Aboveground Storage Tank
Avports	Afco Avports Management
BMP	Best Management Practices
BWI	Baltimore/Washington International Airport
C&D	Construction and Demolition
CAA	Clean Air Act
CBPA	Chesapeake Bay Preservation Act
CBRA	Coastal Barrier Resources Act
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CH_4	Methane
CHASP	Construction Health and Safety Plan
CLOMR	Conditional Letter of Map Revisions
CO	Carbon Monoxide
CO_2	Carbon Dioxide
CO_2e	Co_2 Equivalent
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	Decibels
dBA	Decibels weighted on the “A’ weighted scale
DCA	Ronald Reagan Washington National Airport
DDFS	Design Day Flight Schedule
DHR	Virginia Department of Historic Resources
DNH	Division of Natural Heritage
DNL	Day-Night Average Sound Level
DOT	Department of Transportation
e.g.	Exempli Gratia
EA	Environmental Assessment
EO	Executive Order
EPA	United States Environmental Protection Agency
ESA	Environmental Site Assessment
etc.	Et Cetera

FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
FR	Federal Register
ft	Foot/Feet
FTA	Federal Transit Administration
FPPA	Farmland Protection Policy Act
GA	General Aviation
GSE	Ground Support Equipment
HAAC	Historical, Architectural, Archaeological, and Cultural
HEF	Manassas Regional Airport
HUC	Hydrologic Unit Code
HVN	Tweed New Haven Airport
i.e.	Id Est
IAD	Dulles International Airport
IATA	International Air Transport Association
IP	Individual Permit
IPaC	Information, Planning and Consultation
ISO	International Standards Organization
L	Left
lbs	Pounds
LED	Light-Emitting Diode
LOS	Level of Service
LWCF	Land and Water Conservation Fund
MD	Maryland
MOVES	Motor Vehicle Emission Simulator
MSA	Magnuson Stevens Fishery Conservation and Management Act
MSE	Mechanically Stabilized Earth
N_2O	Nitrous Oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	Nitrogen Dioxide
NO_X	Nitrogen Oxides
NOAA	National Oceanic and Atmospheric Administration
NPIAS	National Plan of Integrated Airport Systems
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWP	Nationwide Permit
O_3	Ozone
ODCP	Oil Discharge Contingency Plan
PASA	Preservation Area Site Assessment
Pb	Lead
PCB	Polychlorinated Biphenyl

PEA	Programmatic Environmental Assessment
PFAS	Per- And Polyfluoroalkyl Substances
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PM_{10}	Coarse Particulate Matter
$PM_{2.5}$	Fine Particulate Matter
PPC	Pollution, Prevention and Contingency
R	Right
R/W	Runway
RCNM	Roadway Construction Noise Model
RCRA	Resource Conservation and Recovery Act
RIC	Richmond International Airport
RPA	Resource Protection Area
RPZ	Runway Protection Zone
SF	Square Foot
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SPCC	Spill Prevention Control and Countermeasures Plan
SPGP	State Programmatic General Permit
SRE	Snow Removal Equipment
SWPPP	Stormwater Pollution Prevention Plan
TBD	To Be Determined
T/W	Taxiway
TSA	Transportation Security Administration
US	United States
USACE	United States Army Corps of Engineers
U.S.C.	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tank
VA	Virginia
VADEQ	Virginia Department of Environmental Quality
VaFWIS	Virginia Department of Game and Inland Fisheries Information Tool
VDCR	Virginia Department of Conservation and Recreation
VDOT	Virginia Department of Transportation
VMT	Vehicle Miles Traveled
VOC	Volatile Organic Compounds
VPDES	Virginia Pollution Discharge Elimination System
VRE	Virginia Railway Express
VPH	Vehicles Per Hour

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Appendices

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Appendix B: PEA Tier 1 and 2 Projects
Appendix C: Project #6 Construction Methods and Coordination
Appendix D: HEF PEA Planning White Paper
Appendix E: Agency Consultation
Appendix F: Primary Statutes, Regulations, Laws and EOs related to Environmental Resource Categories
Appendix G: Air Quality Technical Report
Appendix H: Traffic Impact Study
Appendix I: Biological Resources Documents

1. Regulatory Summary
2. Habitat Assessment Report
3. Mussel Survey Approval and Survey Plan
4. Mussel Survey Report
5. Determination Key for Tricolored Bat
6. Mussel Flow Report

Appendix J: Coastal Zone Management Act Federal Consistency Certification Checklist
Appendix K: Phase I Environmental Site Assessment
Appendix L: Historical, Architectural, Archaeological, and Cultural Resources Documents

1. Avion Solutions Group, LLC October 27, 2025, Response to DHR's August 28, 2025, Comments
2. Section 106 Technical Report with Project Review Application Form and Cultural Resources Due Diligence Report
3. Part 139 Certification Viewshed Summary

Appendix M: Land Use Report
Appendix N: Noise Technical Report
Appendix O: Water Resources Documents

1. Wetland and Stream Delineation Report
2. Regulatory Summary
3. Pre-Application Meeting with USACE and VADEQ – Meeting Minutes
4. Mitigation Bank Credits
5. Impact Minimization Memorandum

Appendix P: Summary of Resource Category Reduction, Avoidance, and Minimization Measures
Appendix Q: Public Involvement
Appendix R: Preparers

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